



EUROPEAN COMMISSION
DG Competition

CASE M.7932 – Dow/DuPont

(Only the English text is authentic)

MERGER PROCEDURE REGULATION (EC) 139/2004

Article 8(2) Regulation (EC) 139/2004

Date: 27.3.2017

This is a provisional non-confidential version. The redactions included in this text have not yet been accepted by the Commission. The assessment of the redactions claimed by the Parties to the transaction and included in this provisional non-confidential version is ongoing. A final non-confidential version will be published in due course

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Parts of this text have been edited to ensure that confidential information is not disclosed; those parts are enclosed in square brackets.



Brussels, 27.3.2017
C(2017) 1946 final

Public version

COMMISSION DECISION

of 27.3.2017

**declaring a concentration to be compatible with the internal market and the EEA
Agreement (Case M.7932 – Dow/DuPont)**

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declaring a concentration to be compatible with the internal market and the EEA Agreement (Case M.7932 – Dow/DuPont)

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THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to the Agreement on the European Economic Area, and in particular Article 57 thereof,

Having regard to Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings¹, and in particular Article 8(2) thereof,

Having regard to the Commission's decision of 11 August 2016 to initiate proceedings in this case,

Having given the undertakings concerned the opportunity to make known their views on the objections raised by the Commission,

Having regard to the opinion of the Advisory Committee on Concentrations²,

Having regard to the final report of the Hearing Officer in this case³,

Whereas:

SECTION I: INTRODUCTION

- (1) On 22 June 2016, the Commission received a notification of a proposed concentration pursuant to Article 4 of Council Regulation (EC) No 139/2004⁴ ("the Merger Regulation") by which The Dow Chemical Company ("Dow", United States, ("US")), the ultimate parent company of the undertaking comprising the Dow group, and E.I. du Pont de Nemours and Company ("DuPont", US), the ultimate parent company of the undertaking comprising the DuPont group, enter into a full merger within the meaning of Article 3(1)(a) of the Merger Regulation by way of an Agreement and Plan of Merger of 11 December 2015 ("the Transaction"). Dow and DuPont are collectively referred to in this Decision as "the Parties", whilst the

¹ OJ L 24, 29.1.2004, p. 1. With effect from 1 December 2009, the Treaty on the Functioning of the European Union ("TFEU") introduced certain changes, such as the replacement of "Community" by "Union" and "common market" by "internal market". The terminology of the TFEU will be used throughout this Decision.

² OJ C200. , p....

³ OJ C200. , p....

⁴ OJ L 24, 29.1.2004, page 1.

undertaking that would result from the Transaction is referred to as "the merged entity".

- (2) **Dow** is a diversified chemicals company with its headquarters in the US. It is active in plastics and chemicals, agricultural sciences, and hydrocarbon and energy products and services. In 2014, Dow generated global sales of approximately EUR 46 billion.
- (3) **DuPont** is also a diversified company with its headquarters in the US. It produces a variety of chemical products, polymers, agro-chemicals, seeds, food ingredients, and other materials. In 2014, DuPont generated global sales of approximately EUR 21 billion.

SECTION II: THE OPERATION AND THE CONCENTRATION

- (4) On 11 December 2015, Dow and DuPont announced a “merger of equals”. The merged entity would have a market capitalisation of approximately USD 130 billion. At a later stage, Dow and DuPont intend to create from their combined activities three separate publicly traded companies focusing on agriculture, material science and specialty products respectively.
- (5) In agriculture, the merged entity would become the number 1 global integrated crop protection and seeds player, the number 2 global seeds player (number 1 in the European Economic Area (EEA) with a small increment from Dow).
- (6) Dow and DuPont announced that the Transaction would create around USD 3 billion in cost synergies, with potential growth synergies of USD 1 billion.⁵

Figure 1 - Three planned spin-offs from the Dow/DuPont merger



Source: Public announcement of the Dow/DuPont agreement, 11 December 2015

- (7) The Transaction constitutes a concentration within the meaning of Article 3(1)(a) of the Merger Regulation.
- (8) The Transaction is also notifiable in more than [...] other jurisdictions.

SECTION III: UNION DIMENSION

- (9) The undertakings concerned have a combined aggregate world-wide turnover of more than EUR 5 000 million⁶ [Dow: EUR 45 654 million; DuPont: EUR 21 382 million⁷]. Each of them has an aggregate Union-wide turnover in excess

⁵ Dow DuPont's investor presentation, dated 11 December 2015.

⁶ Turnover calculated in accordance with Article 5 of the Merger Regulation and Section C of the Commission Consolidated Jurisdictional Notice (OJ C 95, 16.4.2008, page 1).

⁷ 2015 figures: Dow: EUR 45 592 million; DuPont: EUR 22 589 million.

of EUR 250 million [Dow: EUR [...]; DuPont: EUR [...]⁸], but they do not achieve more than two-thirds of their aggregate Union-wide turnover within one and the same Member State.

- (10) The Transaction therefore has a Union dimension pursuant to Article 1(2) of the Merger Regulation.

SECTION IV: THE PROCEDURE

1. COMMISSION'S PROCEDURE

- (11) [Date], the Parties informed the Commission of the planned notification of the Transaction by filing a case allocation request.
- (12) [Date], the initial meeting between the Commission and the Parties took place. A number of subsequent meetings between the Commission and the Parties took place during the pre-notification stage, in particular [dates].
- (13) [Date] the Parties submitted the first draft of the Form CO to the Commission in several parts.⁹
- (14) [Date], the Parties submitted the second draft of the Form CO to the Commission.
- (15) During the Phase I investigation the Commission contacted a large number of market participants (mainly customers of the Parties, competitors, stakeholders), requesting information through electronic questionnaires, telephone calls and written requests for information pursuant to Article 11 of the Merger Regulation.
- (16) In addition, the Commission also sent several written requests for information to the Parties and reviewed internal documents of the Parties submitted during the Phase I investigation.
- (17) On 20 July 2016, the Parties submitted five sets of commitments which consisted of the Herbicide Remedy, Insecticide Remedy, Genome Editing Remedy, Acid Co-Polymer Remedy, and Ionomers Remedy. Those commitments were not market tested.
- (18) On 11 August 2016, the Commission found that the Transaction raised serious doubts as to its compatibility with the internal market and the EEA Agreement and adopted a decision to initiate proceedings pursuant to Article 6(1)(c) of the Merger Regulation ("the Article 6(1)(c) Decision").
- (19) The Article 6(1)(c) Decision raised serious doubts in relation to (i) Agriculture: selective herbicides targeting broadleaf weeds, most prominently in relation to cereals but also in relation to other crops; insecticides targeting chewing insects notably for specialty crops (grapes/vines, fruits and nuts, vegetables, and some further sub-segments like citrus, pome and stone fruit, strawberries, tomatoes), as well as corn/maize; innovation in crop protection; gene editing technologies; bundling; and (ii) Material Science: acid co-polymers; ionomers.
- (20) The Article 6(1)(c) Decision also highlighted areas for further investigation, such as (i) Agriculture: insecticides for other crops, such as oilseed rape, as well as broad-

⁸ 2015 figures: Dow: EUR [...]; DuPont: EUR [...].

⁹ The sections of the first draft of the Form CO were provided in particular [...].

spectrum insecticides and targeting sucking pests; nematicides; fungicides; licensing and supply of active ingredients; technical tying; (ii) Material Science: vertical link involving glacial methacrylic acid ("GMA") and ethylene/n-butyl acrylate/glycidyl methacrylate ("E/nBA/GMA") ter-polymer; vertical link involving Polyolefin elastomers ("POE") and maleic anhydride ("MAH")/POE; and (iii) Specialty products: vertical link involving DuPont's activities in 248 photoresist polymers and Dow's activities in 248nm photoresists to assess the risk of input foreclosure.

- (21) The Article 6(1)(c) Decision also found that the commitments proposed by the Parties on 20 July 2016 were not sufficient to eliminate the Commission's serious doubts as to the compatibility of the Transaction with the internal market, for the reasons described in that decision.
- (22) On 12 August 2016, the Commission provided non-confidential versions of certain key submissions of third parties collected during the Phase I investigation to the Parties.
- (23) On 26 August 2016, the Parties submitted their written comments on the Article 6(1)(c) Decision ("the response to the Article 6(1)(c) Decision").
- (24) [Date], following the Parties' response to the Article 6(1)(c) Decision, a State of Play meeting took place between the Commission and the Parties.
- (25) During the Phase II investigation, the Commission sent more than 40 requests for information to the Parties. The Commission obtained and analysed substantial amount of information from the Parties, including internal documents, third party industry reports and submissions.
- (26) The Commission also sent a number of requests for information to competitors, customers of the Parties, and other stakeholders. The Commission conducted further calls and meetings with some market participants, including customers, competitors of the Parties and other stakeholders such as technical institutes.
- (27) On 2 September 2016, the merger review time period was extended by 10 working days following the Parties' request pursuant to Article 10(3) of the Merger Regulation.
- (28) [Date], the Commission adopted two decisions pursuant to Article 11(3) of the Merger Regulation suspending the merger review time limit due to the failure of the Parties to provide certain requested documents. The first suspension lasted from 1 September 2016 until 26 September 2016 and the second from 13 October 2016 until 7 November 2016, when the requested documents were provided.
- (29) [Date], the Commission informed the Parties of the preliminary results of the Phase II investigation during a formal State of Play meeting.
- (30) A Statement of Objections addressed to the Parties was adopted on 7 December 2016. Access to file was given to the Parties via DVD-ROMs on 8 December 2016, followed by access to confidential quantitative and qualitative information in a data room on 14, 15 and 16 December 2016. On 22 December 2016 and 6 January 2017, the Parties were given additional access to the confidential version of their data room reports at the Commission's premises, where they prepared a new confidential version of their data room reports as well as confidential annexes that supplemented their written response to the Statement of Objections. Access to file was subsequently given to the Parties via encrypted emails on

20 December 2016, 6 January 2017, 23 January 2017, 2, 15 and 16 February 2017 and 2, 10 and 13 March 2017.

- (31) The Parties replied to the Statement of Objections on 21 December 2016 (“the response to the Statement of Objections”). [Date], following additional access to the data room, each Party submitted a supplemental response to the Statement of Objections based on the confidential information contained in the data room. These two supplemental responses to the Statement of Objections were put on the Commission's file.
- (32) An oral hearing took place on 9 January 2017.
- (33) On 20 January 2017, the Commission, with the agreement of the Parties, extended the merger review time period by additional 10 working days pursuant to Article 10(3) of the Merger Regulation.
- (34) On 20 January 2017, the Commission sent the first Letter of Facts to the Parties, who replied on 30 January 2017 (the “response to the first Letter of Facts”).
- (35) On 1 February 2017, the Commission sent the second Letter of Facts to the Parties, who replied on 6 February 2017 (the “response to the second Letter of Facts”).
- (36) In order to address the competition concerns identified in the Statement of Objections, the Parties submitted commitments on 7 February 2017. Consequently, the period for the adoption of a final Decision was extended by 15 working days pursuant to Article 10(3) of the Merger Regulation.
- (37) The Commission launched a market test of those commitments on 8 February 2017. The Parties submitted final commitments on 17 February 2017.¹⁰
- (38) [...].
- (39) The meeting of the Advisory Committee took place on 14 March 2017.
- (40) The Hearing Officer issued his final report on 16 March 2017.

2. PROCEDURAL ISSUES

- (41) During its review of the Transaction, including the pre-notification stage, the Commission encountered a number of procedural issues which made it more difficult to conduct an efficient and effective investigation.
 - (42) The main of those issues are described in this Section IV.2. Those issues are important for understanding the way in which the Commission interpreted specific evidence in its substantive assessment and the reasons for certain procedural measures that the Commission had to take in order to ensure the integrity of its investigation of the Transaction.
- ### **2.1. Requests for information and exchanges with the Parties in order to obtain information necessary for the Commission’s investigation and assessment**
- (43) In its assessment of mergers the Commission routinely relies on internal documents that undertakings prepare in the ordinary course of business. Those documents allow the Commission to gain a quicker and better insight into the relevant markets as viewed by the market participants themselves.

¹⁰ The Parties submitted a Corrigendum to the Crop Protection Final Commitments [date].

- (44) Internal documents can prove to be an especially useful source of evidence in relation to specific areas of investigation. For example, they often allow the Commission to verify factual claims made by the parties and verify data they submit. Internal documents are frequently crucial to understand the factors which affect the incentives of the parties before and after the proposed merger.
- (45) Undertakings are well aware of the importance of internal documents as a source of evidence which is likely to be requested by competition authorities during a merger review.
- (46) In attributing the probative value to specific internal documents, the Commission takes into account the timing and context in which they were prepared. In particular, internal documents prepared in the ordinary course of business, for example before the proposed merger was agreed upon or without the knowledge of the preliminary competition concerns, may have higher probative value than internal documents prepared for the Commission or influenced by the Commission's review of the proposed merger. Indeed, the former type of internal documents usually reflects the information objectively and independently of the merger control procedure.
- (47) [Details on internal documents requests].
- (48) [Details on internal documents requests].
- (49) In this Decision, the Parties' internal documents have also played a key role in the Commission's assessment. They were useful for assessing the impact of the Transaction in practically all of the relevant markets mentioned in this Decision, as well as in the relevant markets in which no concerns have been raised precisely due to the evidence found in internal documents.
- (50) [Details on internal documents requests].
- 2.1.1. *[Information on internal documents for the analysis of competitive interaction]*
- (51) [Information on internal documents for the analysis of competitive interaction].
- (52) [Information on internal documents for the analysis of competitive interaction].
- (53) [Information on internal documents for the analysis of competitive interaction].
- (54) [Information on internal documents for the analysis of competitive interaction].^{11,12}
- (55) [Information on internal documents for the analysis of competitive interaction].^{13,14}
- (56) [Information on internal documents for the analysis of competitive interaction].¹⁵
- (57) [Information on internal documents for the analysis of competitive interaction].¹⁶
- (58) [Information on internal documents for the analysis of competitive interaction].
- (59) [Information on internal documents for the analysis of competitive interaction].
- (60) [Information on internal documents for the analysis of competitive interaction].

¹¹ [...].

¹² [Internal document] (ID6696-3172).

¹³ [...].

¹⁴ [Internal document] (ID6696-3172).

¹⁵ [Internal document] (ID6696-3172).

¹⁶ [Internal document] (ID6696-3172).

2.1.2. *[Details on internal documents requests]*

(61) [Details on internal documents requests].

(62) [Details on internal documents requests]^{17,18}.

(63) [Details on internal documents requests].

2.2. Delays in providing information and integrity of investigation

(64) Another area of procedural issues in this Decision concerned the delays in the provision of information and documents by the Parties which led the Commission to take measures to protect the integrity of its investigation, as described in this section.

2.2.1. *Delayed submission of internal documents and third party reports during the pre-notification phase*

(65) During the pre-notification phase, the Parties repeatedly provided the requested internal documents and third party reports with significant delays.

(66) [Date], the Parties submitted to the Commission internal documents which they had previously provided to the US Department of Justice ("DoJ") under items 4(c) and 4(d) of the Hart-Scott-Rodino Form ("4(c) and 4(d) documents"). The number of those submitted documents was [...].

(67) [Date], the Commission held an initial meeting with the Parties, where they presented a general overview of the Transaction and areas concerned.

(68) During that meeting, the Commission asked the Parties to provide their internal documents and third party competitive intelligence documents as early in the process as possible.¹⁹ The Commission explained that this was important in order to understand the relevant markets quickly and in a way as viewed by the Parties in the ordinary course of business and by other industry experts.²⁰ As a starting point, the Commission suggested that the Parties provide the industry reports and supporting internal documents on which the Briefing Paper of [date] was based since those would be readily available to the Parties.²¹

(69) [Date], the Commission held a second pre-notification meeting with the Parties, who provided an introduction to the areas of Crop Protection (including R&D) and Material Science. At that meeting, the Commission reiterated that the Parties' internal documents and third party reports would be a key source of evidence that would have to be produced quickly in order to facilitate the Commission's review of the Transaction.

¹⁷ [Internal document] (ID6143-8496).

¹⁸ [Internal document] (ID7829-12008).

¹⁹ In line with the Commission's Best Practices on the conduct of EU merger proceedings, one of the goals of the pre-notification contacts is "*to discuss issues such as the scope of the information to be submitted and to prepare for the upcoming investigation*" (paragraph 6).

²⁰ According to the Commission's Best Practices on the conduct of EU merger proceedings, "*DG Competition recommends that notifying parties should, as early as possible in pre-notification, submit internal documents such as board presentations, surveys, analyses, reports and studies discussing the proposed concentration, the economic rationale for the concentration and competitive significance or the market context in which it takes place. Such documents provide DG Competition with an early and informed view of the transaction and its potential competitive impact and can thus allow for a productive discussion and finalisation of the Form CO*" (paragraph 17).

²¹ Parties' submission entitled [...].

- (70) [Details on requests for information/documents]^{22,23}.
- (71) [Details on requests for information/documents].²⁴
- (72) [Details on requests for information/documents]²⁵.
- (73) [Details on requests for information/documents].
- (74) [Details on requests for information/documents].
- (75) [Details on requests for information/documents].^{26,27}
- (76) [Details on requests for information/documents].
- (a) [...].²⁸
- (b) [...].
- (c) [...].
- (77) The Commission consistently reminded the Parties of the importance of providing internal documents and industry reports as early as possible. [Details on internal documents requests].²⁹
- (78) In their response to the Statement of Objections, the Parties argue that [...] ^{30,31,32}. The Parties also confirm [...] ^{33,34}.
- (79) The Commission notes that it is often unavoidable to have an intensive pre-notification stage with extensive information requests in a case of a comparable scope and complexity. [Details on procedure].
- (80) In particular, the Commission notes that it first requested the relevant internal and third party documents from the Parties in [...]. [Details on internal documents requests]. For example, in two months since the Commission's request for internal documents in RFI 1 DuPont produced [...] such documents (see recital (74)). The Commission notes that while the Parties submitted to the Commission the 4(c) and 4(d) documents in [...], those documents were much more limited in scope³⁵ and number³⁶ than those requested by the Commission.
- (81) The internal documents and third party reports eventually obtained by the Commission have been some of the key sources of evidence in this Decision. Given the size and complexity of the case, the delayed submission of those documents and

²² [Communication with the Commission] (ID28).

²³ [Communication with the Commission] (ID34).

²⁴ Commission's request for information RFI 1, questions 12-19.

²⁵ [Communication with the Commission] (ID82).

²⁶ [Details on internal documents requests].

²⁷ [Details on internal documents requests].

²⁸ Form CO, part B.II, paragraph 60 and Annex B.II.07.

²⁹ E-mail from the Commission to the Parties, [date] (ID1210).

³⁰ Parties' response to the Statement of Objections, paragraph 1212.

³¹ Parties' response to the Statement of Objections, paragraph 1211.

³² Parties' response to the Statement of Objections, paragraphs 1217-1218.

³³ Parties' response to the Statement of Objections, paragraphs 1219.

³⁴ Parties' response to the Statement of Objections, paragraphs 1220.

³⁵ Besides being US-focussed, another limitation of the 4(c) and 4(d) documents was that they were prepared specifically in relation to the Transaction, whereas the Commission's request was broader covering the industry, relevant markets, and the Parties' activities.

³⁶ The US 4(c) and 4(d) documents provided to the Commission [date] totalled [...].

reports in the pre-notification phase made the Commission's review of the Transaction significantly more time-consuming and difficult.

(82) Also, contrary to the Parties' claim, elements requested in pre-notification requests for information were not provided at the time of notification (see for example Section V.2.2.2 on the market share methodology, Section V.2.2.3 on patent data and Section 2.1 of Annex 2 on data necessary to assess the Parties' submissions on generics).

(83) Based on Section 2.2.1, the Commission considers that the production of documents by the Parties during the pre-notification phase was delayed in several instances which complicated the Commission's review of the Transaction.

2.2.2. *Delayed submission of data and methodology used for the computation of market shares provided in the Form CO*

(84) Market shares provide a useful first indication of the market structure and the competitive importance of market players. Before relying on market shares, it is essential for the Commission to verify the reliability of the sources and methodology used for their computation.

(85) As from the pre-notification stage and during part of the Phase I investigation, the Commission and the Parties had numerous and extensive discussions regarding the data and the methodology used by the Parties for the computation of market shares for crop protection markets, as well as regarding the various results obtained through this process.

(86) In that context, the Commission issued several requests for information partly or entirely devoted to issues related to market shares (see Section 2.1 of Annex 3). Also other exchanges took place, in particular by emails and in conference calls.

(87) The methodology note attached to the Form CO of 22 June 2016 provided limited information on the Parties' data and methodology used for the computation of markets shares provided in the Form CO (see Annex 3),³⁷ in particular in light of the importance of market shares in this case with, potentially, hundreds of affected relevant (downstream) markets for crop protection formulated products.

(88) In response to the requests for information sent by the Commission, the Parties provided, [date], details on the data sources used for each market as well as an updated methodology note reflecting the different calculations and assumptions made when data was available and when data was not available to them.³⁸

(89) [Date], the Parties provided details on the methodology used for the allocation of products across the various segments, for, respectively, herbicides and insecticides,³⁹ and fungicides.⁴⁰

(90) [Date], the Parties completed their response to question 1 of the Commission's request for information RFI 16,⁴¹ [date], by submitting a spreadsheet that, according

³⁷ Annex 3, Section 2.

³⁸ Parties' response to the Commission's request for information [date] (ID5025 and ID5026).

³⁹ Parties' response to the Commission's request for information [date], question 5, for herbicides (ID4897) and insecticides (ID4896).

⁴⁰ Parties' response to the Commission's request for information [date], question 5, for fungicides (ID5114).

⁴¹ Parties' response to the Commission's request for information [date], question 1 (ID5157).

to the Parties' additional methodology explanations submitted [date], was necessary to compute market shares for fungicides formulated products.

- (91) [Details on communication regarding market share methodology].
- (92) In responding to the Commission's request to "*provide an updated methodology note [...] explaining in detail the preparation of all global data and indicating sources for their respective data point, year, unit*",⁴² the Parties indicated that they [...].⁴³ In their response to the Statement of Objections, the Parties indicate that [details on communication regarding market share methodology].⁴⁴
- (93) [Details on communication regarding market share methodology].
- (94) The Commission also notes that, as explained in Section 2.6 of Annex 3, the decision to use Agrowin data was taken by the Commission in light of the limited information provided at the time of notification on the data and methodology used for the purpose of calculating markets shares in the Form CO, [details on communication regarding market share methodology].
- (95) Overall, [details on communication regarding market share methodology].

2.2.3. *Provision of access to patent data and databases during the pre-notification and formal investigation*

- (96) Given that one of the central areas of the Commission's investigation was the impact of the Transaction on innovation, access to patent data was of key importance for the Commission to evaluate the innovation strength of the relevant players. Nevertheless, the Commission encountered significant difficulties in collecting patent data from the Parties, despite them using such data in the ordinary course of business.
- (97) The Commission notes that the Parties did not mention their internal databases on crop protection patents and did not provide their competitive intelligence reports on competitors' crop protection patents in their responses to several initial Commission's requests for information. Annex 1 on patent analysis describes in detail the Commission's requests for information where information on patents was asked from the Parties.
- (98) [Date], Dow finally submitted its patent database in response to the Commission's request for information RFI 42 [date].⁴⁵ Also DuPont provided a database on its patents as a response to the Commission's request for information RFI 42.⁴⁶
- (99) The Commission notes that the Parties had several earlier opportunities to submit their patent databases, as well as the relevant competitive intelligence reports, on crop protection patents (Commission's requests for information RFI 1, RFI 5, RFI 9, RFI 32). In addition, the Commission's requests for information RFI 13, RFI 17, and RFI 26, while focusing on data used [details on the content of the Commission's RFI], were also opportunities for the Parties to mention their internal databases on crop protection patents and the relevant competitive intelligence reports.

⁴² Commission's request for information [date], question 2, reiterating question 2 of the Commission's request for information RFI 16.

⁴³ Parties' response to the Commission's request for information [date], question 2 (reiterating question 2 of RFI 16), [date] (ID5025).

⁴⁴ Parties' response to the Statement of Objections, paragraphs 1227-1228.

⁴⁵ [Internal documents].

⁴⁶ [Internal document].

- (100) In their response to the Statement of Objections, the Parties argue that they provided patent data when specifically requested by the Commission during the pre-notification phase, and mention for example the submission [...], requested in question 4 of the Commission's request for information RFI 10.⁴⁷ However, the Commission notes that these [...] are not raw data, which were available to [...]⁴⁸ and were not mentioned in response to the Commission's requests for information during the pre-notification phase. As regards [...], the Parties did not provide any comment in the response to the Statement of Objections on the delay to provide access to its patent data.
- (101) The Commission also notes that the Parties did not provide at least one competitive intelligence report on crop protection patents. Indeed, this specific report was provided to the Commission by the DoJ.⁴⁹
- (102) Access to patent databases and patent data has been fundamental for the Commission's assessment of the innovation strengths of crop protection players, as described in detail in Section V.8.7.2.1 and Annex 1 on patent analysis.
- 2.2.4. *Delayed provision of economic data underlying economic analysis during the formal investigation*
- (103) The Parties submitted several economic analyses aimed at assessing the competitive constraint brought by generic products on their own products as well as the switching of customers between Dow and DuPont.
- (104) Most of the time the Parties did not provide the underlying data and methodology together with their economic analyses, as required by DG Competition Best Practices for the submission of economic evidence,⁵⁰ but submitted those only as the result of separate Commission's request for information.
- (105) By way of example, the Parties submitted an economic annex purporting to show that they are not close competitors in their response to the Article 6(1)(c) Decision on [...]. The underlying data and code were provided by the Parties only in response to the Commission's request for information RFI 44 on [...], [...] after the submission of the economic analysis.
- (106) Other instances of the delayed submissions of economic data and methodology, which the Commission had to pro-actively request, are described in Section 2.1 of Annex 2 on generics and in Section 2 of Annex 6 on switching.
- (107) The economic data and methodology mentioned in recitals (84) to (102) were essential for the Commission to verify the conclusions reached by the Parties in their economic analyses.

⁴⁷ Parties' response to the Statement of Objections, paragraphs 1230-1231.

⁴⁸ See Annex 1 on patent analysis.

⁴⁹ [Internal document] (ID7973-17).

⁵⁰ DG Competition Best Practices for the submission of economic evidence, accessible at http://ec.europa.eu/competition/antitrust/legislation/best_practices_submission_en.pdf. See in particular paragraph 46: "[w]here economic submissions rely on quantitative data the parties should provide the data and codes timely, in an appropriate format and in accordance with the criteria laid down in section 3 of this document. In particular, the absence of all the necessary elements needed for replication and assessment of an economic submission can constitute grounds for not taking it further into consideration".

2.2.5. *Need to adopt two Article 11(3) Decisions in Phase II to preserve the integrity of the Commission investigation*

- (108) In light of several instances of delayed submission of the requested information by the Parties in pre-notification and Phase I, at the start of the Phase II investigation,⁵¹ the Commission reminded the Parties that during Phase II it was particularly important to provide responses to the Commission's requests for information in a timely and complete manner.
- (109) Nevertheless, also in Phase II there were instances where the Parties failed to provide certain documents in full within the (extended) deadline. To preserve the integrity of the investigation, the Commission had to adopt two decisions pursuant to Article 11(3) of the Merger Regulation suspending the merger review time limit (the "Article 11(3) Decisions"), as described in the next two sections.

2.2.5.1. First Article 11(3) Decision of [...]

- (110) The first Article 11(3) Decision was adopted by the Commission due to the Parties' failure to provide, in full or partially, several thousands of internal documents in response to three Commission's requests for information within the deadline.
- (111) Those internal documents were requested by the Commission during the Phase II investigation through the Commission's requests for information RFI 35, RFI 36 and RFI 37 [date]. Those requests for information asked *inter alia* for the Parties' internal documents – on the basis of specified search terms, custodians and time range – regarding [details on the content of internal documents requests], which were all important areas of the Commission's investigation.
- (112) Following the Parties' request, the Commission extended the deadline for response to the Commission's request for information RFI 35 from the initial [...] working days to [...] working days, to the Commission's request for information RFI 36 from the initial [...] working days to [...] working days, and to the Commission's request for information RFI 37 from the initial [...] working days to [...] working days. No further extensions of the deadline were asked by the Parties.
- (113) Following additional requests by the Parties, the Commission also agreed to several amendments to the relevant requests for information, notably by narrowing the timeframe of the e-mails search (for the Commission's request for information RFI 35), reducing the number of custodians (for the Commission's requests for information RFI 35 and RFI 36) and accepting an approach avoiding the need for manual screening of the documents to determine whether they fall within the scope of the request (for the Commission's request for information RFI 37).
- (114) The Commission considers that the extended deadline granted to the Parties of [...] working days (for Commission's request for information RFI 37) and [...] working days (Commission's requests for information RFI 35 and RFI 36) was sufficient to produce the requested internal documents. This is based on the estimate of [...] to [...] working days required to extract the responsive documents from the custodians. This period could have been even shorter if the documents of some custodians were covered under the Second Request of the DoJ and their documents had already been extracted. The remaining [...] to [...] days would be used for screening the extracted

⁵¹ For example, at the state-of-play meeting [date] after the Parties' response to the Commission's Article 6(1)(c) Decision.

documents for LPP, which is usually first done automatically based on key words or authors and then manually with the assistance of contracted outside lawyers or paralegals. These estimates are based on the Commission's experience in other merger review proceedings which involved extensive production of internal documents.

- (115) [Date], the Parties provided a partial response to the Commission's request for information RFI 37 but also indicated that they had to review whether other potentially responsive documents are covered by LPP under US law. [Date] (the extended deadline for a complete response to the Commission's requests for information RFI 35 and RFI 36), the Parties indicated that they were not in a position to provide a response to the Commission's requests for information RFI 35 and RFI 36, for the same reasons.
- (116) The Parties informed the Commission that they might be in a position to submit their responses on [date] or at the latest on [date]. Subsequently the Parties specified to the Commission that they should be able to submit a complete set of all responsive documents to all requests for information on [date] at the earliest.
- (117) In order not to compromise its investigation, [date] the Commission adopted an Article 11(3) Decision suspending the merger review time limit from 1 September 2016 (the extended deadline for the response to the Commission's request for information RFI 37) until the receipt of the complete and correct response.
- (118) [Date], the Parties submitted their internal documents in response to the Commission's requests for information RFI 35, RFI 36, and RFI 37, as well as to the Commission's request for information RFI 43. Together with their submissions, the Parties provided privilege logs listing the documents for which they claimed LPP. [Details on LPP documents].
- (119) Upon the examination of the privilege logs, it became apparent to the Commission that in producing internal documents the Parties seemed to have applied a deficient methodology which had resulted in an overly broad definition of documents covered by LPP. This was despite the fact that the definition of categories of documents covered by LPP was explicitly set out in the relevant requests for information. The Commission communicated to the Parties its concerns regarding incomplete provision of responsive documents by e-mail on [date]⁵² and in a telephone call on [date].
- (120) [Date] the Parties provided the updated submissions of internal documents in response to the Commission's requests for information RFI 35, RFI 36, RFI 37 and RFI 43. [Details on LPP documents].
- (121) After its review of the Parties' submissions, the Commission reverted to the Parties [date]⁵³ requesting them to double-check the LPP coverage for around [...] documents of Dow and [...] documents of DuPont.
- (122) [Date], Dow produced additional [...] documents in their entirety and [...] documents in a partially redacted form. [Date], DuPont produced [...] additional documents in their entirety and [...] in a partially redacted form.

⁵² E-mail from the Commission to the Parties, [date] (ID6881).

⁵³ E-mail from the Commission to the Parties, [date] (ID7231).

- (123) It would appear therefore that the Parties' initial LPP claims in the context of the provision of internal documents in response to the Commission's requests for information RFI 35, RFI 36, RFI 37 and RFI 43 were overly broad. It required the Commission to intervene and spend considerable time and efforts in order to ensure that [details on the content of internal documents requests] of responsive internal documents were not unduly withheld under the pretext of LPP.
- (124) The Commission decided to end the suspension of the time limit for merger review imposed by the first Article 11(3) Decision from 26 September 2016 when the majority of internal documents were provided by the Parties, despite the fact that certain additional responsive document were submitted [...] days later, on [date].
- 2.2.5.2. Second Article 11(3) Decision of [...]
- (125) The second Article 11(3) Decision was adopted by the Commission in light of the failure of the Parties' to submit [...].
- (126) [Details on internal documents]. It constitutes important evidence for assessing competitive interaction between different crop protection products (see Sections V.6.3 to V.6.6 on crop protection).
- (127) [Information on internal documents for the analysis of competitive interaction].
- (128) [Information on internal documents for the analysis of competitive interaction].
- (129) The Commission first became aware that [information on internal documents for the analysis of competitive interaction] only during the Phase II investigation. In particular, the Commission identified [information on internal documents for the analysis of competitive interaction].⁵⁴
- (130) After discovery of the first [type of internal document], the Commission requested from the Parties other [type of internal documents] by way of simple requests for information.⁵⁵ Following the Parties' replies, the Commission still had concerns that the Parties had not provided all [type of internal documents].
- (131) To preserve the integrity of its investigation, the Commission considered it necessary to require the Parties, by way of a decision pursuant to Article 11(3) Decision of [...], to supply [type of internal documents], pending which the merger review time period was suspended from 13 October 2016.
- (132) The Parties replied to the second Article 11(3) Decision on [...], following which the merger review period was re-started. With its response, the Parties submitted [number of internal documents].

2.3. Conclusion on the procedural issues

- (133) To sum up, the Commission considers that the Parties' conduct made the Commission's investigation and assessment of the Transaction more difficult. [...].

3. FRAMEWORK OF THE ASSESSMENT

- (134) The Commission is aware that other concentrations are currently planned in the agrochemical industry, potentially affecting the same markets where the Parties are active.

⁵⁴ For further details, see the Article 11(3) Decision of [...].

⁵⁵ Commission's requests for information RFI 49 and RFI 58.

- (135) In particular on 23 September 2016 (that is, after the notification of the Transaction), ChemChina, an undertaking active among others in crop protection, notified to the Commission its proposed acquisition of Syngenta.⁵⁶ At the time of the adoption of this Decision, the Commission's review of ChemChina's acquisition of Syngenta is still ongoing. Also, it has been reported in the press that Bayer reached an agreement to acquire Monsanto, both companies being important players in the agrochemical industry; this planned concentration has not yet been notified to the Commission.
- (136) Consistent with its previous practice, the Commission assessed the Transaction according to a priority principle ("first come, first served" approach) based on the date of notification.⁵⁷
- (137) It should be recalled that assessing the competitive effects of a proposed transaction under the Merger Regulation involves a comparison of the competitive conditions that would result from the notified merger with the conditions that would have prevailed in absence of the merger. The competitive conditions existing at the time of notification constitute, as a general rule, the relevant framework for evaluating the effects of a transaction.⁵⁸ However, in some circumstances the Commission may take into account future changes to the market that can reasonably be predicted.
- (138) The Commission considers from these principles and the general scheme of the Merger Regulation that a party that is the first to notify a transaction should have it assessed on its own merits as to whether it would significantly impede effective competition in the internal market or in a substantial part thereof. This first to notify a transaction should therefore be entitled to have its operation decided first (for example, declared compatible with the internal market) within the applicable time limits of the Merger Regulation. It is therefore not necessary or appropriate to take into account future changes to the market conditions resulting from subsequently notified transactions that require approval from the Commission.
- (139) Therefore, in the circumstances of this Decision, the Transaction, which was notified to the Commission first, should be assessed in the light of the competitive situation that prevailed at the time of its notification, disregarding the potential changes that may be brought by the proposed ChemChina/Syngenta and Bayer/Monsanto transactions.

⁵⁶ Case M.7962 – ChemChina/Syngenta.

⁵⁷ See, for example, Commission Decisions in Case M.6214 – Seagate/HDD Business of Samsung (2011); Case M.6203 – Western Digital/Viviti Technologies (2011); Case M.4942 – Nokia/Navteq (2008); Case M.4854 – TomTom/Tele Atlas (2008); Case M.4601 – Karstadtquelle/My Travel (2007) and Case M.4600 – TUI/First Choice (2007).

⁵⁸ See, for instance, Judgment of 6 June 2002, *Airtours v. Commission*, T-342/99, EU:T:2002:146, paragraph 82 ("*the level of competition obtaining in the relevant market at the time when the transaction is notified is a decisive factor in establishing whether a collective dominant position has been created for the purposes of Regulation No 4064/89*"), as well as Judgment of 19 May 1994, *Air France v. Commission*, T-2/93, EU:T:1994:55, paragraphs 70-72; Judgment of 8 July 2003, *Verband der freien Rohrwerke and Others v. Commission*, T-374/00, EU:T:2003:188, paragraph 170.

SECTION V: CROP PROTECTION

1. BACKGROUND ON THE CROP PROTECTION INDUSTRY

1.1. The crop protection industry: size, evolution and forecast

- (140) Crop protection products, also known as pesticides, are used in agriculture in order to protect a crop from other biological organisms (pests) that can negatively affect the crop development either by attacking it or by competing with it for resources. Losses due to pests are estimated to range from 10 to 90%, with an average of 35 to 40%, for all potential food and fibre crops.⁵⁹
- (141) Crop protection products therefore improve yields and ensure the availability, quality, reliability and price crops to the benefit of farmers and consumers. They constitute an important input for farming. Their use saw a strong increase since the 1940s and the growth of synthetic pesticides.
- (142) In 2014, the size of the crop protection and seeds industry taken together was estimated at [...] globally. By 2025, the size of those industries is expected to grow to [...].⁶⁰ Growth is expected to be driven by population growth and the rise of the middle class.⁶¹ As the area harvested is not expected to grow, technology will be key, and food safety and security is a critical priority.
- (143) Crop protection products can be categorised into herbicides (to fight weeds), insecticides (insects), fungicides (diseases) and others. Herbicides have been the largest segment within crop protection in the last years, while genetically modified ("GM") seeds have been a key development in agriculture globally, [...].

Figure 2 – [Internal document re agricultural products]

[...]

Source: [Internal document] (ID1184), slide 4

- (144) The global market for conventional crop protection products (excluding sales of herbicide tolerant and insect resistant seeds, as well as non-crop agrochemicals) was worth about [...] in [...].⁶²
- (145) The global crop protection market is expected to [...].⁶³
- (146) Globally, [types of crops] are the largest crop by cultivated area, followed by cultivated area, [types of crops].⁶⁴ Correspondingly, these crops are major crops in terms of crop protection product sales [...]. [Types of crops] also amount for a significant share of crop protection products sales.

⁵⁹ International Union of Pure and Applied Chemistry (IUPAC) http://agrochemicals.iupac.org/index.php?option=com_sobi2&sobi2Task=sobi2Details&catid=3&sobi2Id=31.

⁶⁰ [Internal document] (ID6748-19233) slide 3.

⁶¹ See for instance DuPont's public document for the Bank of America Merrill Lynch – Global Agriculture and Chemicals Conference, "Delivering sustainable long-term growth in agriculture", 3 March 2016, slide 4.

⁶² Phillips McDougall, "Industry Overview – 2015 Market", May 2016.

⁶³ Phillips McDougall, "Industry Overview – 2015 Market", May 2016.

⁶⁴ Phillips McDougall, "Industry Overview – 2015 Market", May 2016.

Figure 3 – [Internal document]

[...]

Source: [Internal document] (ID5273-16)

- (147) In the EEA, the market for crop protection products amounts to about [...], that is to say [...] % of the global sales value.⁶⁵ In 2015, the leading markets for crop protection products in the EEA were [...], [...], [...], [...] and the [...].
- (148) The main crops produced in Europe are [type of crop] ([...] % of total production), [types of crops].
- (149) Use of the various categories of crop protection products across Member States varies widely. A study of the European Parliament highlights that "*[h]erbicides are the plant protection agents consumed in largest amounts, especially in northern Member States. Fungicides are the second most consumed. Mediterranean countries show the largest consumption share of insecticides and the lowest share of herbicides over the total plant protection agents consumed.*"⁶⁶ The study also notes that crop protection products represented on average between 3 and 15% of farmers' costs over the 2004-2012 time period.
- (150) Forecasts from industry experts estimate that the European crop protection market [...] per year in the period [...].⁶⁷

1.2. Crop protection products: definitions and basic concepts

- (151) Depending on the type of organism they target, crop protection products are mainly categorised into herbicides, insecticides, and fungicides⁶⁸. There are also other crop protection products such as plant growth regulators. These products are applied on crops, plants or fields. Some crop protection products can also be applied on seeds to protect them from insects and diseases (seed treatments).⁶⁹
- (152) The key components of crop protection products are active substances, or active ingredients (hereafter also designated by "AIs"), which produce the desired biological effect (that is, killing the pest or making it inoffensive).
- (153) A crop protection AI can typically be classified according to five aspects: the plant(s) to be protected (some AIs are used across several crops), the pest(s) against which it acts (some AIs are used against several pests), the mode of action ("MoA"), the chemical class, and the molecule.
- (154) The main players in the agrochemical industry work together in the Resistance Action Committees. For herbicides, the relevant committee is the Herbicide Resistance Action Committee ("HRAC"); for insecticides, the Insecticide Resistance Action Committee ("IRAC"); for fungicides, the Fungicide Resistance Action

⁶⁵ Phillips McDougall, "Industry Overview – 2014 Market", May 2015.

⁶⁶ European Parliament study, "Overview of the agricultural inputs sector in the EU", July 2015.

⁶⁷ Phillips McDougall, "Industry Overview – 2015 Market", May 2016.

⁶⁸ Some mixtures exist joining for instance a fungicide and an insecticide, but they are typically not widespread in Europe.

⁶⁹ In seed treatments, the Parties have limited activities, [internal document] (ID8008).

Committee (“FRAC”).⁷⁰ These bodies notably classify crop protection products by AI, chemical family and MoA. They also work on resistance issues.

- (155) The MoA describes how a particular molecule acts on a plant. For herbicides, MoAs are classified by HRAC codes (an alphabetical classification, according to the herbicides’ target sites/sites of actions), and by the Weed Science Society of America (WSSA; a numerical system). According to the Resistance Action Committees, there are currently 25 MoAs for herbicides, 29 for insecticides and 11 for fungicides.
- (156) The chemical family or chemical class are groupings of molecules. They typically have the same MoA. In some cases different chemical classes can have the same MoA.
- (157) Resistance is a consequence of a basic evolutionary selection process in response to the repeated use of the same product(s) with the same MoA, and is also associated with other crop management decisions (for instance, monoculture).
- (158) AIs are many times mixed with other AIs with the aim to ensure potency, efficiency, to widen the spectrum of pests targeted, to increase convenience for farmers and to help resistance management.
- (159) A formulated product as sold to distributors and farmers is composed of AI(s) mixed with inactive ingredients such as solvents, fillers, and adjuvants. These ingredients aim at making the AIs more stable, effective, or safer or easier to apply. There are various types of final formulations, such as granules, emulsifiable concentrates, etc.

1.3. Overview of the lifecycle of a crop protection product

- (160) The lifecycle of a new AI starts with an R&D company's discovery and development, which requires significant time and financial resources. The average overall costs for the discovery and development of a new agrochemical product brought to the market by an R&D company is estimated by Phillips McDougall at USD 286 million.
- (161) Industry sources and market participants highlight that both the cost and lead times have been increasing over the years, allegedly due to a more challenging regulatory environment. The lead time of a global crop protection product discovery and development is approximately 11 years.⁷¹
- (162) The *discovery process* includes the synthesis of candidate molecules, which are then screened to determine the biological activity of the molecule. Molecules are moved forward in the discovery process based notably on their efficacy, toxicological and environmental properties, and fit with company targets. Some products do not succeed and are abandoned.
- (163) *Patenting* of AIs takes place during the discovery stage. Patent strategy is an important consideration for R&D companies, and sometimes differs between companies in terms of both the timing of patent application and the scope of patenting. Companies can apply for and hold patents not only for new AIs, but also for new formulations, new mixtures of AIs, new process technologies (for instance

⁷⁰ See the websites of these organisations: <http://www.hracglobal.com/>, <http://www.irac-online.org/>, <http://www.frac.info/>.

⁷¹ Phillips McDougall, “The cost of new agrochemical product discovery, Development and Registration in 1995, 2000, 2005-2008, 2010-2014. R&D expenditure in 2014 and expectations for 2019,” a consultancy study for CropLife International, CropLife America and the European Crop Protection Association, March 2016.

new manufacturing processes that allow for example for higher yields or less waste), or new uses of AIs.

- (164) This is also the first moment of some visibility on new products within the industry as competitors screen patents for leads and for defensive measures.
- (165) After discovery, an AI enters the development stage.
- (166) *Regulatory studies* are a large part of the development efforts. Field trials represent the largest single cost in the development cycle with approximately [...] % of the total spend on product development.⁷²
- (167) After registration is obtained, a company would typically start with some initial *preparations/mixtures*, to start the roll-out of the AI with later new mixtures, new uses, new countries.
- (168) [Internal assessment regarding R&D costs].⁷³ Discovery takes 3–4 years, and development 5–6 years. The decision to move a molecule to development is thus key.
- (169) The lifecycle of an AI continues after registration and commercialisation. The maximisation of revenues of an AI takes various forms, which include developing uses for the product (for instance for additional crops or additional effects on the same crops), and creating mixtures with different AIs or other components.
- (170) Even after the expiry of patents, R&D companies often succeed to prolong the lifecycle of an AI. They pursue commercial, registration and patenting strategies to avoid commoditisation and generic competition, for instance by offering the AI in mixtures, sometimes with other patented AIs.
- (171) The lifecycle for AIs can reach more than 30 years. R&D-based companies carefully manage their portfolio to ensure they have products at different stages of the lifecycle.

Figure 4 – [Internal document re lifecycle]

[...]

Source: [Internal document]

- (172) Depending on the strategic role of the AI in the portfolio of the company, an AI for which related products only bring a limited margin might be divested by an R&D company to a generic company as part of its portfolio management and to maintain a level of margin as expected from shareholders. The R&D company sometimes gets distribution rights back, for instance as Dow did for Oxyfluorfen (divested to Nutrichem in 2015).

1.4. Active ingredients: from discovery to commercialisation

1.4.1. Discovery

- (173) The R&D process in crop protection typically starts with the screening of a large number of molecules. Large R&D companies typically screen each year thousands of molecules (for instance more than [...] per year for DuPont, and around [...] in [...] for Dow), using high throughput screening methods. These molecules are

⁷² See [internal document], slide 10 (ID399).

⁷³ See [internal document] (ID5273-16).

synthesised from basic chemical entities that can be bought or traded from/with pharmaceutical companies, from academic institutions, etc.

- (174) Candidate molecules are subject to a series of biological tests to determine their biological activity. If the molecule has a suitable biological activity, it is a "hit". It must also match other criteria: "*it must be able to be patented, possess good toxicological and environmental properties and display good commercial prospects*".⁷⁴ Therefore the R&D discovery process includes initial toxicological and environmental chemistry testing, as well as an evaluation of commercial prospects.
- (175) Dow and DuPont both divide the discovery process into several stages, where some hurdles must be passed each time before moving an AI to the next discovery stage. In light of the resources needed, only a selection of molecules moves forward each year.
- (176) Dow and DuPont both have discovery goals or concepts, that is to say that they aim at finding molecules with a certain type of biological activity and safety profile to match discovery concepts designed on the basis of the commercial alternatives of the targeted market and its commercial fit with the existing portfolio.

1.4.2. Development

- (177) Product development includes further safety testing, testing of formulations using the new AI, biological development to investigate the activity of the AI against different pests and in different environment situations and further assessment of the AI's regulatory profile.
- (178) Selecting candidates for the development stage is a significant step in light of the costs involved in this stage. When moving to the development stage, other considerations are taken into account such as the cost of manufacturing and the competitive landscape, notably taking into account patents and the type of molecules on which other crop protection R&D companies are working. "*Studies on optimising the manufacturing process for commercial production are subsequently undertaken with the aim of arriving at a suitably cost effective manufacturing process. Another important area of chemistry development is formulation evaluation. This generally involves the testing and optimisation of a variety of formulations of the new crop protection product to ensure that the product can be delivered in a safe and effective manner for subsequent field use*".⁷⁵

1.4.3. Approval and authorisation

- (179) Crop protection products have properties that can endanger human health and the environment since their active components are essentially toxins aimed at harming animals, vegetation, or fungi. In the EEA, the approval and commercialisation of AIs

⁷⁴ Phillips McDougall, "The cost of new agrochemical product discovery, Development and Registration in 1995, 2000, 2005-2008, 2010-2014. R&D expenditure in 2014 and expectations for 2019," a consultancy study for CropLife International, CropLife America and the European Crop Protection Association, March 2016.

⁷⁵ Phillips McDougall, "The cost of new agrochemical product discovery, Development and Registration in 1995, 2000, 2005-2008, 2010-2014. R&D expenditure in 2014 and expectations for 2019," a consultancy study for CropLife International, CropLife America and the European Crop Protection Association, March 2016.

and formulated crop protection products is mainly governed by Regulation (EC) No 1107/2009 ("Regulation 1107").⁷⁶

- (180) Regulation 1107 sets the rules for (i) the approval of the AI contained in formulated products (referred to as plant protection products in that regulation) and (ii) the authorisation of plant protection products at Zonal and Member State level.
- (181) Crop protection products require two types of authorisation before they can be sold to farmers in the EEA. First, the AI must have been authorised by the Commission, upon the advice of European Food Safety Authority ("EFSA"). Second, the crop protection product incorporating the AI (alone or as part of a mixture of AIs) must have been authorised by the competent authority in the Member State(s) where it will be sold. The following recitals describe these two authorisations in turn.
- (182) The objective pursued through a Union approval for AIs is to ensure a high level of protection of both human and animal health and the environment. Member States assessing whether a formulated product can be introduced into the market focus on the safe and sustainable use of crop protection products for the production of food, including solutions for resistance management and minor uses (so-called "orphan crops").
- (183) An application for the approval of an AI must be submitted by the producer of the AI to a Member State (the Rapporteur Member State), together with a summary and a complete dossier including the information and documents listed in Article 8 of Regulation 1107. The requirements and conditions for approval of an AI are listed in Article 4 of Regulation 1107. The Rapporteur Member State must prepare a draft assessment report relating to the approval of the AI which is sent to EFSA. The EFSA then launches a consultation over the draft assessment and its findings are presented in its conclusions. The Commission then adopts a regulation approving or not approving, as the case may be, the AI.
- (184) AIs must be proven to be safe for people's and animals' health and the environment. This requires, *inter alia*, an assessment of AI residues in food and feed and of the effects on human and animal health and the environment. Under Regulation 1107, an AI cannot be in principle approved if it is classified as mutagenic, carcinogenic or an endocrine disruptor.
- (185) The approval of an AI is valid for the entire Union and, once approved the AI is included on a registry of approved AI. A list of AIs approved in the Union is available online. There are currently more than 400 approved AI for use in the Union.
- (186) It takes approximately 2.5 to 3.5 years from the admissibility of an application to the approval of a new AI. However, applicants must start studies for the preparation of the AI's approval dossier several years before they can lodge an application.
- (187) The Commission's first approval period for a new AI does not exceed ten years and may be subject to conditions and restrictions.
- (188) Following expiration of the initial authorisation period, the authorisation may be renewed for successive periods of up to 15 years, if the application submitted by a

⁷⁶ Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, OJ L 309, 24.11.2009, p. 1.

producer of the AI establishes that the approval criteria provided in Article 4 of Regulation 1107 are still satisfied.

- (189) The cost of the approval process is approximating USD 33 million and that for renewal is approximately USD 5-8 million.
- (190) Once an AI is approved, it can be considered for authorisation and use in formulated products in the Union. Member States take decisions at a national level, within a zonal authorisation process, on whether individual formulated products with specific use recommendations can be authorised. Member States must ensure authorised formulated products comply with harmonised European standards set in Regulation 1107 and reflect any conditions or restrictions for the AI, where appropriate, to the formulated product. In particular, dossiers supporting formulated products must be evaluated in accordance with the Uniform Principles, which are set out in Commission Regulation (EU) No 546/2011⁷⁷ and contain all the documents and information listed at Article 33(2) of Regulation 1107.
- (191) Once the examining Member State (zonal Rapporteur Member State) issues an authorisation for a formulated product, the applicant wishing to sell the same formulated product in another Member State(s), within the same "zone" must submit an application for the product to the relevant Member State(s) of such a zone which then would examine and, if appropriate, approve the request.
- (192) Regulation 1107 divides the Member States into three zones. For each of the zones, a zonal Rapporteur Member State assesses the application for the registration of a product for the entire zone. Other Member States in the zone shall in principle accept the assessment of the zonal Rapporteur Member State, unless specific environmental or agricultural circumstances require them to conduct their own specific assessment in addition to the zonal Rapporteur Member State's original assessment. Although intended to facilitate entry from one Member State within a zone to another, the Commission conducted an audit in early 2016, which concluded that the zonal procedure has actually increased barriers to entry by adding an extra layer of dossier review. Indeed, Member States normally conduct their own assessment of formulated products.
- (193) A formulated product authorised in one Member State (Member State of origin) may, subject to obtaining a parallel trade permit, be introduced in another Member State (Member State of introduction), if this Member State determines that the formulated product is identical in composition to another formulated product already authorised in its territory (reference product).
- (194) The duration of a formulated product authorisation granted in accordance with Regulation 1107 is laid down in the authorisation but shall not exceed one year from the date of expiry of the approval of the AI contained in the formulated product. The holder of the formulated product authorisation can apply for renewal, provided the requirements for the initial authorisation are still met.
- (195) Some AIs are classified as "candidates for substitution" in light of their negative properties. This entails that use of such AIs is discouraged since Member States, when examining applications for authorisations of formulated products containing

⁷⁷ Commission Regulation (EU) No 546/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards uniform principles for evaluation and authorisation of plant protection products, OJ L 155, 11.6.2011, p. 127.

them, will need to consider whether alternative chemical solutions which require less risk mitigation or non-chemical control or prevention methods exist for the pest problems these AIs address and, if they do exist, reject the authorisation of formulated products containing AIs that are candidates for substitution.

- (196) Member States can also, under specific circumstances – in essence, the absence of alternative similarly effective solutions –, grant Emergency Use Permits ("EUPs"), which are temporary authorisations allowing use of a formulated product containing an AI which has not been approved at the EEA level.
- (197) Overall, it takes approximately 11 years for R&D companies to bring new AIs to market, representing an average cost of USD 286 million, and approximately seven years to obtain the renewal of an AI and subsequent re-registration of a formulated product, for an average cost of USD 10 million.

1.4.4. Patents and other forms of protection

- (198) The protection of new AIs and formulated products is primarily ensured by patents.
- (199) At the early stages of the research process, agrochemical companies commonly seek patents directed at a chemical genus⁷⁸ that includes a new AI. At later stages of the R&D process, a supplementary patent for a composition of matter can be made to protect the identified chemical sub-genus. Patents can also be obtained for some processes ("process patents") or formulations.
- (200) In the EEA, a patent offers protection for a period of twenty years from the date of application, irrespective of whether it is exclusively national or based on a European patent. In the EEA there are also supplementary protection certificates. Regulation (EC) No 1610/96 of the European Parliament and of the Council of 23 July 1996 concerning the creation of a supplementary protection certificate for plant protection products ("Regulation 1610/96")⁷⁹ allows R&D companies to apply for a supplementary protection certificate before the expiration of the patent. This certificate normally has a validity of five years and grants the same rights as the basic patent to the R&D company. Since it takes on average 10 years from the date of patent application to bring a compound to the market, the holder of a patent followed by a certificate can enjoy up to approximately 15 years of exclusivity from the time its formulated product first obtains authorisation to be placed on the market in the Union.
- (201) Data protection is the temporary right of the owner of a test or study report to prevent it from being used for the benefit of another applicant for the purpose of regulatory approval or renewal. When submitting the application for the approval of an AI, the applicant must also hand in a list of any claims for data protection on test and study reports related to the AI.
- (202) The protection applies to the data generated through test and studies concerning the AI, safener or synergist, adjuvants and the plant protection product when they are submitted to a Member State by an applicant for authorisation.
- (203) The period of data protection is in principle 10 years starting at the date of first authorisation in the Member State, and can be extended to 13 years for specific plant protection products. Renewal of authorisation brings a new period of data protection.

⁷⁸ A taxonomic rank used in the biological classification of living and fossil organisms.

⁷⁹ OJ L 198, 8.8.1996, p. 30.

Once the period of data protection expires, Member States may rely on existing data for the benefit of other applicants for authorisation, including those of generic players.

1.4.5. Means of commercialisation of AIs other than own products commercialisation

(204) In light of the costs, it is not rare for firms to partner early on in the discovery/development stage to co-develop an AI.

(205) More commonly, commercialisation of an AI can be done via other crop protection companies with the licensing of an AI or the supply of a produced AI ("technical sales"). Reciprocal arrangements can also be reached to fill gaps in the companies' respective portfolios. Typically, due to cost of manufacturing and economies of scale, the company that licenses out/supplies is the one that continues to manufacture the product.

1.4.6. Formulated products

(206) As indicated in recital (190), registration of new final products/new mixtures takes place at the national level. Efforts to commercialise also take place in national markets.

(207) Typically, a R&D company will be in contact with institutes advising farmers that will conduct tests on the new products two to three years before launch. Companies also start communicating to growers for instance one year before launch, for instance with field presentations. Advertising spending and branding is significant. Distributors, and in some cases retailers, are also important players for commercialisation. Depending on the Member States, they can play an important role in advising farmers. Distribution contracts between producers of formulated crop protection products and distributors are typically not exclusive. Distributors distribute products from several producers of formulated products (both R&D companies and generic companies). However they can have limited space shelf and make a choice in their offering. Distribution channels will be discussed further in Section V.6.2.2.

(208) R&D continues while formulated products are commercialised, to develop new formulations, mixtures, for instance with different adjuvants, mixture ratios, etc.

(209) When expiry of the approval is near, investing in renewal of authorisation is a business decision, taking into account the costs, whether they can be shared for instance in a taskforce, and the expected revenues.

(210) Generic companies enter if the market opportunity is significant. They often approach the data owner, as generating own data takes time. Development time for a generic is shorter, two to three years. Post patent strategies of crop protection companies R&D companies will be detailed in Section V.6.2.1.

1.5. Overview of main companies active in crop protection

1.5.1. Main agrochemical companies

(211) While some companies offer only crop protection products or only seeds, there is a trend to offer integrated solutions. This trend is largely linked to the growth of GM offers in the past years, mainly outside of the Union.

- (212) The top players globally in seeds and crop protection are set out in Figure 5 and Figure 6.

Figure 5 – [Confidential extract re. agrochemical industry]

[...]

Source: Parties' [submission] (based on Phillips McDougall, *Industry Overview – 2014 Market*)

Figure 6 – [Extract from internal document]

[...]

Source: [Internal document] (ID1327-164), slide 7

- (213) Monsanto (US) is the global agriculture and seed leader due to its genetically modified crops resistant to its own best-selling herbicide glyphosate (Round-Up). Its presence in other markets – non-GM for seeds and other chemicals for crop protection – is limited, which explains its relatively small size and relevance in the EEA.
- (214) Syngenta (Switzerland) is an integrated crop protection (global number 1) and seed (global number 3) company, with a very large portfolio of products.
- (215) Bayer (Germany) is the global number 2 crop protection company with a large portfolio of products. It also has a relatively smaller seed business.
- (216) BASF (Germany) is a pure crop protection player, currently the global number 3. It has a large portfolio, with a focus on fungicides.
- (217) DuPont/Pioneer is the global number 2 seed player, combined with the global number 6 crop protection business.
- (218) Dow AgroSciences ("DAS") combines a relatively small seed business with the global number 4 crop protection business, currently focused on herbicides and insecticides.
- (219) Adama, controlled by Chinese state-owned enterprise ChemChina, is the largest "generic" crop protection player, with a large portfolio. It is not active in the discovery of new AIs, but it differentiates itself from pure generic players by developing novel mixtures of old AIs.
- (220) Other global players include notably FMC, Nufarm and Sumitomo.

Figure 7 – [Extract from purchased report re R&D expenditure]

[...]

Source: [Purchased report]

- (221) As for crop protection specifically, there are a number of players active in the sale of crop protection products, with different size and business models. The key players globally are set out in Figure 8.

Figure 8 – [Internal document]

[...]

Source: [Internal document] (ID5273-16)

1.5.2. *The Big 5 R&D-integrated players*

- (222) Five companies are large integrated companies characterised by their scale and their activity at all stages of the value chain (namely discovery, development, mixture/formulation and commercialisation) through large R&D budgets and operations for crop protection. These are Syngenta, Bayer, BASF, Dow and DuPont (thereafter also designated by "Big 5" or "global R&D-integrated players").
- (223) Sales by these five R&D-integrated companies account for around [...] % of the total EEA crop protection market and [...] % of the global crop protection market.
- (224) These companies are seen as the top players in crop protection, as illustrated by [...] other companies.⁸⁰

1.5.3. *Other companies active in crop protection R&D*

- (225) A number of other companies are active in the discovery and development of new AIs. Those firms are discussed in this section and, including the Big 5, are collectively referred to as "R&D players".
- (226) Monsanto has significant crop protection revenues, which are however mostly generated by one relatively old blockbuster product (glyphosate Round-Up), a non-selective herbicide, while its research expenditure is almost exclusively focused on seeds.
- (227) FMC is a player which used to be active in the discovery and development of new AIs. However it has exited the active R&D discovery approximately ten years ago. Since then FMC launched only few products developed by other companies. Those two companies belong, to some extent, to a group of companies referred to, along the Big 5, as "R&D-integrated players".
- (228) A number of other small or mid-sized companies, mostly from Japan, have R&D operations, but do not compete on the same scale as global R&D-integrated companies through global registration and route to market capabilities. The Japanese companies tend to focus on the Japanese market, including relevant products for rice and fruits and vegetables, insecticides and fungicides. They typically do not have a large scale presence in Europe but sometimes cooperate with the Big 5, as well as with generic companies including via some shareholding links.
- (229) Isagro, from Italy, has some discovery activity, however mainly using "*co-development as a strategy*" in light of the "*large scale and significant financial resources [...] required to engage in discovery and then development, which takes about 10-12 years during which no revenues are generated with the product*".⁸¹

⁸⁰ See for instance [internal document] (ID982), [reference to internal document]; Agreed non-confidential minutes of a call with a competitor, 2 June 2016 (ID5800).

⁸¹ Agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7111).

Figure 9 – Companies involved in new crop protection AI research in 2012

Europe	USA	Japan
Bayer	Dow AgroSciences	Sumitomo Chemical
Syngenta	DuPont	Ishihara
BASF	Chemtura	Nihon Nohyaku
Isagro		Otsuka
		Mitsui Chemical
		Kumiai
		Hokko
		Meiji Seika
		Nippon Soda
		Agro Kanesho
		Nissan
4	3	11

Source: Phillips McDougall, "R&D trends for chemical crop protection products and the position of the European Market, A consultancy study undertaken for ECPA", September 2013

1.5.4. "Generic" players

(230) There are a number of generic players for crop protection products with sizeable revenues, led by Adama. None of these, however, has substantially moved to or remained active in the active discovery of AIs.⁸² Their activities are largely dependent on access to AIs originally developed by R&D players.

(231) The "generic" players differ to some extent in business model and activities. As noted by a customer, "[t]he different suppliers belong to three categories: (i) R&D players (e.g. Bayer/BASF), who are involved in developing innovative new products/molecules through research; (ii) Generics producers (eg Albaugh, Globachem) who can be very good at bringing generics to market very quickly once the original product goes off-patent, sometimes selling it in different formulations or via mixes as a new co-formulation under their own brands; and (iii) Generic+R&D producers (e.g. Adama, FMC), who are trying to create innovations by mixing older ('off-patent') ingredients".⁸³

(232) As regards downstream sales of crop protection products, it seems that the generics' share has been overall stable in recent years. [Quote from internal document].⁸⁴

1.5.5. The agrochemical industry is characterised by a concentrated shareholders structure, with significant common shareholding

(233) The agrochemical industry is characterised by a significant level of common shareholding, both in terms of the number of shareholders common to several

⁸² For instance FMC stopped discovery in 2005. Agreed non-confidential minutes of a call with FMC, 8 April 2016 (ID8179).

⁸³ Agreed non-confidential minutes of a call with a crop consultant, 17 March 2016 (ID8246).

⁸⁴ [Internal document] (ID982), page 19.

competitors as well as in the level of shares these common shareholders possess across the industry.⁸⁵

- (234) Using data on "*shareholders [of BASF, Bayer, Dow, DuPont, Monsanto and Syngenta] who file Form 13F (report filed by institutional investment managers)*",⁸⁶ Table 1 lists all shareholders of these firms which hold a total portfolio value in all these companies of more than EUR 1 000 million.

Table 1 – [Shareholdings information]

[...]

Source: Commission's analysis of Parties' response to Commission's requests for information RFI 2

Note: [Shareholdings information]

- (235) The [...] shareholders reported account, in total for around [...]% of BASF, Bayer and Syngenta, and around [...]% of Dow, DuPont and Monsanto. Most of these shareholders hold stocks in more than one those firms, and [...] hold stocks in all [...].
- (236) Overall, each of BASF, Bayer, Dow, DuPont, Monsanto and Syngenta has a concentrated shareholder structure and a significant level of common shareholders with its competitors.

1.6. Industry trends

1.6.1. Consolidation in the crop protection industry

- (237) Historically, the R&D part of the crop protection industry has gone through different waves of consolidation, as illustrated in the non-exhaustive Figure 10. In parallel, the seeds industry has seen consolidation as well.

⁸⁵ A more detailed analysis is provided in Annex 5. This annex provides further factual evidence on the significant level of common shareholding in the agrochemical industry and on the involvement of large minority shareholders which, despite some being labelled "passive investors" are in fact "active owners". The annex also reviews the economic literature, both theoretical and empirical, which provides guidance on the effects of common shareholding on competition between firms in industries subject to such feature, and it discusses how the HHI can be modified to account for common shareholding in the industry.

⁸⁶ Parties' response to the Commission's requests for information RFI 2, question 4 (ID753 and ID1159-257).

- (243) However, while regulatory costs have increased, expenditure on R&D as a percentage of revenues has decreased over the last twenty years. As a result, innovation output has decreased in the crop protection industry. According to a Phillips McDougall industry report,⁹³ the average number of AIs introduced per year was 12.3 between 1980-1989, 12.7 between 1990-1999, 10.3 between 2000-2009, and 6.3 between 2010-2013.
- (244) There has also been in the recent years a shift in geographical focus, with less emphasis on Europe and more on the rest of the world. A study for the European Parliament highlights reduced investments in crop protection in Europe, decline in the number of patents and expresses concerns that "*innovation in this sector will shrink*".⁹⁴ Meanwhile, there has been strong growth of emerging markets, [...].

Figure 11 – [Extract from internal document]

[...]

- (245) Meanwhile, limited solutions are available for so-called "orphan" crops or minor uses. Companies focus on major global crops such as maize, wheat, rice.

1.6.3. New technology developments

- (246) First, precision farming appears as a growing trend. It was developed during the 1980s in the US. The recent emergence of cloud storage allowed precision farming to develop. Precision farming agriculture aims at using collected data for farmers' decision-making. Companies provide services to farmers using scientific models that predict the soil and the plants' needs. For instance, precision farming may take into account weather forecasts. A competitor notes that "*[p]recision agriculture / data-driven agriculture is a clear industry trend. The digital side of the business becomes more important. Access to tools and information helps farmers react better. Some companies talk of a '4th revolution'*".⁹⁵ However, it is still unclear which player will emerge as a leader in this area. A majority of respondents to the Crop Protection Stakeholders' questionnaire stated that precision agriculture will play a major role in the EEA in the next five to 10 years.⁹⁶
- (247) Second, the use of biological crop protection agents is expected to increase to some extent. Biologicals are an area of interest and spending for the industry. However, market participants highlight that biological products still present limited efficacy. Some companies see biologicals as "*a trend but of limited weight in the overall crop protection business so far. The absolute percentage of biologicals is still very low*".⁹⁷ Another player highlighted that "*[b]iologicals only play a minor role at present and can only supplement existing crop protection activities. They represent more of a strategic investment*".⁹⁸
- (248) Third, there is a move to integrated solutions, for instance to develop herbicide resistant traits, especially in the US Monsanto's Round-Up uses these methods. Some options also exist using non-GM technology, such as BASF's Clearfield. The

⁹³ Phillips McDougall, "Directions in Global Research and Development for Crop Protection Products", 5 November 2014, slide 15.

⁹⁴ European Parliament study, "Overview of the agricultural inputs sector in the EU", July 2015.

⁹⁵ Agreed non-confidential minutes of a call with a competitor, 12 April 2016 (ID8247).

⁹⁶ Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 17.

⁹⁷ Agreed non-confidential minutes of a call with a competitor, 12 April 2016 (ID8247).

⁹⁸ Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8242).

industry study notes that "[t]he driving force behind the increase in seeds R&D is the development of new GM traits, a technology that has only been accepted in the EU in the most limited way".⁹⁹

- (249) Fourth, some new technologies are being developed in the biotech sector, such as RNAi silencing and gene editing.

2. CROP PROTECTION BUSINESSES AND PRODUCTS OF THE PARTIES

2.1. Introduction

- (250) DuPont's agriculture businesses generated in 2014 approximately [...] revenues. DuPont's Agriculture business comprises the following business areas:

- (1) DuPont Pioneer, active in the development and commercialisation of seeds generating revenues of approximately [...] in 2014, contributing around [...] of DuPont's total Agriculture revenues.
- (2) DuPont Crop Protection, which provides insect, disease and weed control products as well as seed treatment solutions and accounted for approximately [...] in 2014, contributing the [...] of DuPont's Agriculture revenues. These revenues further break down as follows:
 - (1) Herbicides accounted for approximately [...]% of DuPont's crop protection revenues;
 - (2) Insecticides accounted for the largest portion of DuPont's crop protection sales, namely approximately [...]%;
 - (3) Fungicides accounted for approximately [...]%; and
 - (4) Other products (including nematicides and seed treatment products), accounted for [...]%.

- (251) Dow's agricultural business (Dow AgroSciences, "DAS") generated in 2014 approximately [...] revenues. Dow's business comprises the following business areas:

- (1) DAS Seeds, which generated approximately [...] revenues in 2014, contributing approximately [...]% to DAS's total revenues.
- (2) DAS Crop Protection, which includes insect, disease and weed control products, generated approximately [...] revenues in 2014, accounting for approximately [...]% of DAS's revenues. Dow's crop protection revenues break down as follows:
 - (1) Herbicides accounted for the largest portion, approximately [...]%, of Dow's crop protection sales;
 - (2) Insecticides accounted for approximately [...]%;
 - (3) Fungicides accounted for approximately [...]%; and
 - (4) Other products (including soil fumigants, termiticides, and nitrification inhibitors), accounted for approximately [...]%.

⁹⁹ Phillips McDougall, "R&D trends for chemical crop protection products and the position of the European Market, A consultancy study undertaken for ECPA", September 2013.

(252) [Reference to internal document].

Figure 12 – [Extract from internal document]

[...]

Source: [Internal document] (ID7830-34975), slide 13

(253) As for the crop protection business in the EEA, in 2015 DuPont had a turnover of approximately [...] and Dow of approximately [...], with the break down [reference to internal document].

Figure 13 – [Extract from internal document]

[...]

Source: Parties' briefing paper

(254) Both DuPont and Dow had an EBTDA as percentage of revenues of around [...] % for the crop protection business in 2015. DuPont's gross margin in crop protection as percentage of revenues was [...] % while Dow's was [...] %.¹⁰⁰

(255) In the case of DuPont crop protection business in EMEA, its gross margin was around [...] % in 2015 and its projections are for a growth in sales in EMEA of [...] % per year in the period 2015-2020 ([...]).¹⁰¹

Figure 14 – [Extract from internal document]

[...]

Source: [Internal document] (ID6827-29535)

2.2. Herbicides

(256) In herbicides the Parties have a strong position globally, notably in selective herbicides. Both Parties develop, manufacture and sell a broad range of different herbicides to be applied to all main crop groups across the EEA. While the Parties are strong on products targeting broadleaf weeds, and are notably leaders in cereals, they also have graminicides (targeting grass weeds) and cross-spectrum (also referred to as "broad spectrum") products.

(257) [...].

(258) [...].

Figure 15 – [Reference to internal document]

[...]

Source: [Internal document] (ID7830-34975), slide 14

(259) Dow's current portfolio in the EEA consists mainly of products derived from several AIs. Pyroxsulam, fluroxypyr, florasulam, clopyralid, propyzamide account together for [...] % of Dow's 2015 herbicides sales in the EEA. Dow is notably rolling out two other products: Arylex (AI halauxifen), a broadleaf herbicide, and Rinskor (AI florpyrauxifen-benzyl), a cross-spectrum herbicide.

¹⁰⁰ [Internal document] (ID7829-9342).

¹⁰¹ [Internal document] (ID6827-29535), slide 20 and 53.

(260) DuPont's portfolio in the EEA consists mainly of products from the sulfonylurea family ("SUs" family), as well as lenacil, and in-licensed products. Thifensulfuron methyl, tribenuron methyl, nicosulfuron, triflurosulfuron methyl, rimsulfuron and flupyralsulfuron account together for [...]% of DuPont's herbicides sales in the EEA.¹⁰² DuPont is further conducting development of [pipeline information].

2.3. Insecticides

(261) In insecticides, the Parties also have a strong position globally, notably in insecticides targeting lepidoptera, thrips, coleoptera and diptera. Both Parties develop, manufacture and sell a broad range of different insecticides to be applied to all main crop groups across the EEA.

(262) [...].

(263) As regards the key crop segments globally, namely soybean, rice, cotton, corn and specialty ([reference to internal document]), the combined DuPont and Dow would be particularly strong in [type of crop] (with [...]% of the sales), [type of crop] (with [...]% of the sales) and [type of crop] (with [...]% of the sales).

Figure 16 – [Reference to internal document]

[...]

Source: [Internal document] (ID7830-34975), slide 15

(264) DuPont's insecticides portfolio in the EEA mainly consists of two products: Rynaxypyr (AI chlorantraniliprole) and Indoxacarb. These two products currently account for [...]% of DuPont's EEA insecticides revenues. Both of these products target lepidoptera. DuPont will shortly launch Cyazypyr in the EEA, which has the same chemical class as Rynaxypyr but has a broader spectrum of activity. DuPont also a number of insecticides in its pipeline, [information on pipeline products].

(265) Dow's insecticides portfolio in the EEA currently consists of three products: chlorpyrifos, Spinosad and methoxyfenozide. Chlorpyrifos and Spinosad currently account for [...]% of Dow's EEA insecticides revenues. All three AIs target lepidoptera, while Spinosad also targets thrips and chlorpyrifos is a broad spectrum AI that targets a number of additional pests. Dow is currently launching Spinetoram, which mainly targets lepidoptera and thrips. Dow will also soon launch Isoclast, which mainly targets various hemipteran pests. Finally, Dow has a number of insecticides in its pipeline, [information on pipeline products].

2.4. Fungicides

(266) The Parties currently have a relatively weak position in fungicides. In light of this weak position, Dow and DuPont tend to cooperate with other companies to have a larger presence.

(267) [...].

Figure 17 – [Reference to internal document]

[...]

Source: [Internal document] (ID7830-34975), slide 16

¹⁰² [Internal document] (ID4384-18), slide 4.

- (268) DuPont's fungicide portfolio in the EEA currently consists of six products (Picoxystrobin, Proquinazid, Penthiopyrad, Cymoxanil, Famoxadone and Carbendazim) and Dow's fungicide portfolio in the EEA currently consists of seven products (Myclobutanil, Quinoxifen, Meptyldinocap, Tricyclazole, Fenbuconazole, Mancozeb-Dithane and Propiconazole).
- (269) The Parties have discovery and development pipeline products in fungicides. DuPont has [...] products in the pipeline, namely Zorvec, [pipeline information]. Dow has [...] products in the pipeline, namely Inatreq, [pipeline information].

2.5. Nematicides

- (270) The Parties both produce products that are used in the soil to control nematodes. Dow produces the soil fumigant AI 1,3-dichloropropene. It is used on soil before crop seeds are planted to control nematodes and other pests. [...].
- (271) DuPont produces one nematicide AI, oxamyl. Oxamyl was originally developed to control true insects. However, its main usage now is to control nematodes. DuPont is also developing a new nematicide, fluazaindolizine ([...]) with a new MoA.¹⁰³

3. OVERALL STRUCTURE OF THE COMMISSION'S ASSESSMENT OF THE EFFECTS OF THE TRANSACTION ON COMPETITION

3.1. The activities of DuPont and Dow overlap in four respects

- (272) As seen in the previous section the activities in crop protection of DuPont and Dow overlap in four respects.
- (273) First, the Parties sell existing overlapping products in a number of European markets. In so far the Transaction may affect product and price competition between existing products of the Parties. In that regard the Commission investigates, in line with paragraphs 24 et seq. of the Commission Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings ("Horizontal Merger Guidelines")¹⁰⁴, whether the Transaction gives rise to non-coordinated effects, in particular as a result of the creation or strengthening of a dominant position and the elimination of an important competitive constraint.
- (274) Second, [...]. Paragraph 58 of the Horizontal Merger Guidelines clarifies that a merger with a potential competitor can have similar effects to mergers between competitors already active on the same market. In that regard the Commission in line with paragraphs 58 et seq. and 24 et seq. also investigates whether the Transaction gives rise to non-coordinated effects, in particular as a result of the creation or strengthening of a dominant position and the elimination of an important competitive constraint.
- (275) As regards the overlapping activities [...] the Commission focus its assessment on product and price competition. Product competition may be reduced through a different positioning of the products in order to prevent cannibalisation of each other's' products' sales. Price competition may be reduced in those areas where the products of the Parties would continue to compete head-to-head. It is important to note that product and price competition may be reduced independently of whether

¹⁰³ Parties' response to the Commission's request for information RFI 27, question 3.

¹⁰⁴ OJ C 31, 5.2.2004.

the merged entity decides to continue to sell both products or to withdraw one of the products from the market. In the latter case there might however be an additional reduction of competitive pressure on other competitors and thus an even more significant harm to product and price competition in a given market.

- (276) Section V.6 will focus on the effects of the Transaction on product and price competition.
- (277) Third, [...]. In so far the Transaction may affect innovation competition between the two Parties in the form of discontinuation, deferment or redirection of competing lines of research and early pipeline products.
- (278) Fourth, the Parties are operating two of only a few competing global R&D organisations. The discontinuation of one of those organisations may significantly reduce the overall level of innovation competition and thus product innovation in the crop protection industry.
- (279) As regards the overlapping activities [...], paragraph 8 of the Horizontal Merger Guidelines clarifies that Union merger control also applies to mergers which diminish innovation or reduce choice of goods. Paragraph 8 also suggests that the parts of the Horizontal Merger Guidelines dealing at first sight only with price competition can be applied *mutatis mutandis* to innovation competition: "*[i]n this notice, the expression 'increased prices' is often used as shorthand for these various ways [including diminished innovation and reduced choice] in which a merger may result in competitive harm*".
- (280) Section V.8 will focus on the effects of the Transaction on innovation competition.
- (281) There are also potential overlaps as regards the licensing and supply of new AIs, as discussed in section V.7.

3.2. Likely magnitude of the effects

- (282) For the two types of overlaps between the Parties discussed in [...] the harm to consumers would result mainly from the reduction of competition between the products of the Parties in the respective markets.
- (283) For the two types of overlaps discussed in [...] the effects on innovation competition, which result mainly in the discontinuation, deferment or redirection of competing lines of research and early pipeline products, would cause an additional long-term harm to consumers in the markets where a reduction of variety would take place. This harm would reinforce the harm resulting from the absence of price and product competition between the Parties in those markets and would be felt repeatedly year after year for any possible future interaction between the Parties. As a consequence, for the latter two types of overlaps the Commission considers likely that the magnitude of harm would be relatively larger.

3.3. Depending on how close pipeline products are to the market the Transaction would be likely to affect product or only innovation competition

- (284) As explained in Section 3.1 the second layer focuses on [pipeline information].
- (285) Indeed, paragraph 38 of the Horizontal Merger Guidelines highlights that "*effective competition may be significantly impeded by a merger between two important innovators, for instance between two companies with "pipeline" products related to a specific product market. Similarly, a firm with a relatively small market share may nevertheless be an important competitive force if it has promising pipeline products*".

- (286) Similarly, paragraphs 58-60 of the Horizontal Merger Guidelines describe the potential anti-competitive effects of a merger between potential competitors, where *"the potential competitor [...] already exert[s] a significant constraining influence or there [is] a significant likelihood that it would grow into an effective competitive force [in a relatively short period of time]"*. These paragraphs point to the significance of costs already incurred or yet to commit as a useful indicator.
- (287) However, what constitutes such a significant constraining influence or a significant likelihood that a potential competitor would become an effective competitive force in a relatively short period of time will of course depend on the specific characteristics of each industry. In particular, key factors will be the time necessary to launch a new product on the market, as well as the point in that process where the likelihood of growing into an effective competitive force (and, *a fortiori*, of effectively entering the market) becomes significant.
- (288) The Commission has recently decided several cases in the pharmaceutical sector where it considered both potential competition and innovation competition. In that industry, candidate molecules go through several development stages, starting with pre-clinical trials in laboratories and on animals and later moving on to clinical trials in humans (so called "Phase I", "Phase II" and "Phase III" clinical trials).
- (289) As noted in the Commission Decision COMP/M.1846 – Glaxo Wellcome / Smithkline Beecham, Phase I marks the start of clinical testing on humans, currently some eight to 10 years before a product is marketed, with initial efficacy and toxicology screenings. Statistically, projects in Phase I generally have no more than a 10% chance of reaching the market. Phase II, some four to five years before the product is marketed, involves working out the proper dose for the patient and defining the areas of application. The success of Phase II is generally acknowledged to be approximately 30%. Phase III, starting approximately three years before the product is marketed, involves establishing the product's effectiveness on larger groups of patients. The risk of failure in Phase III is reported to be over 50%.¹⁰⁵
- (290) In the Commission Decision COMP/M.7275 – Novartis/GlaxoSmithKline Oncology Business, the Commission concluded that the transaction would lead to a reduction of potential competition for innovative cancer treatments regarding overlaps between a marketed product and a pipeline Phase III product as well as to a reduction of innovation competition regarding overlaps between pipeline products at earlier stages of development, namely in Phase I and Phase II.¹⁰⁶ In sum, it concluded to a significant impediment to effective competition on the basis of potential competition where a product had no more than a 50% chance of reaching the market, within approximately three years. It also concluded to such an impediment where two competing projects were, respectively, 8-10 years and 4-5 years from market launch, with only 10% and 30% chances of success.
- (291) Crop protection is a sector where large investments and significant amounts of time are needed to bring new products to the market. It thus appears to take approximately eight to 10 years to get an AI from its discovery to the launch of formulated products, with an average cost of approximately USD 250-300 million. A crop protection

¹⁰⁵ Commission Decision in Case M.1846 – Glaxo Wellcome/Smithkline Beecham (2000), recital 70.

¹⁰⁶ Commission Decision in Case M.7275 – Novartis/GlaxoSmithKline Oncology Business (2015), recital 90.

company therefore simply cannot discover and launch a new AI on the market in only one or two years.

- (292) First of all, the company defines some areas of research or discovery concepts based on the expected market output, thus focusing the research on discovering molecules that can be applied in certain market segments and geographical areas (EEA, for instance).
- (293) As explained in Sections V.1.3 and V.1.4, selected candidate molecules – in fact, several analogs of a base molecule at these early stages – go through the discovery process, where they are first screened and optimised for efficacy and intended uses. Tests are also run to assess toxicology and their environmental impact in order to prevent later failures. Patents are typically filed.
- (294) Once enough data has been gathered to the satisfaction of the company, candidate molecules are moved to the development stage, where further data is gathered for regulatory submissions for the companies to be able to market their products. These trials will be made both on AIs and on formulated products, including mixtures of several AIs. The business case will also be gradually refined, with specific target crops, pests and geographies, precise revenue estimates as well as marketing and differentiation strategies.
- (295) Development entails strong financial commitments from crop protection companies, since many of the expensive studies required for regulatory approval can apparently not be halted. Because development is so costly, these studies will typically only be launched where there is relative certainty that the AI will eventually be successfully launched – albeit perhaps with a slightly modified formulation or marketing scope reducing market prospects somewhat, for example use or dose limitations, in light of the full results of the studies and of the approval and authorisation process. It is thus statistically unlikely that a product in development will eventually not be launched.
- (296) Finally, companies will apply for registration of their products, a process taking several years during which they may be called upon to provide additional data.
- (297) Accordingly, the likelihood of success is very different in crop protection than it is in the pharmaceutical industry. It gradually increases in the discovery phase, from a relatively low level in the early stages – albeit higher than for pharmaceutical candidates in the pre-clinical phase – to higher levels in the later stages ([...]). Moreover, because the main toxicology and environmental screenings are increasingly done as early as possible in discovery, the likelihood of success becomes very high as soon as the molecule is moved into development, with an 80 to 90% chance of reaching the market.

Figure 18 – [Reference to internal document]

[...]

Source: *[Internal document] (ID1329-155), [date], slide 9*

- (298) In spite of this very high likelihood of success, market launch is still many years away because the regulatory constraints for registration – particularly in the EEA – make the requisite studies long, resulting in a prolonged development phase. The processing of applications for registration also takes a significant number of years.
- (299) Hence, pipeline projects in crop protection will have a significant likelihood of reaching the market much earlier than similar pharmaceutical projects. By way of

illustration, projects approximately six to eight years away from launch will have no more than a 10% to, at best, 30% chance of launch in the pharmaceutical sector, whereas similar projects in crop protection will have an 80 to 90% chance. Conversely, pharmaceutical projects will only reach an 80 to 90% likelihood of success once the results of the Phase III trials have been assessed and decisions are made regarding launch, which will be fairly close to effective product launch.

- (300) In parallel, this long development and registration lead time means that detailed testing of mixture concepts and sales plans, including relatively detailed roll-out and business plans by crop and geography, will be prepared already six to eight years before effective launch.
- (301) This is made possible by the fact that crop protection companies have some visibility on competitor pipelines through publicly available information such as patent applications – the subject-matter of which they typically manufacture and test – filings for ISO names, and investor presentations. With this close monitoring of competing pipelines, crop protection companies are able to somewhat reliably assess the competitive dynamics of the market for the coming decade. In fact, they are compelled to do so in order to assess the revenue potentials of their own pipeline products, and make business and investment decisions on that basis. Because discovering and developing new products takes a long time, these anticipations are very unlikely to be unexpectedly disrupted.
- (302) The Commission thus concludes that, in crop protection, the assessment of potential competition should take into account AIs which have entered or are about to enter the development stage (as defined in Section V.1.4.2), and accordingly have a significant likelihood of being launched on the market in spite of this launch in Europe sometimes being six to eight years away.

4. CROP PROTECTION MARKET DEFINITION PRINCIPLES

4.1. Introduction

- (303) Agrochemical companies mainly sell formulated products to crop protection distributors or cooperatives of farmers and seed treatment products to seed suppliers (which are very often the same as for crop protection).
- (304) In addition, R&D agrochemical companies sell their technology on the upstream market through the *licensing* of AIs (which may include IP rights, data, registration, etc.) to competing crop protection players. This can also take the form of a *supply* of AIs which encompasses a transfer of technology. The receiving party may then use those AIs as an input to produce their own formulated products benefiting from the licensor's/supplier's proprietary technology (for example IP rights, data, etc.). These sales are to be distinguished from the bulk supply of off-patent¹⁰⁷ (generic) AIs when it does not involve any transfer of technology (that is to say no IP, data package, etc.).
- (305) Finally, it is also necessary to consider the innovation efforts of R&D agrochemical companies to discover and develop new AIs which will then feed into the sales of AIs and of formulated products.

¹⁰⁷ "Off-patent" in this context means AIs which do not enjoy any more patent, data or other types of protection.

4.2. Crop protection formulated product markets

4.2.1. Relevant product markets

- (306) According to the Commission notice on the definition of relevant market for the purposes of Community competition law (the "Market Definition Notice"), a relevant product market comprises all those products which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics, their prices and their intended use (paragraph 7). According to paragraph 13 of the Market Definition Notice, "*firms are subject to three main sources or competitive constraints: demand substitutability, supply substitutability and potential competition*".
- (307) The main criteria for the definition of the relevant market is demand side substitutability according to which "*the range of products which are viewed as substitutes by the consumer*" should be in the same relevant market (paragraph 15 of the Market Definition Notice).
- (308) Crop protection formulated products consist of finished products that are mixtures of active and inert ingredients (such as solvents, fillers, and adjuvants) ready to be applied for their respective purpose. These latter ingredients aim at making the AIs more stable, effective, or safer or easier to apply. The farmers are the ultimate consumers of formulated products.
- (309) The Parties argue in their response to the Statement of Objections that the segmentation of markets for crop protection formulated product by crop-pest combinations is too narrow from a demand-side and supply-side perspective and suggest to consider instead ranges of pests and crops.¹⁰⁸ This is because while products are differentiated as regards driving pests, all of them cover a range of pests, and the farmer will take that into account when deciding between different products.
- (310) The Commission considers instead that farmers buy a formulated crop protection product to address their particular needs. They will choose based on the crop, pest(s), timing, etc., they want to target. In line with the Market Definition Notice, this implies a narrow relevant product dimension consisting of a crop/pest combination. In fact, in general, a formulated product that applies to a given crop/pest combination is not substitutable from the farmer point of view with another product that applies to a different crop/pest combination.
- (311) Moreover, all formulated products have a label that typically indicates AIs, formulation, permitted use crops, pests targeted, options for compatible tank mixing, crops that can be sown after a crop treated with the product, safety instructions, etc. As explained by a technical institute for herbicides "*products are authorized for a specific use, that is to say for a given type of seeds and a precise crop*".¹⁰⁹ This implies that off-label use or misuse by market participants is typically uncommon¹¹⁰ and potentially subject to fines.

¹⁰⁸ Parties' response to the Statement of Objections, pages 208-212.

¹⁰⁹ Agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557). Courtesy translation from French: "*les produits sont autorisés pour un "usage" particulier, c'est-à-dire sur un type de mauvaises herbes et pour une culture précis*".

¹¹⁰ Agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7383). [Quote from internal document] (ID6696-15304).

- (312) Based on recitals (306) to (311) and according to previous Commission decisions,¹¹¹ from a demand-side perspective, formulated products can be distinguished notably by target crop, target pest, and other specific features as elaborated in Sections V.6.3 to V.6.6 more for herbicides, insecticides, nematicides and fungicides.
- (313) Supply side substitutability may be considered for product market definition when *"suppliers are able to switch production to the relevant products and market them in the short term without incurring significant additional costs or risks in response to small and permanent changes in relative prices"* (paragraph 20 of the Market Definition Notice). According to paragraph 14 of the Market Definition Notice *"the competitive constraints arising from supply side substitutability other than those described in paragraphs 20 to 23 [...] are in general less immediate and in any case require an analysis of additional factors. As a result such constraints are taken into account at the assessment stage of competition analysis"*.
- (314) As explained in Section V.1.4, the discovery and production of a new formulated product involves high costs (above USD 250 million) and a long period of time (above 10 years). This implies that a supplier producing a given formulated product targeting a given crop/pest combination cannot start competing in the short term and without incurring in significant costs for another crop/pest combination, if the label of the product does not allow for this use.
- (315) [Reference to internal documents].¹¹²
- (316) The Commission notes that some crop protection products of the Parties are registered for several crop/pest combinations. However, this does not imply that the relevant product market should include all those combinations since products targeting several crop/pest combinations only partially overlap among them.
- (317) For instance, consider the case of an herbicide A targeting cereals and oilseed rape, and an herbicide B targeting cereals and corn. Those two formulated products partially overlap for cereals. If one includes on the same relevant market all products targeting cereals, oilseed rape and corn, one would be incorrectly assuming that formulated product B would be an option for a farmer with a need for oilseed rape. In other words, by widening the relevant market to include several crops one would be overestimating the competitive pressure of formulated products which cannot be applied for some of those crops.
- (318) In spite of relevant product markets corresponding to a crop/pest combination, from a practical point of view, it will be impossible to assess so many narrow markets. Therefore, in order to conduct a meaningful assessment, the Commission will, in Sections V.6.3 to V.6.6, consider sometimes groupings of crop/pest combinations. Such groupings can be seen in some of the Parties internal documents, as well as in reports from specialised consultancies such as Phillips McDougall. However, these aggregate groupings may hide relevant product markets where the Parties shares are higher than the grouping shares.
- (319) Based on recitals (306) to (318), the Commission considers that the relevant product market for formulated products correspond to segmentations by crop/pest combination. Throughout the Decision the Commission will try to identify these

¹¹¹ See for instance Commission Decision in Cases M.1806 – AstraZeneca/Novartis (2000) and M.2547 – Bayer/Aventis Crop Science (2002).

¹¹² Parties' response to Article 11(3) decision of [...].

markets and to make the assessment at that level. For the sake of convenience grouping shares will also be presented, bearing in mind their limitations.

4.2.2. *Relevant geographic markets*

- (320) In the past, the Commission assessed the formulated products markets as national in scope, since their authorisation is still regulated at the national level¹¹³ and each Member State remains responsible for maintaining specific national data requirements.
- (321) The Parties, however, claim that the situation has evolved significantly over the past 15 years and that markets are now Union-wide or at least regional, notably for the following four reasons.¹¹⁴
- (322) First, they argue that conditions of competition do not substantially differ across the EEA and that the main large, international manufacturers of crop protection products are active throughout the Union/EEA.
- (323) Second, they claim that products are principally identical in all countries of the Union. Parallel imports are customary and meet minimal barriers today.
- (324) Third, they submit that distributors and co-operatives on the demand side have created pan-European alliances. Examples include 'Novafield', the alliance of European distributors that covers 12 EEA Member States, and 'Euro-A-Pro', the pan-European joint venture.
- (325) Fourth, the Parties point out that Regulation 1107 recognises the existence of three geographic zones (North, Centre and South) in the Union, which have comparable agricultural, plant health and environmental conditions.
- (326) Nonetheless, in line with the Commission's previous practice, the Parties have provided market data and a competitive assessment at the national level.
- (327) Contrary to the arguments of the Parties, the Commission's in depth investigation does not confirm that the downstream markets for formulated products are wider than national. This is notably for the following reasons.
- (328) First, the Parties' direct customers on these markets are distributors, some of which may be active in several Member States. However, these distributors' portfolio of products is adapted to varying demands of their customers in different Member States. Customers' needs, habits, and preferences appear to be dependent on geography and differ across EEA countries. Producers' design, brand products as well as their prices vary according to country. Customers of the Parties who replied to the Commission's questionnaires indicated that the relevant geographic market is national in scope, with a majority of respondents purchasing crop protection products at the local or national levels.¹¹⁵
- (329) Second, data on prices submitted by the Parties indicates national differences in price levels and evolutions for the same products.

¹¹³ See Commission Decision in Cases M.2547 – Bayer/Aventis Crop Science (2002), recital 23-27; M.1806 – AstraZeneca/Novartis (2000), recital 82-83; and M.1932 – BASF/American Cyanamid (AHP) (2000), recital 29-31.

¹¹⁴ Form CO, part B.I, paragraph 85.

¹¹⁵ Questionnaire to Crop Protection Customers (Q1), question 57.

- (330) Third, authorisations have remained national. In practice, the zonal system described in Regulation 1107 has not been implemented widely yet. This is indicated in some internal documents of the Parties,¹¹⁶ as well as underlined by the European Crop Protection Association ("ECPA").¹¹⁷ Market participants also underlined the limited application of the zonal system. For instance, "[s]ometimes formulations are authorised in other Member States but, despite theoretical mutual recognition, not authorised in the UK".¹¹⁸
- (331) One competitor also stated that "*geographic markets remain national, due to the regulatory process. This is because although registration for active ingredients is done at EU level, what counts is the registration at national level for the formulated products, which is done by crop and type of pest. While in theory there is a system of zones, the concept of mutual recognition of products has a negligible effect in practice. Parallel imports are also negligible (less than 1%). There are also differences in climate. Distribution channels vary by country, and customers are typically organised at national level due to language and the need for customer proximity. Countries also vary in their regulatory approach, for instance the Netherlands place significant emphasis on ground water protection*".¹¹⁹ Parallel trade exists but is limited, as will be detailed in Section V.6.2.3.
- (332) Based on recitals (320) to (331), the Commission considers that the markets for formulated products are national in their geographic scope.

4.3. Technology markets

- (333) As explained in recital (304), R&D companies may sell their technology to competing crop protection players through the *sale or licensing of AIs* (which may include IP rights, data, registration, etc.). These "sales" can also take the form of swaps between R&D companies through which one company obtains access to a given third-party AIs in exchange of giving access to its own AIs.
- (334) In past decisions,¹²⁰ the Commission found that each AI constitutes a separate product market, although recently it left open whether for off-patent ingredients broader markets exist including all AIs within the same class of molecules.¹²¹ The Parties argue that for the purposes of the Transaction the exact market definition can be left open.
- (335) The Commission investigation confirmed that there is active trading of AIs between crop protection players. Hence, the Parties have so-called "technical sales" of various AIs to other companies. Also, the majority of the relevant respondents to the

¹¹⁶ See for instance [internal document] (ID1329-199), [internal document] (ID1034).

¹¹⁷ See ECPA position paper ECPA Position on the future revision of Regulations 1107/2009 and 396/2005, July 2015.

¹¹⁸ Agreed non-confidential minutes of a call with a farmers' association, 18 March 2016 (ID8254). See also Questionnaire to Crop Protection Competitors (Q2), question 28, "*Mutual recognition does not work well because of lack of uniformed document exchanges between member's states*" (ID4027).

¹¹⁹ Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248).

¹²⁰ See Commission Decision in Cases M.6141 – CNAC/Koor Industries/Makhteshim Agan Industries (2011) and M.2547 – Bayer/Aventis Crop Science (2002).

¹²¹ See Commission Decision in Case M.6141 – CNAC/Koor Industries/Makhteshim Agan Industries (2011).

Commission questionnaires stated that they (cross-)license or purchase AIs from other companies.¹²²

- (336) The relevant actors on the demand side for the sale and licensing of AIs are different from those in downstream markets for formulated products. Customers of these products are other producers of crop protection products. Also the relevant actors on the supply side are often different. There are fewer upstream developers and suppliers of AIs than downstream producers of finished formulated products. It is also possible to distinguish those suppliers (originators) who license or sell molecules they brought to the market, as is the case for the global integrated crop protection companies, from chemical companies that in some instances have manufacturing abilities of off-patent AIs.
- (337) In line with the Commission's Guidelines on the application of Article 101 of the Treaty on the Functioning of the European Union to technology transfer agreements¹²³ (the "Technology Transfer Guidelines") the Commission considers that the Parties are active and compete on upstream technology markets.
- (338) The Technology Transfer Guidelines define technology as an input, which is integrated either into a product or a production process. As such, technology right licensing can affect competition both upstream in input markets and downstream in output markets: "*[f]or instance, an agreement between two parties which sell competing products downstream and which also cross license technology rights relating to the production of these products upstream may restrict competition on the downstream goods or services market concerned. The cross licensing may also restrict competition on the upstream market for technology and possibly also on other upstream input markets. For the purposes of assessing the competitive effects of licence agreements it may therefore be necessary to define the relevant product market(s) as well as the relevant technology market(s).*"¹²⁴
- (339) In line with the assessment in the Article 6(1)(c) Decision, however, the Commission finds that it is possible to draw a distinction between the licensing and sale of AIs (including swap) involving technology from the mere bulk supply of AIs which, besides being off-patent, do not involve any transfer of technology.
- (340) As regards geographic markets, the Parties submit that the geographic scope for AI markets is at least EEA-wide, if not worldwide.
- (341) Because the Transaction would not raise competition concerns at the level of the technology markets or the supply of AIs, the exact scope of the product and geographic market for the sale and licensing of AIs can be left open.

4.4. Innovation spaces

4.4.1. Product dimension

- (342) As explained in recital (304), R&D companies engage in innovation efforts to discover and develop new AIs.
- (343) In the US, the antitrust agencies have used the concept of innovation markets. The recent proposal for "Antitrust Guidelines for the Licensing of Intellectual Property"

¹²² Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 63.

¹²³ OJ C 89, 28.3.2014, pages 3-50.

¹²⁴ Technology Transfer Guidelines, paragraph 20.

issued by the DoJ and FTC (Federal Trade Commission), distinguishes between goods markets, technology markets and research and development market.¹²⁵

- (344) Goods markets correspond to the markets where the final product is sold. In the current case it corresponds to formulated products.
- (345) Technology markets "*consist of the intellectual property that is licensed (the 'licensed technology') and its close substitutes—that is, the technologies or goods that are close enough substitutes to constrain significantly the exercise of market power with respect to the intellectual property that is licensed*".¹²⁶ This is similar to the concept of technology market defined in Section V.4.3.
- (346) Research and development markets "*consists of the assets comprising research and development related to the identification of a commercializable product, or directed to particular new or improved goods or processes, and the close substitutes for that research and development*".¹²⁷
- (347) According to the Technology Transfer Guidelines, "*innovation is a source of potential competition which must be taken into account when assessing the impact of the agreement on product markets and technology markets. In a limited number of cases, however, it may be useful and necessary to also analyse the effects on competition in innovation separately. This is particularly the case where the agreement affects innovation aiming at creating new products and where it is possible at an early stage to identify research and development poles. In such cases it can be analysed whether after the agreement there will be a sufficient number of competing research and development poles left for effective competition in innovation to be maintained*".¹²⁸
- (348) When considering both the downstream product markets and the upstream technology markets, innovation should not be understood as a market on its own right, but as an input activity for both the upstream technology markets and the downstream [...] markets. This however does not prevent the Commission to assess the impact of the Transaction at the level of innovation efforts by the Parties and its competitors.
- (349) First, the assessment of innovation competition requires the identification of those companies which, at an industry level, do have the assets and capabilities to discover and develop new products which, as a result of the R&D effort, can be brought to the market.
- (350) Secondly, it is also relevant to identify and analyse those spaces in which innovation competition occurs in the crop protection industry. The R&D players do not innovate for all the product markets composing the entire crop protection industry at the same time. They also do not innovate randomly without targeting specific spaces within that industry. When setting up their innovation capabilities and conducting their research R&D players have specific discovery targets ([...]).

¹²⁵ DoJ and FTC, "Antitrust Guidelines for the Licensing of Intellectual Property", 12 August 2016.

¹²⁶ DoJ and FTC, "Antitrust Guidelines for the Licensing of Intellectual Property", 12 August 2016.

¹²⁷ DoJ and FTC, "Antitrust Guidelines for the Licensing of Intellectual Property", 12 August 2016.

¹²⁸ Technology Transfer Guidelines, paragraph 27.

* Should read: product.

- (351) A given discovery target is based on lead crops and lead pests and may thus comprise AIs that can be used in several downstream formulated product markets (for example chewing Lepidopteran insecticides, broadleaf herbicides). The spaces where innovation competition takes place are thus broader than an individual downstream crop protection market, but are nonetheless small. In fact, in light of increasing regulatory hurdles, which require crop protection products to be ever more selective, the innovation spaces in the crop protection industry are getting ever smaller: the innovation output tends to be confined to ever narrower spaces from which it is more difficult to adapt the innovation to other purposes.
- (352) In conclusion, in order to assess innovation competition, the Commission will both consider metrics of innovation taking place at industry level, as well as innovation taking place in spaces consisting of groupings of crop/pest combinations (as will be defined specifically for the areas where the Parties overlap in Section V.8.8).

4.4.2. *Geographic dimension*

- (353) On the one hand, AIs are typically developed globally for sales in several regions, depending on the crops targeted. R&D companies also pursue global strategies for patents.
- (354) During the Commission's market investigation, market participants overall indicated that innovation in the crop protection industry takes place on a global level. Respondents to the Commission's questionnaires notably indicated that (i) major industry issues are of global importance (for instance whiteflies, moths, thrips), and (ii) new solutions are predominantly developed by international companies.¹²⁹
- (355) On the other hand, because innovation is developed aiming at innovation spaces that can be defined by groupings of crop/pest combinations, and given the specificities of different regions of the world as regards the main crop and pests, the competitive environment may differ significantly among regions like EEA, North America, Asia, South America, etc.
- (356) For instance, some companies, like the Japanese, primarily seek herbicides, fungicides, and insecticides for rice and other crops present in their geographic area and only occasionally these molecules have also application in European agriculture.
- (357) Weather and soil conditions also differ from region to region and thus companies that want to have a strong presence in a given region need to have assets for testing in those regions.
- (358) Moreover, there are differences in the regulatory requirements of different regions of the world. In particular, in the Union the registration requirements are tougher than in most of the other regions.
- (359) As explained in Section V.1.4.3, according to Union legislation, crop protection products must undergo two regulatory steps before they can be placed on the market. In the first step, the AI must be approved by the Union, which implies the obligation to submit extensive test data. In the second step, formulated plant protection products that contain the AI (or a mix of several AIs) must be authorised in each Member State where they will be employed.

¹²⁹ Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 34.

- (360) According to the Parties "*a number of regional factors tend to impact the focus of companies' innovation efforts, relating to the key crops grown in a region, the corresponding pest, weed and disease control requirements, local environmental conditions, the level of control offered by existing products on the market, and local regulatory requirements*".¹³⁰
- (361) Based on recitals (353) to (360), the Commission considers the innovation spaces to be global, with strong differentiation between the different regions, or at least EEA-wide.

5. MARKET SHARES: SOURCES AND METHODOLOGIES

5.1. Market shares relevant for product competition

- (362) The Commission illustrates its assessment of competition at the formulated product level with shares computed at the level of crop/pest combination groupings, at the national level. The Commission also uses shares for these groupings at the EEA level for context, as being informative of the strength of market players at the level of their portfolio of AIs, as well as shares of R&D suppliers, as being informative of the relative strength of suppliers bringing new AIs in the market.

5.1.1. The Parties' markets shares provided in the Form CO

- (363) As from the pre-notification stage and during part of the Phase I investigation, the Commission and the Parties had numerous and extensive discussions regarding the data and the methodology used by the Parties for the computation of the market shares in the Form CO, as well as regarding the various results obtained through this process. In that context, the Commission issued at least five pre-notification and five post-notification requests for information partly or entirely devoted to issues related to market shares.¹³¹
- (364) The methodology note attached to the Form CO provided limited information on the Parties' data and methodology used for the computation of markets shares provided in the Form CO, in particular in light of the importance of market shares in a case with, potentially, hundreds of affected relevant (downstream) markets for formulated products.¹³²
- (365) In responding to the Commission's request to "*provide an updated methodology note [...] explaining in detail the preparation of all global data and indicating sources for their respective data point, year, unit*",¹³³ [reference to Parties' submission].¹³⁴ [Details on communication regarding market share methodology].
- (366) Overall, [information regarding discussions on market share methodology].
- (367) [Details on market share methodology].¹³⁵

¹³⁰ Form CO.

¹³¹ For more details, see Annex 3, Section 2.1.

¹³² For more details, see Annex 3, Sections 2.2, 2.3 and 2.4.

¹³³ Commission's request for information [date], question 2, reiterating question 2 of the Commission's request for information RFI 16.

¹³⁴ Parties' response to the Commission's request for information [date], question 2 (reiterating question 2 of RFI 16), [date] (ID5025).

¹³⁵ For more details, see Annex 3, Section 2.5.

- (368) In light of the limited time available in a Phase I investigation and of the elements described in recitals (363) to (367), in particular given the difficulties faced by the Commission, despite its efforts, to be provided with sufficient level of information on the data selection and on the methodology used by the Parties, the Commission considered necessary to compute market shares for formulated products.
- (369) The Commission notes that, [information regarding discussions on market share methodology].^{136,137}
- 5.1.2. *Data used by the Commission for the computation of markets shares on the (downstream) relevant markets for formulated products*
- (370) For the purpose of the calculation of market shares and related figures, such as concentration measures, for the purpose of the assessment of the present Transaction on the (downstream) relevant markets for formulated products, the Commission relied on databases provided by a third party, Agrobases-Logigram,¹³⁸ through its product called Agrowin.¹³⁹
- (371) The Commission understands that Agrowin is widely used and recognised in the agrochemical industry. [...].¹⁴⁰
- (372) Agrowin defines itself as the "*crop protection and seeds use database*", which compiles information on the use of pesticides and seeds from multiple sources: "*Agrowin is better labelled as 'use data' rather than 'sales data'. Indeed, Agrowin tracks quantities and prices of products used by farmers, which only partly correspond to the products sold by suppliers.*"¹⁴¹ In a nutshell, the added value of Agrowin is to standardise the primary data obtained from panel companies and to provide its users with a standardised set of variables valid across the various primary data.
- 5.1.3. *The Commission's markets shares and concentration measures used in the Decision for the purpose of the assessment of the present Transaction on the (downstream) relevant markets for formulated products*
- (373) As explained in Section V.4.2.1 detailing market definition principles for relevant crop protection formulated product markets, the Commission considers that, in general, the relevant product markets for formulated products correspond to segmentation by crop/pest combinations. Nevertheless, the Commission decided, in order to be in a position to conduct a meaningful assessment of the Transaction, to group crop/pest combinations into "markets".¹⁴²
- (374) The market shares and the concentration measures computed by the Commission therefore reflect such grouping and use different methodologies to allocate sales value to each of these groupings. Whenever no data are available from Agrowin, the Commission's assessment relies on figures provided by the Parties.

¹³⁶ [Internal document] (ID7081-2531).

¹³⁷ Agrowin is a database used [...] by the Commission, in part for the purpose of computing market shares for downstream formulated products.

¹³⁸ See <http://www.agrobases-logigram.com/index.html>.

¹³⁹ See <http://www.agrobases-logigram.com/pages/agrowin.html>.

¹⁴⁰ See, for example, [internal document] (ID7079-363) or [internal document] (ID6826-796). [...].

¹⁴¹ Agreed non-confidential minutes of a call with Agrobases-Logigram, 12 August 2016 (ID7747).

¹⁴² For more details, see Annex 3, Section 3.

- (375) The Commission uses market shares in this Decision for the purpose of assessing the likely effects of the Transaction on downstream formulated products (at the level of market groupings) though, because of the grouping of markets, these market shares are meant to provide an informative approximation at an aggregated level of relevant markets.
- (376) Moreover, as shown in Section V.1.5, suppliers present in a given relevant market can be divided in different categories, among which R&D suppliers, which have innovated and continue to innovate by identifying new AIs, and generic suppliers, which copy inventions brought by R&D players when their related patent protections expire.
- (377) While, in some (downstream) relevant markets, generic suppliers can supply a significant share of the volumes sold in that market, these suppliers will not bring any new products, that is products with new AIs, but will mainly provide farmers with combination of already invented AIs. As a consequence, the presence and relative strength of R&D players provide contextual elements to be factored in the Commission's assessment of a specific relevant (downstream) market.¹⁴³
- (378) Finally, the Commission also calculates several concentration measures, including the Herfindahl-Hirschman index ("HHI").¹⁴⁴

5.2. Market shares relevant for innovation competition

- (379) As regards innovation competition the Commission will focus on measures of innovation output.
- (380) In an Advocacy Paper,¹⁴⁵ the Parties propose to calculate shares on innovation and assess the R&D companies' strength based on R&D input measures, such as R&D expenditure, and output measures, such as patent applications count and number of AIs launched. This approach is further proposed in the report of one of the Parties' experts.¹⁴⁶
- (381) In this report, the Parties' expert also discussed why the direct metrics proposed would be superior to the Commission's methodology as set out in the Article 6(1)(c) Decision.
- (382) On R&D expenditure,¹⁴⁷ the report acknowledges that this is an input, but because there is uncertainty in innovation, looking strictly at *ex post* measures of output can be misleading.
- (383) As regards output measures,¹⁴⁸ the report indicates that the number of patent applications and the number of new AIs introduced are both more direct measures of innovation than downstream figures used by the Commission, and contend they remain more direct and relevant than the preliminary approach retained by the Commission in its Article 6(1)(c) Decision.

¹⁴³ For more details, see Annex 3, Section 4.

¹⁴⁴ For more details, see Annex 5.

¹⁴⁵ See for instance Parties' Advocacy Paper on Innovation of [date].

¹⁴⁶ [Parties' submission].

¹⁴⁷ [Parties' submission].

¹⁴⁸ [Parties' submission].

- (384) As regards R&D expenditure, the Commission maintains that such a measure is an input measure, which does not account for a number of factors that are relevant for the assessment.
- (385) The Parties' expert contends that, for instance, the Phillips McDougall report has available data for the top 35 firms, and other firms than leading innovators collectively have a billion dollar worth of crop protection expenditure. As it will further be explained in Section V.8.6.3, however, not all these firms have comparable capabilities nor do they necessarily focus on R&D aimed at discovery or development of new AIs. Also generic companies often report figures for an R&D budget, focused for instance on new formulations of existing AIs. Moreover, output measures are better suited to describe relevant capabilities and expertise of crop protection companies and their track record of bringing innovation in crop protection markets.
- (386) In the Sections V.5.2.1 and V.5.2.2, the Commission will discuss which output measures it regards as most representative of the companies' position and strength at innovation level.
- 5.2.1. *The "patent shares" used by the Commission in the Decision for the purpose of the assessment of the present Transaction on innovation competition*
- (387) One of the relevant activities within crop protection R&D is, as explained in Section V.1.4.1, the discovery of new molecules (AIs), which are normally patented by the discovering company. While different companies have different patenting strategies, the analysis of the patent portfolio of crop protection companies can be a metric to assess their strength at the discovery level.
- (388) [Information on R&D]¹⁴⁹.
- (389) Instead, the economic literature suggests using patent citations to measure the importance of a patent, that is to say the quality or value of a patent. This amounts to count the number of times each patent has been cited in subsequent patents to compute, on that basis, a citation-based index as a measure of innovative output.¹⁵⁰ One important finding of the economic literature is that citation-based indexes are informative on the technological importance of patents.
- (390) For that purpose, the Commission uses several data sources, submitted by the Parties at the request of the Commission:¹⁵¹ [Information on patent data].
- (391) Moreover, the Commission used data and metrics from a service provider, PatentSight.¹⁵² PatentSight defines itself as "*providing reliable and relevant benchmarks of patent portfolios to key decision makers in technology companies. To derive reliable insights it is key to measure actual patent strength rather than mere patent filings. This is achieved by the Patent Asset Index™ methodology [... which] considers both the quantity and the quality of patents in a portfolio.*"¹⁵³

¹⁴⁹ See for instance [internal document] (ID7064-526): [quote from internal document].

¹⁵⁰ Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics.

¹⁵¹ Parties' response to the Commission's request for information RFI 45, in particular question 3, [internal document].

¹⁵² See <https://www.patentsight.com/>.

¹⁵³ See <https://www.patentsight.com/>, main page (last accessed on 29 November 2016).

- (392) [Information on patent data].¹⁵⁴ It is recognised in the industry as a reference as regards patents. For example, PatentSight's website displays the following quote from the Executive Vice President and CTO of Dow: "*[t]he Patent Asset Index provides an accurate view of the impact and efficiency of an enterprise's investment in innovation.*"¹⁵⁵
- (393) The citation-based indicator is based essentially on the number of worldwide citations received from later patents, as reported and adjusted for age, patent office practices and technology fields by PatentSight. Citations to a given patent come from any subsequent patents, including from patents owned by the same firm as the one holding the cited patent (internal citations, also called self-citations).
- (394) The difficulty in interpreting internal citations is that they increase mechanically with the size of the patent portfolio because the more patents a firm has, the higher is the probability that a citation from a new patent will be given by a patent that it already owns. Therefore, firms with a larger portfolio size have mechanically a larger number of internal citations, regardless of whether internal citations are indicative of the value of a patent. The link between internal citations and the quality of a patent is likely to be weakened with the size of the patent portfolio due to this mechanical effect.
- (395) On that basis, the Commission considers external citations to measure the quality of a patent¹⁵⁶ and uses total citations, that is citations including internal and external citations, as a sensitivity analysis.
- 5.2.2. *The "new active ingredients" shares used by the Commission in the Decision for the purpose of the assessment of the present Transaction on innovation competition*
- (396) In addition, the Parties suggest that the number of new AI launches is a good measure of innovation output. For instance, in a presentation provided at a meeting held on [date], the Parties provided an overview of launches of new AIs in the period 2005-2016, showing a number of other players launching new AIs.
- (397) The Commission maintains that the total number of new AIs may not account for their quality and commercial significance.
- (398) AIs are likely to differ greatly in their quality, as suggested also by the analysis of patent data (see Annex 1). In order to measure for the effective significance of the R&D output of crop protection companies, one must use a measure which may keep into account the commercial success of the AIs launched by crop protection companies.
- (399) Gauging the commercial success of AIs allows controlling for an important factor affecting the development capabilities of crop protection companies, that is their capability to develop an AI on a large scale and to distribute it to enable its commercial success on the market.
- (400) The Parties themselves seem to implicitly acknowledge that the commercial success of an AI is an important factor when assessing the relevance of the innovation effort of crop protection companies. For instance, the Parties also propose an analysis of the strength of a number of crop protection companies' innovation effort as measured

¹⁵⁴ [Parties' submission] (ID5963). [Internal document] (ID6035-1).

¹⁵⁵ See <https://www.patentsight.com/>, main page (last accessed on 29 November 2016).

¹⁵⁶ See Annex 1 for more details.

by the turnover generated by the AIs they launched on the market ("*blockbuster AIs*").¹⁵⁷

- (401) Moreover, in case of an eventual reduction of innovation by a company introducing AIs with a large scale, this could hardly be compensated by the introduction of new AIs without any commercial relevance in the market for formulated products. Thus weighting competitors innovation activity (that is the number of AIs) by the commercial success of the AIs launched in recent years is an important element to measure their ability to counteract any reduction on innovation by the Parties.
- (402) Therefore, on the basis of information submitted by the Parties at the request of the Commission, which contain information on AIs introduced since 1995,¹⁵⁸ the Commission provides an assessment of the innovation output by weighing the importance of the new AIs introduced by R&D players according to the 2015 turnover generated by each AI in the global market as well as in Europe.

6. COMPETITIVE ASSESSMENT: PRODUCT AND PRICE COMPETITION

6.1. Test under the Merger Regulation and the Horizontal Merger Guidelines and theory of harm in this case

6.1.1. Legal basis

- (403) In this section the Commission will focus on the assessment of the effects of the Transaction on product and price competition as opposed to innovation competition.
- (404) Article 2 of the Merger Regulation stipulates that "[a] concentration which would significantly impede effective competition, in the common market or in a substantial part of it, in particular as a result of the creation or strengthening of a dominant position, shall be declared incompatible with the common market." In its appraisal, the Commission is required by the Merger Regulation to take into account, among others, the need to maintain effective competition in light of the structure of the markets concerned, the market position of the undertakings concerned and their economic and financial power, as well as the development of technical and economic progress provided that it is to consumers' advantage and does not form an obstacle to competition.
- (405) Recital (25) of the Merger Regulation clarifies that the language of Article 2 is meant to encompass the appraisal of the effects of concentrations in oligopolistic markets, and in particular those that may significantly impede effective competition by the elimination of important competitive constraints that the merging parties had exerted upon each other as well as by a reduction of the competitive pressure on the remaining competitors.
- (406) Recital (28) of the Merger Regulation clarifies that the Commission may publish guidance aimed at providing a sound economic framework for the assessment of concentrations, with a view to determining whether or not they may be declared compatible with the internal market.
- (407) In this context, the Horizontal Merger Guidelines provide further guidance on the underpinning concepts of the Commission's assessment.

¹⁵⁷ See pages 6 to 8 [Parties' submission], slide 4.

¹⁵⁸ Parties' response to Commission's request for information RFI 38, question 5, [date] (ID6854 and ID6855).

(408) The Transaction consists of the merger of two crop protection R&D companies active in a large number of crop protection product markets in the EEA, with significant combined market shares in several of these markets.

6.1.2. *Focus on non-coordinated effects*

(409) Horizontal mergers, such as the Transaction, may significantly impede effective competition within the meaning of Article 2(3) of the Merger Regulation in two ways – through non-coordinated and/or coordinated effects. This Decision focusses on non-coordinated effects, characterised as *"eliminating important competitive constraints on one or more firms, which consequently would have increased market power, without resorting to coordinated behaviour"*.¹⁵⁹

(410) The *"most direct effect"* of such a merger will *"be the loss of competition between the merging firms"*, in this case the loss of competition between Dow and DuPont.

(411) The Horizontal Merger Guidelines indicate that such a horizontal merger can also lead to the reduction of competitive pressure on other competitors: *"[n]on-merging firms in the same market can also benefit from the reduction of competitive pressure that results from the merger, since the merging firms' price increase may switch some demand to the rival firms, which, in turn, may find it profitable to increase their prices."*¹⁶⁰

(412) Paragraph 25 of the Horizontal Merger Guidelines distinguishes two ways in which non-coordinated effects result in a significant impediment of effective competition.

(413) Firstly, *"[g]enerally, a merger giving rise to such non-coordinated effects would significantly impede competition by creating or strengthening the dominant position of a single firm"*.

(414) Secondly, *"mergers in oligopolistic markets involving the elimination of important competitive constraints that the merging parties previously exerted upon each other together with the reduction of competitive pressure on the remaining competitors may [...] also result in a significant impediment of competition."*

(415) These two alternatives are not mutually exclusive, since a merger may both eliminate important competitive constraints and in addition and at the same time create or strengthen a dominant position of a single firm.

(416) In this Decision, many product and geographic markets are at stake when looking at crop protection product markets in the EEA, and various situations arise in various markets with the Transaction. Depending on the situation, the Transaction will be assessed under the first or second or both alternative(s) in Sections V.6.3 to V.6.6.

(417) In some instances, a forthcoming product, just launched or close to be launched, will not appear in the current existing market shares, for instance Dow's Arylex herbicide, which is expected to be a successful product on the market. In these cases the Commission will examine the potential competition exerted by these products.

(418) In fact, paragraph 58 of the Horizontal Merger Guidelines indicates that *"[c]oncentrations where an undertaking already active on a relevant market merges with a potential competitor in this market can have similar anti-competitive effects to mergers between two undertakings already active on the same relevant market and,*

¹⁵⁹ Horizontal Merger Guidelines, paragraph 22.

¹⁶⁰ Horizontal Merger Guidelines, paragraph 24.

thus, significantly impede effective competition, in particular through the creation or the strengthening of a dominant position".

- (419) Paragraph 60 of the Horizontal Merger Guidelines describes two basic conditions for a merger with a potential competitor to have significant anti-competitive effects: "*[f]irst, the potential competitor must already exert a significant constraining influence or there must be a significant likelihood that it would grow into an effective competitive force. Evidence that a potential competitor has plans to enter a market in a significant way could help the Commission to reach such a conclusion. Second, there must not be a sufficient number of other potential competitors, which could maintain sufficient competitive pressure after the merger*".
- 6.1.3. *Factors taken into account by the Commission for the assessment of whether significant non coordinated effects are likely*
- (420) Paragraphs 27 to 38 of the Horizontal Merger Guidelines list a number of factors which may significantly impede effective competition by influencing the ability and incentives of the merging parties to increase prices or affect other parameters of competition. Paragraph 26 of the Horizontal Merger Guidelines states that (i) taken separately these factors do not have to be decisive, (ii) not all these factors need to be present for such effects to be likely and (iii) the list should not be considered as exhaustive.
- (421) First, the Commission will present the Parties' market shares in the various crop protection product markets.
- (422) According to paragraph 27 of the Horizontal Merger Guidelines, "*the larger the market share, the more likely a firm is to possess market power*". And the larger the addition of market share, the more likely it is that a merger will lead to a significant increase in market power.
- (423) As will be seen in Section V.6, the Parties have very large combined market shares in several crop protection product markets. The Transaction also leads to sizeable market share additions. Given the very large pre-existing and/or combined market shares in some of the markets, the Commission will examine whether one of the Parties has a degree of market power pre-Transaction and whether that market power will be enhanced as a result of the Transaction.
- (424) Second, in line with paragraphs 25 and 28 to 30 Horizontal Merger Guidelines the Commission will examine whether the Transaction eliminates a significant and close competitor.
- (425) Under paragraphs 25 and 28 to 30 of the Horizontal Merger Guidelines, and in line with Commission practice and economic theory, it is sufficient for competitive harm to arise that the merging parties are significant and close competitors. They do not necessarily have to be the closest competitors. This is all the more true in cases where the merger creates or strengthens a new market leader with large or very large market shares.
- (426) The assessment will examine the degree of substitutability between the Parties' various crop protection products, and the importance of rivalry between them for competition in the market. "*[t]he higher the degree of substitutability between the*

merging firms' products, the more likely it is that the merging firms will raise prices significantly."¹⁶¹

- (427) As will be discussed in Section V.6, the investigation shows that Dow and DuPont are close competitors in many markets where they have overlapping products.
- (428) Third, according to paragraph 31 of the Horizontal Merger Guidelines "*[c]ustomers of the merging parties may have difficulties switching to other suppliers because there are few alternative suppliers. ... The merger may affect these customers' ability to protect themselves against price increases.*"
- (429) This Decision will assess the availability of effective alternatives, taking into account differing demand characteristics and product offers in the various crop protection product markets.
- (430) As explained in more detail in Section V.6.2 the Commission's main findings are that generics do not constitute a strong competitive constraint on the Parties and parallel trade is limited in terms of countries, product range and volumes involved. Moreover, for many markets the number of effective available alternatives is currently reduced and some of these alternatives may even be taken off the market in the near future.
- (431) Fifth, according to paragraph 38 of the Horizontal Merger Guidelines: "*effective competition may be significantly impeded by a merger between two important innovators, for instance between two companies with 'pipeline' products related to a specific product market. Similarly, a firm with a relatively small market share may nevertheless be an important competitive force if it has promising pipeline products.*"
- (432) This is particularly the case of markets where the Parties have products just launched or about to be launched that are soon expected to conquer a significant market share from rivals.
- (433) The relatively high degree of closeness of competition between the Parties together with the very high barriers to entry, large combined market shares, and limited number of alternatives are important drivers of the likelihood of anticompetitive price effects in this case.

6.1.4. *Structure of the assessment*

- (434) In light of the foregoing, the Commission's assessment will be structured as follows. In Section V.6.2 the Commission will start by analysing the general arguments of the Parties applicable to all crop protection products, namely (i) whether generics are a strong competitive constraint on the Parties (Section V.6.2.1); (ii) whether significant buyer power exists to compensate for any potential added market power from the Parties (Section V.6.2.2); (iii) whether parallel trade is an added competitive constraint, which both compensates for any potential added market power from the Parties and broadens the geographic scope of product markets beyond single countries (see Section V.6.2.3) and (iv) whether the switching data shows that the Parties are not close competitors (see Section V.6.2.4 as well as Annex 6). Section V.6.3 will assess the impact of the Transaction as regards the horizontal overlaps in herbicides. Section V.6.4 will assess the impact of the Transaction as regards the horizontal overlaps in insecticides. Section V.6.5 will assess the impact

¹⁶¹ Horizontal Merger Guidelines, paragraph 28.

of the Transaction as regards the horizontal overlaps in nematicides. Section V.6.6 will assess the impact of the Transaction as regards the horizontal overlaps in fungicides.

6.2. General arguments applicable to all crop protection products

(435) In contesting the existence of horizontal concerns in the crop protection markets, the Parties make a number of similar arguments for each type of product, namely that:

- (1) generic products are a strong competitive constraint on the Parties;
- (2) significant buyer power exists to compensate for any potential added market power from the Parties;
- (3) parallel trade is an added competitive constraint, which both compensates for any potential added market power from the Parties and broadens the geographic scope of product markets beyond single countries; and
- (4) the switching analysis shows that the Parties' customers mostly switch to generic suppliers or other branded manufacturers rather than between the Parties.

(436) Since these arguments are made at a general level applicable to all areas of crop protection (herbicides, insecticides, nematicides and fungicides), they are addressed in the following recitals as a general part of the competitive assessment.

6.2.1. Generic players are only a partial and often not significant constraint for R&D players

(437) As explained in Section V.1.5, undertakings predominantly active in the sale of products containing off-patent AIs can follow different business models. The level of competitive constraint such undertakings entail for R&D players can therefore vary significantly, and will depend on the specific market segment in which they are active. Nevertheless, it is possible to draw some general conclusions applicable across crop protection which relate to the common features of the industry and its different types of players.

(438) As explained in Section V.1.4.4, when their AIs reach the end of patent protection, R&D players are at risk of generic players being able to enter the market with copies of their products. The Commission fully acknowledges this competitive threat and does not deny that generics are viewed as a threat by the Parties. However, the investigation has shown that R&D players can address and manage the competitive constraint posed by generic players, thereby probably strongly reducing the actual threat they pose on prices and market shares.¹⁶² Because R&D players react and innovate when faced with the mere threat of generic competition, they appear able to avoid any significant competition by generic players.

(439) In particular, the Parties submitted two economic studies which do not appear to consider the defence strategies that branded manufacturers use to limit competition from generics, such as:¹⁶³ (i) the use of patents on formulated products/mixtures, (ii) market segmentation strategies with the use of mixtures (sometimes by combining off-patent AIs with on-patent AIs) to differentiate their product offerings

¹⁶² [Details on content and name of internal document] (ID6827-020443) (also [internal document] (ID1332-00619)).

¹⁶³ See also Annex 2.

from generic manufacturers, and (iii) cost improvement strategies to maintain their variable costs below generic manufacturers' so that generic manufacturers are less competitive on a variable cost basis.

6.2.1.1. Parties' arguments

- (440) First, in the Form CO, the Parties provided two economic studies by [...] aimed at assessing the competitive constraint exerted by generic suppliers.
- (441) The studies acknowledge that branded manufacturers can respond to generic entry by reducing prices and/or by introducing new and innovative mixtures products that bring added value to farmers.
- (442) In the Parties' view, the Commission essentially argues that the Parties' reactions to generic entry insulate them from any competitive constraint exerted by generic suppliers, and considers generic manufacturers to be only distant competitors to branded manufacturers.
- (443) In response to the Commission's criticism, the Parties explain that generic suppliers still represent their closest competitive constraint. In their view, both the economic analysis and the internal documents show that their competitive initiatives in recent years were primarily driven by competitive pressure from generic suppliers, not by competitive pressure from each other.
- (444) Second, the Parties argue that stable market shares do not *per se* justify the conclusion that generics are no competitive constraint. On the contrary, stable market shares could be a sign of rigorous competition.
- (445) Third, the Parties argue that internal documents point to generics as their closest competitors and a constant threat, forcing other R&D players to develop defence strategies to defend their market position.
- (446) By contrast, the Commission would allegedly focus on a very small number of internal documents, quoted out of context and which would not support the Commission's conclusions.
- (447) Fourth, in the Parties' view, the Commission has failed to take into account the bulk of the evidence they submitted showing that generic players fully compete with equivalent quality, and face the same regulatory constraints as R&D players.¹⁶⁴
- (448) Fifth, the Parties argue that, while a "*majority of respondents said that generics are not able to solve all farmer needs*", that also applies to branded players since no individual company can solve all farmers' needs. Moreover, such broad statements would not indicate that generics do not constrain the Parties in specific relevant markets. They conclude that, on balance, the key documents made available to them show that responses to the investigation were quite positive.

6.2.1.2. Generic players cannot offer competitive products for the parts of the market which require novel AIs

- (449) As explained in Section V.1.5.4, generic players do not have their own discovery capabilities where they would be able to invent new AIs. They generally limit their activities to manufacturing and/or selling products containing off-patent AIs,

¹⁶⁴ Parties' response to the first Letter of Facts, paragraphs 5-9.

sometimes in mixtures. Therefore, generic suppliers cannot offer new AIs to satisfy unmet needs or needs that are not currently sufficiently addressed.

- (450) Moreover, R&D players do not usually share novel and impactful technologies with generic players. In fact, they typically refuse to license their most recent and valuable AIs to generic players in order to avoid generic competition and preserve monopoly profits for as long as possible. A generic company in this respect indicated that "*[g]eneric companies [...] cannot compete in that direction because they would need a license from the patent holder to create similar copy products.*"¹⁶⁵ They will sometimes grant one or more generic players access to one or more of their most recent AIs if they consider it profitable, for example to address new markets where they have limited presence and reach. They will also do this to maintain high production volumes and, therefore, costs, a key competitive advantage which will be further detailed in the following recitals.
- (451) Generic players usually only compete with off-patent technology, and the Commission's investigation suggests that generics are not able to solve all farmer needs.¹⁶⁶ Some respondents noted that generic products were older, not able to tackle new technical problems, and that generic companies did not offer adequate consultancy services. In particular, a customer stated that "*generic products usually contain old active ingredients with many restrictions*" and another that "*generic products do not cover every need and in this case there is not appropriate consultancy*". A third customer stated that "*[n]ew technical problems are hardly solved by old molecules*".¹⁶⁷
- (452) This is particularly relevant for products, such as insecticides and fungicides, where resistance to older products is already strong and continues to develop. For insecticides and fungicides, new products, but most importantly new AIs and – where possible – new MoAs, appear to be very much needed. Because generic players do not have access to these latest products, they may not be able to compete for a large part of the market, likely the most profitable.
- (453) Some market participants also noted that generic products could be of a lower quality, for example regarding formulations. A stakeholder noted that "*[f]or the same AI (fungicide), the generic product are often less efficient than a product coming from Syngenta, Bayer, BASF, Dow and DuPont. It's surely due to the formulation of the product*".¹⁶⁸ A customer similarly stated that "*we do not have enough trust in the adjuvants of generic products. Many doubts on effectiveness and mixtures*".¹⁶⁹
- (454) Furthermore, it appears from the investigation that the perceived difference in quality influences farmer choice. For instance, one market participant explained that "*a specific brand of pesticide may be of importance even when generics for an active ingredient are available, because the generic product may not have been technically*

¹⁶⁵ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

¹⁶⁶ Questionnaire to Crop Protection Customers (Q1), question 72; Questionnaire to Crop Protection Competitors (Q2), question 44; Questionnaire to Crop Protection Stakeholders (Q3), question 38.

¹⁶⁷ Questionnaire to Crop Protection Customers (Q1), question 72 (ID2896, ID9332 and ID9448). Courtesy translation from French: "*[l]es nouveaux problèmes techniques sont difficilement résolus avec des molécules anciennes.*"

¹⁶⁸ Questionnaire to Crop Protection Stakeholders (Q3a), question 37.1 (ID1913).

¹⁶⁹ Questionnaire to Crop Protection Customers (Q1), question 72.1 (ID9541). Courtesy translation from Spanish: "*[n]o tengo suficiente confianza en los coadyuvantes de los productos genéricos. Muchas dudas de efectividad y mezclas con otros cultivos.*"

proven. Even if the active ingredient is the same, the efficacy of the generic product might be worse, because of a different carrier agent or a different solvent used for delivery. The main factor that farmers consider in choosing a specific product is efficacy. Price considerations are secondary."¹⁷⁰ Moreover, a distributor added that, due to uncertainty regarding effectiveness of generic products, "*a distributor cannot be sure that he will be able to sell them*".¹⁷¹

(455) However, other respondents seem to highlight that some (older) groups of products are commoditised and are typically purchased from generic players. Some market participants have even explained that the leading generic players – Adama in particular, with strong formulation capabilities – can offer very good products,¹⁷² sometimes better than products from R&D players.

(456) Overall, generic players appear likely to constitute a potential competitive constraint only for some parts of the overall crop protection market.

6.2.1.3. R&D players use a number of legal and practical tactics to prolong the legal or *de facto* exclusivity for their AIs and products

(457) In the EEA, generic players face a number of hurdles which effectively delay or restrict their apparent possibilities of acquiring market shares and exercising competitive pressure on R&D players.

(A) Patent and data protection periods are long

(458) The initial patent on an AI is granted for a 20 year term from the date of application, which can be extended by a further five years if a supplementary protection certificate is requested. Since it takes on average 10 years from the date of patent application to bring a compound to the market, the holder of a patent followed by a certificate can enjoy up to approximately 15 years of exclusivity from the time its formulated product first obtains authorisation to be placed on the market in the Union.

(459) In parallel, the data needed to support an application for an AI is protected – independently from patent protection – for a period of 10 years (for new AIs)¹⁷³ starting from the date of first authorisation of a product containing the AI. Therefore, depending on the date on which a product is first authorised, protection on the data can expire years after the compound patent and certificate on the AI. In practice, absent an agreement with the patent holder, any generic player wishing to bring to the market a new AI has a forced choice between waiting for the expiration of the protection of the data package, which delays its entry into the market, or generating new data itself, a process that is both expensive and time consuming and would likely propend for the former option.

¹⁷⁰ Agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246).

¹⁷¹ Agreed non-confidential minutes of a call with a customer, 21 March 2016 (ID8263).

¹⁷² Agreed non-confidential minutes of a call with a customer, 21 March 2016 (ID8263).

¹⁷³ The data protection period is 2.5 years for existing AIs.

(B) Regulatory entry barriers are high

- (460) The EEA regulatory framework for the approval of AIs and the authorisation of formulated products is generally considered to be the most strict,¹⁷⁴ and accordingly the most lengthy and costly, in the world. In fact, many AIs never make it to the EEA market because of these complexities and costs. [Internal assessment].¹⁷⁵
- (461) Generic players wishing to launch products in the EEA must comply with registration obligations. In so doing, they have no significant advantage compared to R&D players at that stage. In particular, they must generate or purchase the same data for regulatory authorities.¹⁷⁶
- (462) The Parties argue that R&D players have the large disadvantage of having incurred significant R&D costs to launch new products, which generics are able to easily copy. However, although some rare exceptions may not be excluded, R&D players typically recoup their R&D investment costs by the time of patent expiry,¹⁷⁷ which the Parties acknowledge, and which generic players do not enjoy.
- (463) Moreover, generic players seem to have several disadvantages compared to R&D players when dealing with the Union regulatory system.¹⁷⁸ They encounter difficulties in determining the key characteristics of the AIs and products they wish to copy, which entails delays and added costs. They also lack the technical expertise with the specific AIs coming off-patent.¹⁷⁹ In particular, their production processes (and costs) will usually not be as efficient as those of the R&D player, as will be detailed in the following recitals.¹⁸⁰
- (464) For instance, a generic player explained that it considered launching an off-patent insecticide in the EEA, but ultimately gave up in light of the costs and complexities of registration in multiple crops and countries in relation to the market opportunity. Conversely, it did launch a cereal herbicide, a product used on fewer crops in a limited number of countries but with larger individual market opportunities, where technical complexities were more limited.¹⁸¹
- (465) Significantly, in its comments of 4 January 2017 on the Statement of Objections Finchimica, the Parties' competitor and an interested third party, provides a detailed

¹⁷⁴ Form CO, part D, page 33; agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7111); agreed non-confidential minutes of a call with a competitor, 9 September 2016 (ID7972).

¹⁷⁵ [Internal document] (ID1329-166), [internal document] (ID8259).

¹⁷⁶ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128); agreed non-confidential minutes of a call with a farmers' association, 18 March 2016 (ID8254); agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259); agreed non-confidential minutes of a call with a competitor, 7 April 2016 (ID8260).

¹⁷⁷ Agreed non-confidential minutes of a call with a competitor, 7 April 2016 (ID8260).

¹⁷⁸ As explained by the Parties in response to the Commission's request for information RFI 7 (ID1001), question 52, a recent General Court decision may lead to some changes in this regard, which would make generic entry somewhat easier from a regulatory standpoint. For the moment, it appears that, although there formally is a so-called *Bolar* exception in crop protection, which would enable generic companies to start preparing entry before patent or data protection expiry, the unavailability of the chemical specifications of the AIs (particularly impurities) makes this exception relatively inoperative (compare agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259) and the Parties' response to the Commission's request for information RFI 7 (ID1001), question 52).

¹⁷⁹ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

¹⁸⁰ Agreed non-confidential minutes of a call with a competitor, 7 April 2016 (ID8260).

¹⁸¹ Agreed non-confidential minutes of a call with a competitor, 9 September 2016 (ID7972).

technical explanation strengthening the Commission's finding on the limited competitive constraint constituted by generic players.¹⁸² It focuses particularly on the use R&D players make of the European regulatory framework to unduly protect their business from generic competition, contrary to what would be the acknowledged objectives of the applicable legislation. In Finchimica's own words: "*[t]he Commission observes that the R&D players in the industry have numerous means to counter the generic threat, that is, mainly by means of market segmentation via mixtures with patented active substances or developing mixtures with other old active substances. However, it misses a subtle and more insidious factor to their success in warding off generic competition. R&D firms are able to exploit regulatory barriers for generic entry and continuation in the market*"¹⁸³ (emphasis in original).

- (466) Indeed, Finchimica confirms that R&D players may strategically decide to withdraw older products to make generic entry impossible or more difficult, as explained in recital (484): "*[t]he regulatory barriers represent a very significant facet to the protection afforded to the Parties and the R&D industry. The development of mixtures not only serves to segment the market into costlier smaller access channels, but it also creates added regulatory hurdles for generics to overcome. Where a mixture product is itself patented or a mixing partner is patented, generic competition cannot follow without a license to the IP right. This is not disputed and the generic industry has no argument with this strategy, per se. However, such strategies are also accompanied by tactical withdrawal of old and 'unprotected' reference products and other technical manipulations within their replacement product re-authorization processes, as part of a strategy to extend data protection and foreclose access to unprotected regulatory data requirements under very complex rules set out in Regulation (EC) No 1107/2009 ("Regulation")*"¹⁸⁴ (emphasis added).
- (467) More importantly, as explained in recital (459), access to regulatory data appears to be a strong barrier to generic entry: "*[i]t is the uncertainty embodied in access to unprotected regulatory data requirements and the exclusion from data sharing consortia in order to comply with the continuous cycle of regulatory re-approval and re-authorization that are the key barriers to generic competition in the EU. [...] Indeed, the AIR Data protection period shall vary from Member State to Member State according to how the R&D companies play the game and furthermore, according to how the Member State Competent Authorities (CAs) cope with the burden of product re-authorization procedures.*"¹⁸⁵
- (468) It also appears that the way specific national regulatory authorities will apply the relevant legislation may vary and in some cases constitute a further significant barrier for generics above and beyond the legislation *per se*: "*[f]urthermore, some Member States and their competent authorities are known to act harshly in the*

¹⁸² Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections.

¹⁸³ Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections, page 1.

¹⁸⁴ Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections, pages 1 and 2.

¹⁸⁵ Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections, pages 2 and 4.

operation of their pesticide product authorization schemes, to the direct disadvantage of generic competition. German farmers, in the second largest crop protection product market in the EU, are widely understood to enjoy very little effective generic competition. The reasons are directly attributed to the regulatory barriers particular to Germany, created by the authorities themselves in their own manner of operating the harmonized pesticide product framework regulation"¹⁸⁶ (emphasis added).

- (469) Specifically, delays in the review by national regulatory authorities of renewals of existing authorisations facilitate the extension of data protection by R&D players to 10 or even 13 years: "*[w]hat is the impact of such extensions? Obviously, it facilitates the implementation of the Ten Year Trick by the R&D companies. Any period of extension that delays the re-newal of an existing product favours the successful application for a new product authorisation to be achieved in advance of the old one, hence deriving a period of 10 years data protection for the AIR Data instead of 30 months.*"¹⁸⁷
- (470) Moreover, Finchimica confirms dissimilar treatment between, on the one hand, products from R&D players currently on the market and, on the other hand, new generic copies of these which generics are looking to launch. In sum, generic entrants face considerable difficulties in getting their products authorised, whereas R&D players appear to obtain long extensions to keep their current products on the market beyond expiry of the original authorisation, sometimes in spite of new scientific data: "*[n]ew entrants, generics, seeking to apply for registration of products similar to those already existing in the market, face a variety of administrative policies which effectively lock out new entrants as the renewal of an active substance approaches. [...] As such, new entrants are locked out of the process for filing for new product authorisations between 12-18 months in advance of the active substance renewal of approval program and further locked out until they reproduce the AIR Data themselves or wait for the AIR Data to become unprotected.*"¹⁸⁸
- (471) Finchimica thus concludes that "*the Regulation is a poorly drafted piece of legislation that has the unintended consequence that R&D companies are effectively shielded from any meaningful competition from generics in the European pesticides market(s) to the detriment of consumers/farmers alike (having to ultimately pay higher prices while at same time having reduced choice of products in the market)*"¹⁸⁹ (emphasis added).

¹⁸⁶ Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections, page 2.

¹⁸⁷ Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections, page 5. The Parties contest the existence of such a "Ten Year Trick" but do not provide evidence that Finchimica's explanations in that regard would be inaccurate (see the Parties' response to the first Letter of Facts, paragraph 7).

¹⁸⁸ Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections, page 3.

¹⁸⁹ Submission on behalf of Finchimica S.p.A. of 4 January 2017 in response to the Statement of Objections, page 7.

(C) R&D players may also use secondary patents and patent thickets

(472) To protect their revenues and margins once generic entry becomes possible, R&D players expand their products' use into new crops and pests (with the accompanying patent protection), either as straight products or in mixtures. Because these new uses can be patent protected, generics will again not be able to compete.

(473) R&D players may also use process or formulation patents, which bring potential generic entrants to find alternative production processes or formulations for their products. While this can generally be achieved by generic players given the many chemical routes to synthesise a given molecule – provided the R&D player has not managed to patent all economically viable alternatives – it, however, requires considerable time and investments, that add an additional layer of complexity and cost for such generic players to already difficult and capital intensive business processes. A generic company confirmed that R&D players use *"always subsequent follow-up patents, process patents that are filed by the originator of the molecule in subsequent years in order to block alternative means to produce the active ingredients"*.¹⁹⁰

(474) Some of these so-called "secondary" patents (as opposed to the patent on the compound) may be filed with the main purpose of creating a patent "thicket" to block competitors (including generics) from entering the market with similar products, not to genuinely protect a useful invention for the R&D player, which may in practice not at all use the patented production process or formulation. In this respect a generic competitor indicated that R&D players *"patent various different types and means of presentation of the active ingredient formulations in order to block the generic industry from entering even after the original active substance patent has expired"*.¹⁹¹

(D) R&D players may also rely on production know-how to achieve de facto continued protection of exclusivity

(475) In addition to the possibility of obtaining new patents, R&D players may also choose not to patent their production know-how. This will be especially relevant for molecules which are particularly difficult to produce or require some specific expertise unavailable to all players. R&D players in such a case would anticipate that keeping this knowledge secret rather than making it public by protecting it with patents would ultimately provide longer protection than patents themselves because of the time needed for third parties to discover and acquire the requisite know-how.

(476) As an illustration, Dow appears to have a very high level of expertise in fermentation products, which only a limited number of players may be able to copy even once all patents will have expired. [Internal assessment].¹⁹²

(E) Conclusion

(477) In sum, R&D players appear to have a number of strategies to delay generic entry. If generics ever do decide to launch a product in the EEA and are successful, they will in any event enter the market no sooner than one to two years after patent expiry,

¹⁹⁰ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

¹⁹¹ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

¹⁹² [Internal document] (ID9408), page 16.

[...].¹⁹³ This provides an additional period for R&D players to reap the benefits of their inventions without any competitive constraint from generic players. In a context of spreading resistance, this delay may also in particular circumstances prove sufficient to significantly reduce the value of launching a generic version of a given AI.

6.2.1.4. R&D players use differentiation and segmentation strategies as a defence against generics

(478) R&D players typically launch new AIs as straight products.¹⁹⁴ However, when approaching patent expiry, as a defence strategy R&D players appear to engage in market segmentation and differentiation strategies consisting in creating specific new mixtures: [reference to internal document].¹⁹⁵ For DuPont, [reference to internal document].¹⁹⁶

(479) Indeed, a generic player confirms that "*[o]ne of the strategies of the non-generic R&D companies is to stop selling straight products containing off-patent molecules and to develop mixtures of those same molecules with patented active substances. This way they re-segment the market so that there are fewer straight off-patent products on the market. The market is thus redefined in mixtures with patented products. Generic companies like [...] cannot compete in that direction because they would need a license from the patent holder to create similar copy products.*"¹⁹⁷

(480) [Reference to internal document].

Figure 19 – [Extract from internal document]

[...]

Source: [Internal document] (ID1329-01249)

(481) Another generic player also confirms that "*multinational innovation is moving towards innovative mixtures rather than new active ingredients in solo formulations. Indeed, tribenuron is no longer sold by DuPont as a solo formulation, only in mixture with other SUs*".¹⁹⁸

(482) These mixtures may (when they provide some innovative step or include a patented mixture partner)¹⁹⁹ or may not be patented.²⁰⁰ In both cases, they limit the ability of generic players to compete effectively. The Commission's investigation shows that these mixtures move customers from large straight product markets to smaller, differentiated, mixture markets.

¹⁹³ See for instance [internal document] (ID6827-020443), slide 3 (also [internal document] (ID1332-00619), page 4).

¹⁹⁴ Fungicides tend to be an exception, where treatments are typically mixtures of AIs in order to broaden the spectrum of targeted diseases and to limit the spread of resistance.

¹⁹⁵ Parties' response to the Commission's request for information RFI 5 (ID1156-259), question 17. See also [internal document] (ID1329-01186), page 19, as well as [internal document] (ID00561-00012), [quote from internal document]. See also [internal document] (ID01007-00018), page 4: [quote from internal document], [internal document] (ID8259).

¹⁹⁶ [Internal document] (ID1329-01186), page 19.

¹⁹⁷ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

¹⁹⁸ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

¹⁹⁹ However, the level of innovation to reach appears to be fairly low according to some market players. Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

²⁰⁰ [Internal document] (ID1073), [internal document] (ID1056-00052) [internal document] (ID455-00102), pages 3, 10, 28 and 44.

- (483) Generics may be able to target the former straight products, but face considerable difficulties in attempting to address the latter differentiated ones, even where there is no patent protection. In essence, an overall addressable market can be split into several smaller markets, targeted by a specific product/mixture offering, which taken individually can be too small for generic entry to be profitable, with the exception of a limited number of countries/segments. [Reference to internal document].

Figure 20 – [Extract from internal document]

[...]

Source: [Internal document] (ID7081-00378), page 1

- (484) In addition, when patent expiry approaches, R&D players may also attempt to switch their customers from an existing AI to newer patented AIs which are unavailable for molecule competition by generics. [Reference to internal document].

Figure 21 – [Extract from internal document]

[...]

Source: [Internal document] (ID3987-00100), page 4

- (485) With this segmentation and differentiation strategy using mixtures, R&D players seem able to limit generic penetration to only a relatively small part of the crop protection markets and to preserve their own aggregate sales and margins by focusing on a large number of small markets, [...]. Moreover, R&D players may also move into new uses, new crops and new geographies, where generic players are not present yet.

Figure 22 – [Extract from internal document]

[...]

Source: [Internal document] (ID00455-00119), page 10

- (486) In addition, brand importance in the EEA appears to vary with geography. For instance, German growers seem to favour (German) branded products.²⁰¹ On the contrary, growers in other markets (Southern or Eastern Europe) appear more likely to use – cheaper – generic products.²⁰² For instance, an Italian distributor explains that "*[i]f there was a price difference of 5-10% between a generic and branded product, a farmer may choose the more expensive branded product. If there is a big price difference farmers may turn to generics because of the difficult financial situation of the agriculture sector*".²⁰³
- (487) It thus appears that brand value and quality plays a significant role in at least some EEA countries.

6.2.1.5. R&D-integrated players typically enjoy superior economies of scale and production

- (488) R&D-integrated players have an in-depth knowledge of their AIs and products. When generics threaten to enter the market, they have had decades to optimise production processes and costs. Due to their broader market presence (broad

²⁰¹ See, for instance, the agreed non-confidential minutes of a call with a competitor, 9 September 2016 (ID7972).

²⁰² Agreed non-confidential minutes of a call with a farmers' association, 28 April 2016 (ID8445).

²⁰³ Agreed non-confidential minutes of a call with a customer, 21 March 2016 (ID8263).

portfolio and distribution network, out-licensing, technical sales), they also have a much larger scale than (smaller) generic players, especially at patent expiry, and thereby lower costs. Overall, even years after generic entry, R&D-integrated players may have lower production costs. This is of course a key competitive advantage, especially for commoditised products.

- (489) For example, [reference to internal documents].^{204,205}
- (490) More generally, because of their smaller scale and sales, generics have more limited financial resources from which to finance multiple simultaneous registrations and distributions, which are required for a quick return on investment and large profits.²⁰⁶ [Reference to internal documents].²⁰⁷ Diachem, a generic competitor, confirms that its "*limited resources enable it to prepare only a small number of regulatory dossiers at the same time.*"²⁰⁸
- (491) Generic players will therefore likely only target the markets that are more likely to be profitable for them. They will rationally target the largest crop protection markets which they can access. They will likely not be able to easily build market reach, and avoid costly multiple registrations (across small crops but also across countries).
- (492) In the EEA, it seems that they will thus likely focus on row crops (cereals in particular) rather than specialty crops, and avoid very fragmented/differentiated (with mixtures) markets like fungicides, where the addressable segments are unlikely to make entry profitable.²⁰⁹
- (493) A generic player confirms that "*[t]he time and costs to obtain a registration varies depending on the type of product and the number of crops that are registered. Particularly for vegetables fungicides (and insecticides), numerous crops have to be registered individually, and when each requires field trials, it can be an enormous task.*"²¹⁰ These smaller, niche, markets are the heart of European agriculture.
- (494) Moreover, the market investigation suggests that generic players are usually active in only a few countries within the EEA.²¹¹ Only a large generic player like Adama (and perhaps FMC) appears to be able to have a market reach comparable to that of an R&D-integrated player.
- (495) On the contrary, R&D-integrated players' market reach – in terms of distribution capabilities and expertise, product portfolio and brand value – is much greater.²¹² [Reference to internal document].²¹³
- (496) For instance, a generic player cited the difficulties of competing against R&D-integrated players: "*[i]t can be difficult to compete against R&D players in the off-patent market, because R&D players have different cost structures, having already*

²⁰⁴ [Internal document] (ID00455-00119), page 27.

²⁰⁵ [Internal document] (ID00455-00119), pages 53, 54 and 56.

²⁰⁶ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128); agreed non-confidential minutes of a call with a competitor, 9 September 2016 (ID7972). In this regard, [reference to internal document]" (ID1329-166), slide 9).

²⁰⁷ [Internal document] (ID6696-3350).

²⁰⁸ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

²⁰⁹ Parties' response to the Commission's request for information RFI 56 (ID8089), paragraph 1.2.

²¹⁰ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

²¹¹ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

²¹² [Internal document] (ID1329-01186), page 19.

²¹³ [Internal document] (ID1329-01186), page 19.

*recouped their investment during the patent exclusivity phase. Furthermore, there are economies of scale in production. A generic player typically needs to buy access to the data from the R&D companies: either they physically share the data or they provide a so-called letter of access, which can be provided to the regulatory authority".*²¹⁴

6.2.1.6. Generic players are typically left with portfolios of low margin AIs discarded by R&D-integrated players

(497) Although R&D-integrated players appear to have a number of strategies to limit the competitive impact of generic players, some older products ultimately become commoditised. When that happens and gross margins reach predefined levels considered too low (typically around 30-40%), R&D-integrated players may sell their AIs to other players, usually the generic players, which are accordingly kept at a safe distance from the R&D-integrated players.²¹⁵

(498) In so doing, R&D-integrated players curate their portfolio compositions to preserve the high margin products, thus avoiding head-to-head competition with generic players on commoditised molecules. [Reference to internal document].²¹⁶ It seems that, contrary to generic players, R&D-integrated players' business model is one of value, not volume.

6.2.1.7. The case study presented by the Parties on [...] indicates that R&D-integrated players have means to defend their margins

(499) [...], the Commission's analysis seems to be fully borne out by the examples of generic threat [reference to internal documents].²¹⁷ [...]. Indeed, Bayer confirms that "*generics are also successful in areas where there is limited innovation, such as herbicides (Nufarm, for example, is strong in herbicides) and insecticides.*"²¹⁸

(500) The examples provided by the Parties do not seem to point to significant effective competition by generic players on all crop protection markets in the EEA.

6.2.1.8. [Reference to internal documents]

(501) [Reference to internal documents].²¹⁹

(502) [Reference to internal documents].²²⁰

(503) [Reference to internal documents].

Figure 23 – [Extract form internal document]

[...]

Source: [Internal document] (ID00455-00119), page 59

²¹⁴ Agreed non-confidential minutes of a call with a competitor, 7 April 2016 (ID8260).

²¹⁵ Agreed non-confidential minutes of a call with a competitor, 27 September 2016 (ID8562). Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128). Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

²¹⁶ [Internal document] (ID1329-01186), page 18.

²¹⁷ Parties' response to the Statement of Objections, paragraph 649; Parties' response to the Article 6(1)(c) Decision, paragraphs 55-65. See also the Parties' response to the first Letter of Facts, paragraph 10.

²¹⁸ Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248).

²¹⁹ For example, [reference to internal document]. See [internal document] (ID4384-00006), pages 5 and 9.

²²⁰ [Internal document] (ID1329-000541), page 1.

(504) As a consequence of these "anti-generic" measures, the overall market share of generic players has remained stable over recent years – [...].²²¹ This marks a significant difference from the neighbouring pharmaceutical industry, where the share of generic players has increased over the last years, largely under pressure from health systems to limit expenditures.

Figure 24 – [Extract from internal document]

[...]

Source: [Internal document] (ID1329-01186), page 17

(505) [Reference to internal document].

Figure 25 – [Extract from internal document]

[...]

Source: [Internal document] (ID1329-01252), page 2

(506) Similarly, and in spite of the generic constraint, the Parties appear to have been able to preserve high market shares in crop protection markets, thereby further confirming how limited the generic constraint truly is. [Reference to internal document].²²²

(507) It follows that the Parties and other R&D-integrated players are likely to still be able to extract relatively high gross margins from off-patent molecules, sometimes decades after patent expiry, [reference to internal document].

Figure 26 – [Extract from internal document]

[...]

Source: [Internal document] (ID1329-01186), page 45

(508) [Reference to internal document].^{223,224}

(509) Other market players also appear to confirm the limited competitive impact of generics. For example, a competitor highlighted that it *"does not consider that the generics will increase their market share in the future. There are significant regulatory hurdles and these companies do not have the necessary expertise to overcome these. The innovation hurdle is also very high, for example Nufarm cannot enter in fungicides."*²²⁵

(510) Similarly, R&D-integrated players generally seem to look mainly at the other R&D-integrated players as their competition. Smaller players like generic producers, but also small companies active in discovery, are monitored and taken into account when planning product development and commercialisation. However, they are apparently taken into account only to the level of competitive constraint they seem to constitute for the larger players, that is as second- or third-tier players, with limited product offering, market reach and market power.

²²¹ [Reference to internal document] (ID1329-01186), pages 17 and 19. This is also quoted by the Parties in their response to the Article 6(1)(c) Decision with emphasis on the preceding sentence (not cited here).

²²² [Internal document] (ID729-00009), page 68.

²²³ [Internal document] (ID6033-00004), slide 150.

²²⁴ [...]. [Internal document] (ID9304-00016), page. 33.

²²⁵ Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248).

- (511) In conclusion, it appears that generic players are unable to exercise significant competitive constraints on R&D players like Dow and DuPont.
- 6.2.1.9. The economic analyses submitted by the Parties do not support their general claims related to the competitive constraints brought by generic suppliers
- (512) The economic analyses submitted by the Parties, if properly read, do not point to a different conclusion than the Commission's own on the basis of the available evidence. The Parties have submitted several economic analyses²²⁶ (hereafter collectively referred to "Submissions on generics") that aimed at assessing the competitive constraint brought by generics products on their own products when they lose patent protection.²²⁷ Most of the time, the underlying data and methodology were not provided along these submissions, as requested by DG Competition Best Practices for the submission of economic evidence,²²⁸ but as the result of requests for information.²²⁹
- (513) These Submissions on generics focus on [...] ²³⁰.
- (514) These economic studies provide a qualitative analysis of the evolution over time of volume, price and margin, in light of market events such as patent expiry and "generic entry". In other words, the Parties aim at assessing graphically the causality of market events, such as patent expiry or generic entry, by solely identifying whether downward changes in price or margin occurred in similar periods than these events.
- (515) On the basis of the Submissions on generics, the Parties claim that:
- (a) Generic entry is widespread after patent expiry;²³¹
 - (b) Straight products experience significant price drops as a result of the competitive constraint brought by the introduction of generic products;²³²
 - (c) Mixtures also experience significant price and margin drops as a result of the competitive constraint brought by the introduction of generic products,²³³ in particular due to the possibility of tank-mix by farmers,²³⁴

²²⁶ The Parties first submitted their arguments in the first draft Form CO (draft Form CO, [...], ID477). These arguments were later developed in three economic analyses: Parties' submission entitled [...] [date] (ID706), Parties' submission entitled [...] (ID7829-11117), Parties' response to the Article 6(1)(c), annex 4, entitled [...] [date] (ID6097). Finally, the Parties supplemented their arguments in their response to the Statement of Objections, annex 5, entitled [...] [date].

²²⁷ See Annex 2 for a full assessment of the Submissions on generics.

²²⁸ DG Competition Best Practices for the submission of economic evidence, accessible at http://ec.europa.eu/competition/antitrust/legislation/best_practices_submission_en.pdf.

²²⁹ For the first economic analysis: Parties' response to the Commission's requests for information RFI 6, question 26 (ID765), submitted on [...]; RFI 8, question 20 (ID709), reiterated in RFI 9 question 20 and RFI 10, question 6b (ID1376), submitted on [...] after the submission of the economic analysis; and RFI 13, questions 10-12 (ID3653), submitted on [...], [...] after the submission of the economic analysis. For the second economic analysis: Parties' response to Commission's oral request, received on [...]. For the third economic analysis: Parties' response to the Commission's request for information RFI 44, question 2, received on [...] (ID6789), [...] after the submission of the economic analysis.

²³⁰ Parties' submission entitled [...], slide 5 (ID706).

²³¹ According to the Parties, [...]. See Form CO, [...].

²³² According to the Parties, [...]. See Form CO, [...].

²³³ According to the Parties, [information on price analysis] [internal document] (ID7829-11117), [...] Parties' response to the Article 6(1)(c) Decision, annex 4, entitled [...] (ID6097), section 2.2.

- (d) [...] reacts to the competitive constraint on price and margins exerted by the introduction of generic products by introducing new mixtures [date].²³⁵
- (516) The Commission made a thorough analysis of the Parties' Submissions on generics and is unable to validate the Parties' claim on the competitive constraints brought by generic suppliers, with particular respect to [...] and [...].²³⁶
- (517) **First**, the Submissions on generics suffer from important limitations. For example, the Submissions are based on the analysis of price of an AI per kilogram of this AI, [pricing information extracted from internal documents].
- (518) Another important issue is that entry by generics is mischaracterised and branded manufacturers, [...], are often reported as generic entrants. Such mischaracterisation is frequent²³⁷ and is at odds with the Parties' own assessment of the agrochemical industry supply side in which [...] are not identified as generic suppliers²³⁸ but as branded manufacturers.²³⁹
- (519) Moreover, the analysis amounts solely to the graphical identification of downward changes in price or margin occurring in similar periods than patent expiry or generic entry, and do not attempt to control for the heterogeneity of the data that could be caused, for example, by [...] change in cost structure, market trends, country characteristics or product characteristics.
- (520) Given these limitations, the Commission doubts that the Submissions on generics capture the essence of competition between generics and branded products, as they do not focus their analysis on the variable of choice of customers.
- (521) **Second**, [details on Parties' sales]. Any conclusion reached on this sample is thus of limited probative value. [Details on Parties' sales price development].²⁴⁰
- (522) **Third**, [details on Parties' sales]. Any conclusion reached on this sample is thus, also, of limited probative value. Moreover, among other things, changes in prices do not seem to be consistently downwards related to patent expiry or generic entry.
- (523) **Fourth**, the general assessment of the evolution of sales of mixtures show that changes in market power for mixtures vary significantly across countries and between the two AIs. In particular, [details on Parties' market strategies].
- (524) **Fifth**, the Commission also considers that [details of the Parties' submissions and internal documents].
- (525) [Quote from Parties' submission],²⁴¹ that is that the constraints brought by generic suppliers induce R&D suppliers to bring new mixtures on the market. The Commission notes that this argument is not relevant for the assessment of downstream competition for formulated products, which occurs between existing or

²³⁴ According to the Parties, [information on price analysis]. See Parties' submission entitled [...] (ID7829-11117).

²³⁵ According to the Parties, [information on the Parties' strategies].

²³⁶ See Annex 2 for a full assessment of the Submissions on generics.

²³⁷ [...].

²³⁸ Form CO, [...].

²³⁹ Form CO, [...].

²⁴⁰ Changes in market power are proxied by change in Lerner Index, that is changes over time of the margin expressed as a share of price. On the Lerner index, see, for example, Tirole (1998), *The theory of industrial organisation*, MIT press, section 1.1, page 66.

²⁴¹ Parties' response to the Statement of Objections, annex 5, entitled [...], section 2.1.

forthcoming mixtures and products. To that respect, mixtures brought to the market by branded manufacturers are patent protected and, consequently, cannot be copied by generic products, and the Parties' Submissions do not take into account the effective market segmentation strategy branded manufacturers put in place with mixtures to differentiate from generic manufacturers. Such successful strategy suggests that the competitive pressure from generic companies is limited. The Commission also notes that the Parties' argument is not relevant for the innovation competition assessed in this Decision, which focuses on the discovery of new AIs and not the creation of mixtures made of known AIs.

- (526) Taking all these elements in consideration, the Commission concludes that the data provided by the Parties with their Submissions on generics do not allow to reach the Parties' claims, in particular that branded manufacturers are significantly constrained by patent expiry or generic entry and that generic products are close competitors to products of branded manufacturers.

6.2.1.10. Conclusion

- (527) In conclusion, the Commission's investigation show that, while generic players may be a threat to R&D players, the latter are likely to implement highly effective strategies which would strongly limit the competitive constraints generic players could exercise on R&D players.

6.2.2. *Distribution channel appears to act more as a barrier to entry and expansion for smaller competitors than as a competitive constraint to the Parties*

6.2.2.1. Parties' arguments

- (528) In the Form CO, the Parties argued that they "*face substantial countervailing bargaining power by their sophisticated customers, namely distributors and agricultural cooperatives*". Moreover, they consider that distributors "*constrain the manufacturers' pricing*" because they "*multi-source a wide range of products from different suppliers and have a strong influence on the farmers' choice*".²⁴²

6.2.2.2. The Commission's assessment

- (529) Against such claims, the Commission provisionally considers that countervailing purchasing power of distributors would not be sufficiently important to exercise constraints on suppliers. This is for the following reasons.
- (530) **First**, certain EEA Member States such as Italy and Spain have a very fragmented distribution network in which the five main distributors account for less than [...] % of total crop protection products sold.²⁴³ In such countries distributors' bargaining power is likely limited as they individually represent only a fraction of the total sales that agrochemical companies make.
- (531) **Second**, distribution is rather concentrated in a range of EEA Member States, including Austria, Belgium, the Czech Republic, Germany, and the UK where the five main distributors represent over [...] % of total crop protection products sold.²⁴⁴ However, even where distribution networks are concentrated it is unlikely that distributors would exercise significant countervailing buyer power in their

²⁴² See, among others, Form CO, [...].

²⁴³ Parties' response to the Commission's request for information RFI 47, [internal document] (ID7150).

²⁴⁴ Parties' response to the Commission's request for information RFI 47, [internal document].

negotiations with crop protection companies. The following considerations support this conclusion.

- (532) In the first place, distributors' profitability is influenced by rebates granted by their main suppliers. As one competitor explained "*[l]oyalty programmes are to be seen as considerable price reductions and incentive programmes that many distributors depend on as an additional income source*".²⁴⁵ The Commission's investigation shows that rebates can be very substantial and in some instances exceed [...]%.²⁴⁶ [Information on Parties' competitive intelligence].²⁴⁷ It must also be noted, that crop protection companies tend to offer loyalty inducing rebates such as retroactive rebates, target rebates and discretionary rebates.²⁴⁸ On balance, rebates appear to be a tool for crop protection companies to encourage distributors' loyalty and constrain their ability to source crop protection products from a broad range of suppliers.
- (533) In the second place, the Commission's investigation indicates that distributors are unlikely to be materially impacted by price increases applied by crop protection companies because they are often in a position to pass on such price increases to the final customers. For instance, one competitor indicated that "*it is understood that whenever the agrochemical companies increase the price of their products, this increase will be reflected on the final price for customer. However, this rule is not applied in case of decreasing pricing as only the distributors will profit from it. There is a considerable delay in the passing on of lower prices to farmers. Therefore, distributors are not significantly affected by price increases implemented by the large agrochemical companies. If prices go up it is the final customers that suffers and not the distributors*" moreover this competitor pointed out that "*[t]he distributors' margins have been increasing in recent years*".²⁴⁹ Therefore, distributors' incentives to counter price increases by crop protection companies is likely limited.
- (534) In the third place, distributors face constraints in the number of products from different crop protection producers they can offer. This is mainly due to the need for distributors to streamline their procurement and inventory management and to limit the financial risks of carrying a large and diversified inventory. As one competitor explained "*[e]ach product line (SKU) creates cost of logistics from catalogue to warehouse and delivery. This indirectly restricts the number of products offered*".²⁵⁰ Indeed, distributors have an incentive to focus their procurement on suppliers offering a large number of high-volume products. In this respect, one competitor pointed out that "*to have big volumes [distributors] have the tendency to limit the n° of products on their catalogue*".²⁵¹ Moreover, such a sourcing strategy facilitates the achievement of volume and loyalty rebates from suppliers. Therefore, while distributors have in principle an interest in offering alternative options to their

²⁴⁵ Agreed non-confidential minutes of a call with a competitor, 23 September 2016 (ID8870).

²⁴⁶ Parties' response to the Commission's request for information RFI 20.

²⁴⁷ Parties' response to the Commission's request for information RFI 40.

²⁴⁸ Questionnaire to Crop Protection Customers (Q1), question 86 and question 71; Questionnaire to Competitors Seeds (Q6), question 64; Questionnaire to Customers Seeds (Q5), question 38. See also Parties' response to the Commission's request for information RFI 20.

²⁴⁹ Agreed non-confidential minutes of a call with a customer, 12 October 2016 (ID8855).

²⁵⁰ Competitor's response to the Commission's request for information to competitors on distribution (ID6571).

²⁵¹ Competitor's response to the Commission's request for information to competitors on distribution (ID6392).

customers in practice they tend to source a limited number of products, often two or three, for each crop/pest combination. In the words of one competitor "*some distributors will choose to carry a limited number of products/ brands to address a specific customer need (ie 2-3 seed brands for a given species; one branded and one generic offer for a given chemical / target)*".²⁵² Another competitor indicated that distributors "*limit the number of products mainly to limit the difficulties in purchase, traceability and storage management. Therefore most distributors have only 3-4 products per segment in their range*".²⁵³ In turn, this limits distributors' ability to multisource and to leverage the threat of switching vis-à-vis their suppliers.

- (535) In the fourth place, as the Parties argue, the merged entity would not be in a unique position to leverage the range of products it would offer post-Transaction to win sales with distributors. Indeed, Adama, BASF, Bayer, and Syngenta hold portfolios that are similar in scope, if not larger, than that of the merged entity. However, the combined effect of the strength of the main crop protection companies in the distribution channel, thanks to their ability to offer rebates, the range of their products, the presence of their catalogues of must-have products, and their ability to generate farmers' demand thanks to their presence in the territory of the individual EEA Member States, restricts the ability for smaller generic competitors to win sales with distributors. One competitor in this respect indicated that "*[b]ig suppliers with a dominant portfolio are able to push their product catalogue through and limit smaller suppliers in their vertical market access*"²⁵⁴ while another pointed out that "*[l]arger multinationals with aggressive, high value rebate schemes have the ability to shut out smaller competitors by offering rebates on aggregate purchases of a variety of products. As a result, smaller competitors who cannot match the breadth of product offerings may have difficulty competing for distributor shelf space*".²⁵⁵ Therefore, the distribution channel appears to act more as a barrier to entry and expansion for smaller competitors than as a countervailing factor to the Parties' and their main competitors' market position.

6.2.3. *Parallel trade appears limited in terms of countries, product range and volumes involved*

6.2.3.1. Parties' arguments

- (536) The Parties submit that the constraint represented by parallel imports on their competitive behaviour should be assessed on a country-by-country and market-by-market basis. Moreover, the Parties point out that, in Germany in certain segments parallel imports can be higher than the average figure ([...])% indicated by the Commission in its Article 6(1)(c) Decision.

²⁵² Competitor's response to the Commission's request for information to competitors on distribution (ID6523).

²⁵³ Competitor's response to the Commission's request for information to competitors on distribution (ID6874).

²⁵⁴ Competitor's response to the Commission's request for information to competitors on distribution (ID6647).

²⁵⁵ Competitor's response to the Commission's request for information to competitors on distribution (ID6869).

6.2.3.2. The Commission's assessment

- (537) The Commission considers that the competitive constraint posed by parallel import would not be material to exercise constraints on the combined market power of the Parties. This is for the following reasons.
- (538) **First**, while the share of crop protection products that is imported in each individual EEA Member State can vary it must be noted that the overall legal and commercial framework in which parallel trade takes place is rather homogeneous across the EEA. Indeed, respondents to the Crop Protection Parallel Traders questionnaire reported a decrease in volume due to the tightening of conditions for legal parallel trade of crop protection products in the Union. In this respect a parallel trader reports that Regulation 1107 "*led to a partitioning-off the market and a reinforcement of an existing oligopoly*".²⁵⁶ Another submitted that national authorities in some countries are becoming increasingly restrictive to protect the domestic industry. For instance, in Slovakia, although parallel trade formally exists, it is hardly possible because of formal obstacles.²⁵⁷
- (539) **Second**, while some customers highlighted that "*[p]arallel trade is a growing area*"²⁵⁸, other respondents highlighted a limited scope for parallel trade and some technical and regulatory issues. For instance, a customer explained that it is "*hesitant to engage in parallel trade, meaning the import of products from other EU countries to exploit price differences. It is technically and legally difficult. There have been some issue with products coming e.g. from France, the Netherlands or Poland. Labelling is not always correct. Parallel trade is a very small percentage of [company's] business, because [company] will have a good and reliable image.*"²⁵⁹
- (540) **Third**, for respondents to the Commission's Crop Protection Customers questionnaire, only a small number of distributors commercialise products obtained from other Member States via parallel imports²⁶⁰. Distributors that engage in parallel imports tend to buy their products from neighbouring countries (for example for Germany from Poland, for Romania from Bulgaria etc.).²⁶¹
- (541) **Fourth**, the indicative overview of companies registered in the EEA to trade their AIs between Member States submitted by the Parties²⁶² highlights that only some products are concerned. It also concerns registration, and not actual sales.

6.2.4. *The switching analysis submitted by the Parties does not allow the Commission to validate the claim of lack of closeness of competition between Dow and DuPont*

- (542) In the Form CO, the Parties report the results of a switching analysis which intends to show that the Parties' customers mostly switch to generic suppliers or other branded manufacturers rather than between the Parties.²⁶³ This analysis is further developed in their response to the Article 6(1)(c) Decision²⁶⁴ and in their response to

²⁵⁶ Questionnaire to Crop Protection Parallel Traders (Q4), question B.2.

²⁵⁷ Questionnaire to Crop Protection Parallel Traders (Q4), question B.7.1.

²⁵⁸ Agreed non-confidential minutes of a call with a customer, 18 March 2016 (ID8249).

²⁵⁹ Agreed non-confidential minutes of a call with a customer, 7 April 2016 (ID8245).

²⁶⁰ Questionnaire to Crop Protection Customers (Q1), question 60.

²⁶¹ Questionnaire to Crop Protection Customers (Q1), question 60.1.

²⁶² Parties' response to the Commission's request for information RFI 46.

²⁶³ Form CO, part B.I, paragraphs 181-189.

²⁶⁴ Parties' response to the Article 6(1)(c) Decision, Annex 4, entitled [...] (ID6097).

the Statement of Objections.²⁶⁵ The underlying data and methodology were provided in response to the Commission's request for information RFI 6.²⁶⁶ This section refers to those three submissions as "Submissions on switching".

- (543) The Commission has assessed the Parties' data, methodology and arguments in Annex 6. The Commission's findings on such submissions can be summarised as follows.

6.2.4.1. Parties' data and methodology

- (544) The Parties base their Submissions on switching on sales data of each of Dow and DuPont to all their customers²⁶⁷ for a selection of their products in the following categories: broadleaf herbicides, cross-spectrum herbicides and insecticides. For each category, the Parties selected their most important AIs and, on that basis, all products with one of these AIs as the primary AI.²⁶⁸ The data show the yearly amount of a particular product a customer bought from each of the Parties in a given year ([...]) [details on switching analysis methodology]. The analysis is performed [...] on [...] countries (referred to as [...] in this section).²⁶⁹
- (545) [Information on Parties' switching data].
- (546) For the purpose of their analysis, the Parties define, in each product category, a customer group called "potential switchers" by identifying customers for whom, first, the value of sales of products in this category from either Party fell by more than a given threshold, 25% in their base analysis, and for whom, second, the value of sales of products in this product did not fall for both Parties at the same time.^{270,271} Customers who reduced their purchases from both Parties are excluded from the analysis on the basis that such scenario could reflect a reduction in customer's total demand rather than a switch of the customer from one supplier to the other.
- (547) For the customers identified as "potential switchers", the Parties compute the proportion of sales which switched from one Party to the other as follows.²⁷² The results are then aggregated both at national and at [...] level. The proportion of sales switched from one Party to the other Party is calculated by dividing the potential switchers' sales lost from one Party to the other Party, with the total sales loss of potential switchers.
- (548) For the sake of the argument, it is assumed that a customer decreased its purchases from Dow by more than 25% between 2013 and 2014. If, in the same period, this customer did not increase its purchases from DuPont, then all the sales lost by Dow are flagged as resulting from a switch from Dow to other competitors. If, on the contrary, this customer increased its purchases from DuPont, then all the sales gained

²⁶⁵ Parties' response to the Statement of Objections, Annex 5, entitled [...].

²⁶⁶ Parties' response to the Commission's request for information RFI 6, question 22, detailing the methodology followed (ID1029-189) and providing the underlying data; received [...] after the submission of the results in the first draft Form CO.

²⁶⁷ Note that the Parties' customers are distributors and not farmers.

²⁶⁸ Form CO, part B.I, paragraphs 182-183 and "Switching Methodology" from the Submission on generics.

²⁶⁹ According to the Parties, [information on Parties' switching data].

²⁷⁰ Form CO, part B.I, paragraph 184.

²⁷¹ [Information on Parties' switching data].

²⁷² Form CO, part B.I, paragraph 185.

by DuPont are flagged as resulting from a switch from Dow to DuPont.²⁷³ If, on top of that, this customer increased its purchases from DuPont by less than it decreased its purchases from Dow, then, the difference between the sales lost by Dow and the sales gained by DuPont is flagged as resulting from a switch from Dow to other competitors.

- (549) In response to the Article 6(1)(c) Decision, the Parties also provide two variations of the initial analysis in which potential switchers are defined by customers for whom the value of sales in a product category from either Party fell by more than either 0% or 50% (rather than 25%) but did not fall for both Parties at the same time.²⁷⁴
- (550) Finally, in the response to the Statement of Objections, the Parties make a supplementary analysis in which (i) potential switchers include customers for whom the value of sales in a product category from either Party fell by more than a given threshold between 0% or 50% but did not fall for both Parties at the same time, and (ii) potential customers also include, to some extent, customers for whom the value of sales in a product category increased from both Parties or decreased from both Parties.^{275,276} The switching rates for these customers are computed following the rule used in stylised examples provided by the Commission in its Statement of Objections²⁷⁷ for the purpose of showing the strong limitations of the data provided by the Parties.

6.2.4.2. Parties' arguments

- (551) The Parties argue that their selection of "potential switchers" is conservative in the sense that it excludes instances of possible switching away from the Parties to other firms, as some of these changes in purchases might also be considered as demand reductions.
- (552) On a [...] level and with the 25% threshold, the Parties' analysis shows that the value of customer sales switched between the Parties is [...] for both broadleaf and cross-spectrum herbicides: in broadleaf herbicides the proportion is [...]% for both Parties, while in cross-spectrum herbicides the proportion is [...] ([...])% for switching from Dow to DuPont and approximately [...]% for switching from DuPont to Dow.²⁷⁸ On insecticides, the Parties' analysis shows a [...] proportion of switching for both directions, around [...]%.²⁷⁹ The Parties interpret the results of their analysis as

²⁷³ If the sales gained by DuPont exceed the sales lost by Dow, then the proportion of sales switched from Dow to DuPont is set at 100%.

²⁷⁴ Parties' response to the Article 6(1)(c) Decision, annex 4, entitled [...] (ID6097), section 3.2.

²⁷⁵ Parties' response to the Statement of Objections, annex 5, entitled [...] (ID10040), section 3.1.

²⁷⁶ Customers for whom the value of sales from both Parties increased are all taken into account. Those for whom the value of sales from both Parties decreased are further divided in four categories, depending on whether the decrease is below or above a fixed threshold of 25%. Customers for whom the value of sales from both Parties decreased by less than 25% are excluded, other are included with specific computation rules for the switching rate. The annex does not provide any justification for the choice of 25% for this threshold as well as why the logic of having a given threshold between 0% and 50% was not applied to these customers.

²⁷⁷ Annex 6 to the Statement of Objections, Section 4.3.2. This section is also present in Annex 6 of the present Decision, in Section 4.3.2.

²⁷⁸ Form CO, part B.I, paragraph 189.

²⁷⁹ The Parties also provide a similar analysis with potential switchers defined by different thresholds, namely potential switchers being customers for whom the value of sales in a product category from either Party fell by more than 0% or 50% (rather than 25%) but did not fall for both Parties at the same time.

evidence that there is [...] switching and that the Parties are therefore not close competitors.

- (553) In their supplementary analysis, the Parties' own computations result in a switching rate for broadleaf herbicides around [...] % from Dow to DuPont and around [...] % from DuPont to Dow. For cross spectrum herbicides, the switching rate lies between [...] % and [...] % from Dow to DuPont and between [...] % and [...] % from DuPont to Dow. For insecticides, according to the Parties, the switching rate is [...] % from Dow to DuPont and [...] % from DuPont to Dow.

6.2.4.3. Commission's assessment

- (554) The Commission considers that the switching analysis submitted by the Parties does not allow the Commission to validate their claim of lack of closeness of competition between Dow and DuPont, for the following reasons.
- (555) First, the Commission notes that the data provided by the Parties suffer from many limitations. [...]. This in itself limits the ability to identify precisely customers who have switched purchases between Dow and DuPont and other suppliers.
- (556) In their response to the Article 6(1)(c) Decision, the Parties essentially agree that a clear differentiation between switching and demand reductions is not possible. Nevertheless, they argue that large changes in the quantity bought by one of the Parties are likely to reflect switching while small changes are more likely to reflect overall fluctuations in the market environment. In their response to the Statement of Objections, the Parties do not address the fundamental criticism that such data are not suited for a meaningful switching analysis.²⁸⁰
- (557) Second, as a consequence of this lack of certainty on which customers do switch purchases between Dow and DuPont and other suppliers, the Parties make assumptions which exclude from their analysis [...] of customers and sales. Common customers that increase or decrease their purchases from both Parties represent a [...] of the Parties' sales, which could include [...] between the Parties. All these customers are excluded from the analysis and only partially incorporated in the supplementary analysis.
- (558) Here also, the Parties agree with the Commission's observations in the Article 6(1)(c) Decision that situations in which customers decrease or increase their sales from both Parties simultaneously could include occurrences of switching of sales between the Parties. Nevertheless, they mention that in the absence of specific information on the actual behaviour of these customers, it is not possible to incorporate these customers in the switching analysis.
- (559) The Parties also argue that excluding those customers do not bias the results towards less switching between the Parties since these sales could also include switches to other firms, and customers for which purchases from both Parties fell would be less likely to have switched between the Parties than other customers' categories included in the Parties' analysis. The Commission provides stylised examples showing that, in fact, the Parties' claims cannot be sustained. Moreover, the Parties' supplementary analysis, which partly includes customers that increase or decrease their purchases from both Parties, results in significantly higher switching rates than their initial analysis.

²⁸⁰ [...].

- (560) Third, the Parties also include in their switching analysis customers who never bought from one of them. On the one hand, the fact that these customers never bought from one of the Parties suggest that this supplier was not present in these customers' choice set, and as a consequence they did not have the possibility to switch purchase to this supplier. On the other hand, the switching analysis assumes that any decrease in the purchase from the supplying Party is switched away to other competitors, whereas such decrease may just be due to a change in demand. The Parties' approach therefore mechanically underestimates the switching rate between the Parties.
- (561) [...].²⁸¹ The lack of methodological information provided by the Parties in relation to these empirical exercises makes it difficult to the Commission to address that argument. The mere existence of such customers might related to errors in handling the data, or difficulty in cleaning and matching Dow's and DuPont's customers. It could as well result from the fact that the analysis proposed by the Parties mixes products that belong to different (downstream) relevant markets for formulated products.
- (562) Fourth, the analysis provided by the Parties suffers from significant volatility of switching rates, depending on the period considered. Such volatility typically requires more attention and, absent robustness checks, casts doubts on whether any inference on closeness can be made from the Parties' analysis.
- (563) Fifth, if anything, the Commission's assessment of the data provided by the Parties in support of their Submissions on switching provides indication of [...] rates between Dow and DuPont than those provided in their Submissions. The Parties' supplementary analysis also results in significantly [...].
- (564) Sixth, and without prejudice to the Commission's assessment of the relevance of the Parties' switching analysis, the Commission notes that, given the [...] and given the [...], standard techniques used for measuring likely price effects of merger would lead to the anticipation of significant price increases.
- (565) Seventh, the limitations of the data provided by the Parties are such that the Parties' switching analyses need to make several critical assumptions which are not correct as soon as, for example, the customers' demand increase or decrease over time.
- (566) Finally, and more generally, the Commission is of the view that it is not possible to perform a meaningful switching analysis when, as it is the case in the Submissions on switching, the only data available are sales data from both Parties to their customers, with no understanding of sales made by other suppliers, customers' characteristics or markets' characteristics and evolution.

6.3. Herbicides

6.3.1. Introduction to herbicides

6.3.1.1. Herbicide use in agriculture

- (567) Herbicides are crop protection products aimed at preventing or controlling weeds which compete with crops for water, light, nutrients and space. Since the Parties' activities in non-selective herbicides²⁸² are limited, the main focus of this Decision is

²⁸¹ Parties' response to the Statement of Objections, annex 5, entitled [...] (ID10040), section 3.2.

²⁸² See recital (628).

on selective herbicides, which are herbicides designed to eliminate only the weeds while leaving intact the crop to which they are applied.

- (568) Selective herbicides are usually intended for use in specific crops, such as rice; some are registered for use in several crops, for instance cereals and oilseed rape. The type of crop is thus the key element when considering the application of selective herbicides.
- (569) There are, however, thousands of weeds in the EEA. An AI will typically target either grasses or broadleaf weeds, but it can also be effective against a broader range of weeds from both weed categories. The target weed is another distinguishing element for selective herbicides.
- (570) In the EEA, from a demand-side perspective, farmers usually face at least 10 different varieties of weed that they seek to eliminate, which fall into the two main categories of broadleaf weeds and grass weeds. This requires looking at specific weeds when examining the demand for herbicides. Certain weeds are more decisive for farmers' choices than others as they appear in higher numbers and may therefore have a considerable impact on yields. Those key weeds vary among crops and regions. Typical examples of key broadleaf weeds in the EEA include Galium aparine (cleavers), Stellaria media (chickweed) and Rumex (dock). Key grass weeds include Avena fatua (wild oat), Echinochloa crus-galli (barnyard grass) and Lolium multiflorum (annual ryegrass).
- (571) When farmers seek to eliminate both weed categories, they can either buy separate products for grass weeds (graminicides) and broadleaf weeds (broadleaf herbicides) or buy ready-made products that are effective against a range of weeds from both categories ('cross-spectrum' or 'broad-spectrum' herbicides). Different products may also have different levels of efficacy on certain weeds compared to others.
- (572) Formulated herbicide products can either contain a single AI or a mixture of two or more AIs. The AI determines the core characteristics and efficacy of the formulated product. In herbicides, mixtures of several AIs are more common than in other crop protection denominations such as insecticides.
- (573) When choosing a selective herbicide, farmers also need to consider at what time during the growing season and at what point in the crop's lifecycle they need to apply a product. For instance, in cereals, certain herbicides are applied in autumn while others are used in spring. Whether autumn application is required depends on the crop type, namely winter crops or spring crops, and the specific time of sowing: early, mid- or late autumn. The timing of application is further limited to a specific period in the plant's lifecycle: before sowing (pre-plant herbicides), after sowing but before germination (pre-emergence herbicides) or after germination (post-emergence herbicides).
- (574) One problem facing herbicide use in crop growing is the development of resistance in weeds. This occurs when the same herbicide or various herbicides with the same MoA are used repeatedly. Resistant mutant biotypes survive, resulting in an increasing number of plants until a majority of plants may become resistant. After a weed has become resistant to a certain MoA, it may become resistant to all products with the same MoA and all products in the same chemical class.
- (575) From a supply-side perspective, herbicide AIs are to be classified into MoA groups and chemical classes. MoA groups consist of herbicides that use the same mechanism to kill weeds, from absorption to death. There are currently over 20 MoA

groups in herbicides. Chemical classes of herbicides group together AIs which present chemical similarities in terms of their molecular structure and physical properties. Members of the same chemical class all have the same MoA but one MoA group will cover several chemical classes.

- (576) Because weed resistance limits the lifecycle of herbicides, herbicide manufacturers recommend rotation as a means to control the development of herbicide-resistant weeds. Farmers are advised to rotate herbicides annually and during the growing season. In the EEA the European Herbicide Resistance Action Committee (EHRAC) promotes the development of resistance management strategies in order to maintain efficacy and reduce the risk of resistance. Other bodies provide guidance to farmers, including, depending on the country, institutes, crop consultants, distributors, cooperatives and crop protection companies. Based on these recommendations, farmers decide which products they will use to suit their specific circumstances.
- (577) Herbicides require two types of authorisation before they can be sold to farmers in the EEA. First, the AI must be authorised by the Commission, on the advice of EFSA. AIs that are given Union-wide authorisation are included in Annex I of the Authorisations Directive (Directive 91/414/EC). Second, the crop protection product incorporating the AI (alone or as part of a mixture of AIs) must be authorised by the competent authority in the Member State(s) where it will be sold. For more information on those authorisations, see Section V.1.4.3.
- (578) In the early stages of the research process, agrochemical companies typically seek to register patents covering a chemical genus²⁸³ that includes a new AI. Later on in the research process, supplementary patents for composition of matter can be registered to protect the chemical sub-genus identified. Patents can also be registered for processes ("process patents") or formulations. In the EEA, patents offer protection for a period of 20 years from the date of application, regardless of whether they are exclusively national or based on a European patent. The patent protection period in the EEA can also be extended through supplementary protection certificates. For more information on patents and other forms of intellectual property protection see Section V.1.4.4.

6.3.1.2. Current turnover figures

- (579) Total herbicide sales amount to about USD [...] globally, and around USD [...] in the EEA. Selective herbicides represent the large majority of herbicide sales in the EEA, at around USD [...] (USD [...] market globally) in 2015.²⁸⁴
- (580) Cereals, corn, oilseed rape, fruits and vegetables and beets are the main crops for herbicides in the EEA. Cereals accounted for [...]% of herbicides sales in the EEA in 2015 (USD [...]), corn [...]% (USD [...]), oilseed rape [...]% (USD [...]), fruits and vegetables [...]% (USD [...]) and beets [...]% (USD [...]). Rice represented [...]% (USD [...]), pasture between [...]% and [...]% (estimates range between USD [...] and USD [...]) and sunflowers [...]% (USD [...]).²⁸⁵

²⁸³ A taxonomic rank used in the biological classification of living and fossil organisms.

²⁸⁴ Parties' response to the Commission's request for information RFI 29, question 3.1.

²⁸⁵ Parties' response to the Commission's request for information RFI 8 and follow-up requests, and Agrowin data.

(581) In this Decision, in light of the Parties' activities in the EEA, the relevant crops for the competitive assessment on selective herbicides are cereals, rice, pasture, oilseed rape, sunflowers, beets and corn.

6.3.2. *Product portfolios of the Parties*

(582) The Parties have strong product portfolios globally, notably in selective herbicides.²⁸⁶

(583) The Parties have very limited activities in non-selective herbicides, which do not give rise to any affected markets in the EEA. The Parties' sales of non-selective herbicides are small: USD [...] ²⁸⁷ in the EEA in 2015 for Dow (EEA market share: [0-5]%) and less than USD [...] in 2015 for DuPont, which were limited to [...] (EEA market share: [0-5]%).²⁸⁸ The Decision will therefore review only the Parties' portfolios of selective herbicides, as they are the only products giving rise to affected markets.

(584) Both Parties develop, manufacture and sell a broad range of different herbicides to be applied to all main crops across the EEA, including beets, cereals, corn, cotton, fruits and nuts, grapes/vines, oilseed rape, plantation (tobacco), pasture, potatoes, rice, vegetables and sunflowers. Both companies also have the technology to develop selective herbicides that can be applied across crops.

(585) While the Parties are strong in products targeting broadleaf weeds, and are notably leaders in cereals,²⁸⁹ they also have graminicides and cross-spectrum products in their portfolios of selective herbicides.

(586) Sections V.6.3.2.1 and V.6.3.2.2 describe the herbicide portfolios of Dow and DuPont respectively, including current and pipeline products in the EEA. AI names will be mainly used, as brand names tend to vary by country. When sales are given by AI for mixture products, the sales figure is usually allocated to the "lead AI" in the mixture (typically the most recent of the constituent AIs).

(587) The Parties' selective herbicides for cereals, rice, pasture, oilseed rape, sunflowers, beets and corn will be examined further in the relevant crop sections.

6.3.2.1. Dow

(588) Herbicides have traditionally represented the majority of Dow's agrochemical business ([...] % in 2014²⁹⁰). [...].

(589) The largest market for Dow in Europe is [...] with 2014 sales estimated at [...], followed by [...], [...], [...] and [...].²⁹¹ Key Dow herbicides for the European market include pyroxsulam, fluroxypyr, florasulam, clopyralid and propyzamide, which together accounted for [...] % of Dow's herbicides sales in the EEA in 2015.

²⁸⁶ Form CO and estimates of the Parties (Parties' response to the Commission's request for information RFI 8 and follow-up requests).

²⁸⁷ Estimate of the Parties' response to the Commission's request for information RFI 29, question 3.1).

²⁸⁸ Form CO, part B.I, page 14; and Form CO, Annex B.1.6.2.

²⁸⁹ [Internal document] (ID1329-39).

²⁹⁰ Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation, page 202.

²⁹¹ Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation, page 201.

(590) The company itself recognises its strength in this segment: a 2015 Dow internal document notes that Dow is [internal assessment of Dow's market position].²⁹²

Table 2 – Dow's herbicides portfolio in the EEA

AI name	Status in the EEA	Main relevant crop(s)	Overall category of weeds targeted ²⁹³	Chemical class	EEA sales in EUR million (2015)	Comments
Pyroxsulam	Sold in the EEA	Cereals	Cross-spectrum	Triazolopyri midines	[...]	Patent expires in 2022, data protection in Union until 2024
Florasulam	Sold in the EEA	Cereals, Maize	BLW	Triazolopyri midine	[...]	
Fluroxypyr	Sold in the EEA	Cereals, Maize	BLW	Pyridine carboxylic acid	[...]	
Clopyralid	Sold in the EEA	Oilseed rape, Cereals, Beets, Pasture	BLW	Pyridine carboxylic acid	[...]	
Propyzamide	Sold in the EEA	Oilseed rape, Grapes, Fruits, Vegetables	Cross-Spectrum	Benzamide	[...]	
Penoxsulam	Sold in the EEA	Rice, Cereals, Fruits	Cross-Spectrum	Triazolopyri midine	[...]	Patent expires in 2017
Triclopyr	Sold in the EEA	Non-crop, Cereals, Grassland	BLW	Pyridine carboxylic acid	[...]	
2,4-D	Sold in the EEA	Maize, Cereals, Fruits, Nuts, Pasture, Rice	BLW	Phenoxy-carboxylic-acid	[...]	
Aminopyralid	Sold in the EEA	Oilseed rape, Cereals, Pasture, Rice	BLW	Pyridine carboxylic acid	[...]	Patent expires in 2021
Isoxaben	Sold in the EEA	Cereals, Perennial crops	BLW	Benzamide	[...]	

²⁹² [Internal document] (ID445-119), slide 9.

²⁹³ "BLW" stands for broadleaf weeds.

AI name	Status in the EEA	Main relevant crop(s)	Overall category of weeds targeted ²⁹³	Chemical class	EEA sales in EUR million (2015)	Comments
Picloram	Sold in the EEA	Pasture, Cereals, Maize, Oilseed rape	BLW	Pyridine carboxylic acid	[...]	
Haloxypop-P	Sold in the EEA	Oilseed rape, soybeans, fruits and vegetable, cotton, beets	Grasses	Aryloxyphen oxypropionates	[...]	
Cyhalofop	Sold in the EEA	Rice	Grasses	Aryloxyphen oxypropionate	[...]	
Phenoxies	Sold in the EEA	Cereals, Maize	BLW	Pyridine carboxylic acid	[...]	
Oryzalin	Sold in the EEA	Fruits, Vegetables, Vines	Cross-Spectrum	Dinitroanilines	[...]	
[Arylex (halauxifen)]	Launch in 2016 to [...]	Cereals, OSR	BLW	Arylpicolinate		Launch in 2016/2017 for cereals [...]
[Rinskor (florpyrauxifen-benzyl)]	[...]	Rice	Cross-Spectrum	Arylpicolinate		[...]
Oxyfluorfen	Recently divested	Fruits, Vegetables, Plantation crops	Cross-Spectrum	PPO diphenylether	[...]	Divested in 2015 to Nutrichem
Glyphosate	Recently divested	Vines	Cross-spectrum	EPSP	[...]	Divested in 2016 to Nutrichem
Ethalfuralin	Recently divested	Peanuts, Sunflower	Cross-Spectrum	Dinitroanilines		Divested in 2015 to Gowan Company
Benfluralin	Recently divested	Fruits, Vegetables	Cross-Spectrum	Dinitroanilines	[...]	Divested in 2015 to Gowan Company
Trifluralin	Recently divested	Cereals, Cotton		Dinitroanilines		Divested in 2015 to Gowan Company
MCPA	3 rd party AI		BLW	Phenoxy carboxylic acid	[...]	
Chlorotoluron	3 rd party AI		Cross-spectrum	Urea		
Diflufenican	3 rd party AI		BLW	Pyridinecarb oxamide		
Mesotrione	3 rd party AI		BLW	Triketone		

AI name	Status in the EEA	Main relevant crop(s)	Overall category of weeds targeted ²⁹³	Chemical class	EEA sales in EUR million (2015)	Comments
Metazachlor	3 rd party AI		Cross-spectrum	Chloroacetamide		
Oryzalin	3 rd party AI		Cross-spectrum	Dinitroanilines		
Pendimethalin	3 rd party AI		Cross-spectrum	Dinitroanilines		

Source: Parties' submissions

(A) Existing products

- (591) The offering of selective herbicides in Dow's portfolio can be grouped by chemical class and MoA, as is usually the case in the agrochemical industry (see recital (574)).²⁹⁴
- (592) Dow offers products in the chemical class of pyridine carboxylic acids, which are part of the synthetic auxin MoA group. They account for a large part of Dow's agrochemical portfolio, with worldwide sales in excess of USD [...]. Dow's leading pyridine herbicides are picloram and fluroxypyr, with global sales of around USD [...] in 2014. Clopyralid, aminopyralid and triclopyr also belong to this chemical class.²⁹⁵
- (593) Dow's portfolio also includes herbicides in the chemical class of triazolopyrimidines, which act by inhibition of acetolactate synthase (ALS). This group makes up a large part of Dow's herbicide portfolio, with global sales totalling approximately USD [...] in 2014. Dow's main AIs in this class are penoxsulam, pyroxsulam and florasulam, which all have large sales globally.
- (594) Dow is one of the leading manufacturers of phenoxy carboxylic acid herbicides worldwide, which also belong to the synthetic auxin MoA group. Its worldwide sales of this product group reached approximately USD [...] in 2014. The range is led by 2,4-D, which is widely used both in crop and non-crop situations, followed by MCPA and a number of other analogues.
- (595) In addition, Dow produces herbicides in the aryloxyphenoxypropionate chemical class, which is part of the acetyl CoA carboxylase inhibitor (ACCase) MoA group. This range includes the graminicide cyhalofop, which was introduced in 1996 for use in rice to control grass weeds, including barnyard grass. Sales in 2014 are estimated to have reached USD [...] worldwide, [...].
- (596) Another member of the aryloxyphenoxypropionate chemical class is Dow graminicide haloxyfop, which was first introduced in 1986 and is sold for post-

²⁹⁴ See the product portfolios of the leading 15 agrochemical companies discussed in Phillips McDougall, – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation.

²⁹⁵ Phillips McDougall, – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market, page 204.

emergence grass weed control on soybean, oilseed rape, fruit & vegetables, cotton and sugarbeet. Global sales in 2014 are estimated to have reached USD [...].²⁹⁶

(B) Forthcoming products

(597) Dow has recently developed the new chemical class of arylpicolinates, of which Arylex (AI halauxifen-methyl) is the first member. It is a new broadleaf auxinic herbicide specialised in hard-to-control weeds worldwide with utility in multiple crops and uses. It is intended to target primarily Galium, as well as other weeds such as Conyza, Chenopodium and Papaver [pipeline information].²⁹⁷ Dow has recently obtained the first commercial authorisations of Arylex-based products for use in cereals in the Union. It plans to continue the launch of Arylex-containing products in the EEA in 2016-2017 in cereals [pipeline information].²⁹⁸ Dow estimates that total sales of Arylex will generate USD [...] revenue at maturity.²⁹⁹

(598) [Another member of the new chemical class of arylpicolinates is Dow's late-development product Rinskor (florpyrauxifen-benzyl), a cross-spectrum herbicide for the post-emergent control of grasses, broadleaf weeds and sedges, including resistant species, in rice]. It has a synthetic auxin MoA, which is new in rice crops. Formulated products based on this molecule are not yet registered in the Union. Dow applied for Union registration of Rinskor in March 2016 and expects approval in [...]. It aims to launch a Rinskor-formulated product [...]. Dow estimates that Rinskor will generate revenues of USD [...], which will help Dow grow its [internal assessment]³⁰⁰.

(C) Early pipeline products³⁰¹

(599) [Early pipeline information].^{302,303}

(600) [Early pipeline information].^{304,305,306}

(601) For more information on Dow's early pipeline research in herbicides see Sections V.8.8.1.3. to V.8.8.1.5

(D) Divestitures

(602) According to the information provided by the Parties, Dow has recently made some divestitures in its herbicides portfolio. [...]. One divestiture was to Gowan, namely the DNA portfolio, a group of molecules including trifluralin, benfluralin,

²⁹⁶ Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation, page 210.

²⁹⁷ [Internal document] (ID445-119), slide 7.

²⁹⁸ [Internal document] (ID729-000009), slide 5.

²⁹⁹ [Internal document] (ID8833-92), [internal document] slide 4.

³⁰⁰ [Internal document], slide 5.

³⁰¹ The Commission points out that notwithstanding its description of certain discovery products in this section, it has conducted its final competitive assessment on the sole basis of existing products and forthcoming, that is to say development or near-development products.

³⁰² [Internal document] (ID1328-131), [internal document].

³⁰³ [Internal document] (ID6696-29505), [internal document].

³⁰⁴ [Internal document] (ID6696-29505), [internal document].

³⁰⁵ [Internal document] (ID6143-057697), [internal document], slide 15.

³⁰⁶ [Internal document] reply to RFI 37.

ethalfluralin. Internal documents indicate that the rationale for the divestment was [internal assessment].³⁰⁷ [Information on external relationships].³⁰⁸

- (603) Another divestiture, also in 2015, was oxyfluorfen to Nutrichem. Internal documents indicate that the rationale for the divestment was that [internal assessment].³⁰⁹ However, internal documents also indicate that Dow would [quote from internal document; internal assessment].^{310,311}

6.3.2.2. DuPont

- (604) Herbicides were traditionally the most significant sector for DuPont's agrochemical operations, supported by its strong portfolio of sulfonylurea (SU) products. However, the herbicide business of DuPont has more recently been replaced in relative importance by the insecticide products, currently representing almost [...]% of DuPont's total agrochemical sales.³¹²

Table 3 – DuPont's herbicides portfolio in the EEA

AI name	Sales status in the EEA	Main relevant crop(s)	Overall category of weeds targeted	Chemical class	EEA sales in EUR million (2015)	Comments
Thifensulfuron	Sold in the EEA	Cereals, Soybeans, Maize, Pasture	BLW	Sulfonylurea	[...]	
Tribenuron-m	Sold in the EEA	Cereals, Sunflower, Pasture, Rice	BLW	Sulfonylurea	[...]	
Triflusaluron-methyl	Sold in the EEA	Cereals, Maize, Soybeans, Beets, Rice	BLW	Sulfonylurea	[...]	
Rimsulfuron	Sold in the EEA	Maize, Potato, Fruits, Sunflower	Grasses	Sulfonylurea	[...]	
Flupyralsulfuron	Sold in the EEA	Cereals, Pasture	Cross-spectrum	Sulfonylurea	[...]	
Nicosulfuron	Sold in the EEA	Maize, Fruits	Grasses	Sulfonylurea	[...]	
Metsulfuron	Sold in the EEA	Cereals, Rice, OSR, Pasture	BLW	Sulfonylurea	[...]	

³⁰⁷ [Internal document], slide 4.

³⁰⁸ [Internal document], slide 5.

³⁰⁹ [Internal document].

³¹⁰ [Internal document], slide 4.

³¹¹ [Internal document] (ID742), [internal document].

³¹² Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation, page 240.

AI name	Sales status in the EEA	Main relevant crop(s)	Overall category of weeds targeted	Chemical class	EEA sales in EUR million (2015)	Comments
Lenacil	Sold in the EEA	Beets, Potatoes, fruits, vegetables	BLW	Uracil	[...]	
Ethametsulfuron-methyl	Sold in the EEA	Oilseed rape	BLW	Sulfonylurea	[...]	Union registration process ongoing
Chlorsulfuron	Sold in the EEA	Cereals, pasture	Cross-spectrum	Sulfonylurea	[...]	
Azimsulfuron	Sold in the EEA	Rice	Cross-spectrum	Sulfonylurea	[...]	[...]
Aminocyclopyrachlor	Not in EEA	Pasture				
Bensulfuron	Recently divested in the EEA	Rice	Cross-spectrum			
Quizalofop	3 rd party AI					[Information on supply sources]
Mesotrione	3 rd party AI		BLW	Triketone	[...]	[Information on supply sources]
Dicamba	3 rd party AI		BLW	Benzoic acid	[...]	[Information on supply sources]
Amidosulfuron	3 rd party AI		BLW	Sulfonylurea		
Bentazone	3 rd party AI		BLW	Benzothiadiazinone		
Bromoxynil-octanoate	3 rd party AI		BLW	Nitrile		
Carfentrazone-e-e	3 rd party AI		Cross-spectrum	Triazolone		
Clodinafop	3 rd party AI		Grasses	Aryloxyphenoxypionate 'FOPs'		
Clomazone	3 rd party AI		BLW	Isoxazolidinone		
Diclofop-m	3 rd party AI		Grasses			
Diflufenican	3 rd party AI		BLW			
Florasulam	3 rd party AI		BLW	Triazolopyrimidine		[Information on supply sources]
Fluometuron	3 rd party AI		Cross-spectrum	Urea		
Fluroxypyr	3 rd party AI		BLW	Pyridine carboxylic acid		[Information on supply sources]

AI name	Sales status in the EEA	Main relevant crop(s)	Overall category of weeds targeted	Chemical class	EEA sales in EUR million (2015)	Comments
Imazamox	3 rd party AI		Cross-spectrum	Imidazolone		
MCPA	3 rd party AI		BLW	Phenoxy-carboxylic acid		
MCPP-P	3 rd party AI		BLW	Phenoxy-carboxylic acid		
Pethoxamid	3 rd party AI		Grasses	Chloroacetamide		
Propaquizafop	3 rd party AI		Grasses	Aryloxyphenoxypropionate 'FOPs'		
Terbuthylazine	3 rd party AI		BLW	Triazine		

Source: Parties' submissions

(A) Existing products

- (605) The offering of selective herbicides in DuPont's portfolio can also be grouped by chemical class and MoA. DuPont's portfolio in the EEA consists mainly of products derived from 11 AIs of the SU family, as well as lenacil, and in-licensed products. The SUs thifensulfuron methyl, tribenuron methyl, nicosulfuron, triflurosulfuron methyl, rimsulfuron and flupyr-sulfuron account together for [...] % of DuPont's 2015 herbicides sales in the EEA.³¹³ Other DuPont SUs include metsulfuron, triflurosulfuron, azimsulfuron, ethametsulfuron and chlorsulfuron.
- (606) DuPont introduced the sulfonylurea chemical class in the early 1980s, enabling the company to compete successfully in a broad range of crop and non-crop applications. SUs are part of the ALS (acetolactate synthase) Inhibitors MoA group. This product group has recently become less important to DuPont. However, despite resistance issues, pressure from generic competition and newly developed competitive products DuPont's SU product sales experienced [...] in recent years. SU sales [...] between 2010 and 2013 and sales in 2014 came to USD [...], accounting for [...] % of DuPont's total herbicide sales.³¹⁴
- (607) DuPont has not introduced any new SU products since 1997. However, the product range [pipeline information; internal assessment].³¹⁵
- (608) DuPont has an [quote from internal document]³¹⁶ [pipeline information].³¹⁷ The sulfonylurea products were initially offered in dry formulations, but the range has

³¹³ [Internal document] (ID4384-18), [internal document], slide 4.

³¹⁴ Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation, page 240.

³¹⁵ [Internal document] (ID6827-05922), [internal document].

³¹⁶ [Internal document], (ID581), [internal document], slide 7.

recently been extended with liquid formulations (liquid SUs).³¹⁸ This new delivery form makes it easier for the products to be used in co-formulations for weed resistance management.

(B) Forthcoming products

- (609) [Information on forthcoming products].³¹⁹ [Pipeline information], DuPont now has several new molecules in its pipeline (see Section V.8.8.1).

Figure 27 – [Internal document]

[...]

Source: [Internal document]

- (610) DuPont is conducting development of cross-spectrum herbicide [pipeline information] for control of grass and certain broadleaf weeds in rice. [Pipeline information]³²⁰, offering a completely novel MoA [pipeline information; quote from internal document].^{321,322,323}

- (611) [Pipeline information].^{324,325}

- (612) [Pipeline information].³²⁶

(C) Early pipeline products³²⁷

- (613) Furthermore, DuPont has several products in its discovery pipeline, [early pipeline information].³²⁸

- (614) [Early pipeline information].³²⁹

- (615) [Early pipeline information].³³⁰

- (616) [Early pipeline information].^{331,332}

- (617) [Early pipeline information].³³³

- (618) [Early pipeline information].³³⁴

- (619) [Early pipeline information].

³¹⁷ [Internal document] (ID5668-143), [internal document].

³¹⁸ [Internal document] (ID5668-143), [internal document].

³¹⁹ [Internal document], slide 9.

³²⁰ [Information on R&D process].

³²¹ Parties' response to the Commission's request for information RFI 38, question 8, Annex 8.1.

³²² [Internal document], slides 11-12.

³²³ [Internal document].

³²⁴ Parties' submission [...], dated [...], page 7.

³²⁵ [Internal document].

³²⁶ Form RM, 17 February 2017, page 61.

³²⁷ The Commission points out that notwithstanding its description of certain discovery products in this section, it has conducted its final competitive assessment on the sole basis of existing products and forthcoming, that is to say development or near-development products.

³²⁸ Parties' response to the Commission's request for information RFI 25.

³²⁹ Parties' response to the Commission's request for information RFI 56, question 4, Annex 4.07.

³³⁰ Form RM, 17 February 2017, page 61.

³³¹ Parties' response to the Commission's request for information RFI 27, question 2, Annex 2.02.

³³² [Internal document], slide 41 (ID6825-7771).

³³³ [Internal document].

³³⁴ [Internal document].

- (620) [Early pipeline information].
- (621) [Early pipeline information].³³⁵
- (622) [Early pipeline information].³³⁶
- (623) [Early pipeline information].^{337,338}
- (624) [Early pipeline information].
- (625) [Early pipeline information].^{339,340}
- (626) [Early pipeline information]³⁴¹.
- (627) For more information on DuPont's early pipeline research in herbicides see Sections V.8.8.1.3. to V.8.8.1.5

6.3.3. *Market definition*

6.3.3.1. Past decisional practice

- (628) In previous cases, the Commission has considered the distinction between (i) selective herbicides and (ii) non-selective herbicides to be relevant.³⁴² Non-selective herbicides kill many types of plants, including cultivated crops, and are therefore applied to fields after the harvest of one crop and prior to the sowing of the next. By contrast, selective herbicides are designed to kill only the weeds while leaving intact the crop to which they are applied and are therefore usually applied between sowing and harvesting.
- (629) With regard to perennial crops (fruits and nuts, citrus fruits, grapes), in previous merger decisions, the concerned parties have claimed that a distinction between selective and non-selective was not appropriate and that these products competed with each other. Whether herbicides for citrus fruits constituted a separate product market was left open.³⁴³
- (630) The Commission has also considered the different types of crops to be a relevant basis for segmentation. The Commission found that the type of crop on which a herbicide is used is the most important factor in determining product substitutability from a farmer's point of view.³⁴⁴
- (631) More specifically, within cereals, the Commission has previously left open whether barley herbicides formed a separate relevant segmentation, and noticed the growing importance of graminicides due to resistance problems.³⁴⁵

³³⁵ Parties' response to the Commission's request for information RFI 56, question 4, Annex 4.09.

³³⁶ Parties' response to the Commission's request for information RFI 27, question 2, Annex 2.23.

³³⁷ [Internal document].

³³⁸ Parties' response to the Commission's request for information RFI 27, question 2, Annex 2.22.

³³⁹ Parties' response to the Commission's request for information RFI 56, question 4, Annex 4.10.

³⁴⁰ Parties' response to the Commission's request for information RFI 56, question 4, Annex 4.10, slide 16.

³⁴¹ Parties' response to the Commission's request for information RFI 27, question 2, Annex 2.26.

³⁴² See for instance Commission Decision in Cases M.1806 – AstraZeneca/Novartis (2000), recital 48; and M.6141 – CNAC/Koor Industries/Makhteshim Agan Industries (2011), recital 21.

³⁴³ See Commission Decision in Case M.2547 – Bayer/ Aventis Crop Science (2002), recital 575.

³⁴⁴ See for instance Commission Decision in Cases M.1806 – AstraZeneca/Novartis (2000) and M.6141 – CNAC/Koor Industries/Makhteshim Agan Industries (2011).

³⁴⁵ See Commission Decision in Case M.2547 – Bayer/Aventis Crop Science (2002), recital 581.

- (632) In previous decisions³⁴⁶, the Commission has also considered a further possible distinction between (i) broadleaf weed herbicides, (ii) graminicides (control of grass) and (iii) broad-spectrum herbicides. If a farmer faces harmful grass weeds in his crop fields, he needs to use herbicides capable of controlling those particular weeds, typically graminicides. The same applies for the control of broadleaf weeds. In addition, broad-spectrum herbicides are products active against both weed categories, that is to say broadleaf weeds and grasses. In previous cases, the Commission underlined that the market segments of broadleaf herbicides and graminicides may be linked through the presence of broad-spectrum herbicides.
- (633) Moreover, the Commission has considered a distinction between herbicides based on the stage of application, notably between (i) pre-sowing, (ii) pre-emergence and (iii) post-emergence herbicides³⁴⁷. Pre-emergence herbicides are applied to a target crop before it has germinated whereas post-emergence herbicides are applied after germination.
- (634) The Commission noted that there was some degree of flexibility for farmers in choosing the time of application and thus of substitutability between the three types of herbicides before the sowing stage at least. As time goes by and weed problems occur in the crop fields, pre-sowing herbicides or even pre-emergence herbicides are no longer substitutes for post-emergence herbicides.³⁴⁸
- (635) Concerning oil seeds, the Commission distinguished a separate market for post-emergence graminicides.³⁴⁹

6.3.3.2. Parties' arguments

- (636) The Parties agree in general with the segmentation between selective and non-selective herbicides. However, they consider that this approach is not appropriate for some crops, such as perennial crops (fruits, nuts, citrus fruits, grapes). For those crops, non-selective and semitotal herbicides are also used to control weeds without damaging the crops. Thus, the Parties argue, for this crop group selective herbicides and non-selective herbicides would compete with each other.
- (637) The Parties agree with the segmentation of herbicides by crop. Farmers choose herbicides that are adapted and authorised for use on the crop they want to protect. However, the Parties claim that further segmentation by crop within cereals is not appropriate, in particular, in broadleaf cereal herbicides.
- (638) The Parties submit that the relevant product markets for herbicides for individual crops or crop groups should not be further segmented by (i) weed category treated and/or (ii) by stage of application.
- (639) According to the Parties, the boundaries between the three types of herbicides (broadleaf herbicides, graminicides and cross-spectrum) are often unclear. They further submit that sub-segmentation by weed category is inappropriate given that farmers typically need products that kill both categories of weeds. Plausible sub-segments “*would need to take into account the full range of substitutable products*”

³⁴⁶ See for instance Commission Decision in Cases M.2547 – Bayer/ Aventis Crop Science (2002), recital 577; and M.6141 – CNAC/Koor Industries/Makhteshim Agan Industries (2011), recital 21.

³⁴⁷ See for instance Commission Decision in Case M.6141 –CNAC/Koor Industries/Makhteshim Agan Industries (2011), recital 21.

³⁴⁸ See Commission Decision in Case M.2547 – Bayer/Aventis Crop Science (2002), recital 579.

³⁴⁹ See Commission Decision in Case M.1806 – AstraZeneca/Novartis (2000), recital 65.

*[...] and therefore at least include (i) all products that can be used against broadleaf weeds, i.e., broadleaf herbicides plus cross-spectrum herbicides, and (ii) all products that can be used against grass, i.e., graminicides plus cross-spectrum herbicides.*³⁵⁰

- (640) In addition, the Parties argue that it is inappropriate to define relevant product markets on the basis of individual targeted weeds given that a farmer has to target several weed species and that each herbicide on the market targets a range of weeds.
- (641) Further, they claim that sub-segmentation by time of application is inappropriate on the grounds that all three types of herbicides distinguished by timing of application (pre-plant, pre-emergence, post-emergence) are used to treat the same weed categories and that boundaries between pre-emergence products and post-emergence herbicides are not always clear.
- (642) They submit that the results of the Commission's market investigation cannot be used to substantiate that from a demand-side perspective, customers and stakeholders distinguish herbicides based on the weeds targeted (broadleaf, grass, cross-spectrum) and on the timing of application.³⁵¹

6.3.3.3. The Commission's assessment

- (643) The general principles to define the relevant product market for crop protection are described in Section V.4.2. The Commission is of the view that, for market definition purposes, herbicides have to be segmented into selective and non-selective crop protection products, and then further by crop, by the specific weed targeted, and finally by the timing of their application.
- (644) First, with regard to crop selectivity, the Commission finds, on the basis of the market investigation, that the distinction between (i) selective herbicides and (ii) non-selective herbicides should be maintained, in line with past decisional practice.
- (645) From a demand-side perspective, farmers choose their selective herbicide products first on the basis of their ability to control the target weeds without harming the crop, then on their efficacy on the various weeds over time in terms of timing of application and resistance, and next on other factors such as price. When buying non-selective herbicides, by contrast, farmers are not concerned with protecting a particular crop, but rather the product's ability to clear the field between harvesting one crop and sowing the next.
- (646) Both customer and competitors confirmed that they consider selective and non-selective herbicides to be distinguishable. A majority of respondents to the crop protection competitors' market investigation³⁵² stated that they distinguish between selective herbicides and non-selective herbicides. A significant number of respondents to the crop protection customers' market investigation stated likewise.³⁵³ The internal documents of the Parties also confirm the distinction between selective and non-selective herbicides.³⁵⁴

³⁵⁰ Parties' response to the Article 6(1)(c) Decision, paragraph 44.

³⁵¹ Parties' response to the Statement of Objections, paragraph 997.

³⁵² Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 90.

³⁵³ Questionnaire to Crop Protection Customers (Q1), question 320.

³⁵⁴ Parties' response to the Commission's request for information RFI 57, question 5, Annex 5.01, slide 10.

- (647) Second, with regard to the type of crop, the in-depth market investigation³⁵⁵ confirmed that the type of crop on which the selective herbicide will be applied is the most important factor in determining product substitutability from a demand (that is, the farmer's) perspective.³⁵⁶
- (648) However, as regards cereal herbicides in particular, the Commission notes that views are divided³⁵⁷ on whether segmentation to the level of individual crops (wheat, barley, oats, etc.) is appropriate. Some markets participants state that nearly all cereals use the same products³⁵⁸ while others explained that "*different requirements and weed controls are needed*".³⁵⁹ One market participant pointed to another possible segmentation, namely between "*common cereals such as wheat, barley, oats and rye (collectively known as small-seed cereals)*" and "*larger-seed cereals such as durum wheat*".³⁶⁰ Another noted that herbicide use even differs between types of wheat.³⁶¹ In its investigation the Commission noted that market shares across the different cereal crops tend to be similar. While authorisations and indications on the label are by crop,³⁶² labels of the products of the Parties also usually indicate several target cereal crops. For the purpose of the Decision, the Commission will refer in its competitive analysis to cereal herbicides as a group.
- (649) Third, the relevance of further segmentations of selective herbicides in terms of weeds was confirmed by customers³⁶³ and stakeholders³⁶⁴. Herbicides targeting a certain weed cannot be substitutable for herbicides targeting another weed as they do not offer a solution to the same problem. For the purpose of the Decision and on the basis of the data available, the Commission will consider in its analysis specific groups of weeds targeted, namely broadleaf, grass and cross-spectrum.
- (650) The market investigation results are in line with the Commission precedents which already acknowledge the growing importance of graminicides driven by increasing resistance problems.³⁶⁵ The internal documents of the Parties also observe this trend for cereal herbicides.³⁶⁶
- (651) Cross-spectrum herbicides target both broadleaf and grass weeds. Farmers can either mix broadleaf herbicides and graminicides, or purchase a pre-mixed cross-spectrum product. However, according to the market investigation, cross-spectrum herbicides might not always be an alternative to broadleaf herbicides or graminicides for all farmers. For example, farmers who face mostly broadleaf weeds with low pressure

³⁵⁵ Questionnaire to Crop Protection Customers (Q1), question 33.

³⁵⁶ While perennial crops have specificities, these crops are not addressed in this Decision given that those crops are not the object of the Commission's concerns.

³⁵⁷ Questionnaire to Crop Protection Customers (Q1), question 34; Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 92.

³⁵⁸ See also for instance agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

³⁵⁹ Questionnaire to Crop Protection Customers (Q1), question 34.1 (ID4418).

³⁶⁰ Agreed non-confidential minutes of a call with a competitor, 27 September 2016 (ID8568).

³⁶¹ Agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

³⁶² See for instance agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557) and agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7383).

³⁶³ Questionnaire to Crop Protection Customers (Q1), question 35.

³⁶⁴ Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), questions 91, 93, 94.

³⁶⁵ Commission Decision in Case M.2547 – Bayer/Aventis Crop Science (2002), recital 580.

³⁶⁶ Parties' response to the Commission's request for information RFI 57, question 5, Annex 5.01, slide 7.

from (or even absence of) grass weeds may not find them substitutable,³⁶⁷ especially because cross-spectrum herbicides appear to be more expensive to a certain extent.³⁶⁸ As stated by a competitor, "*a farmer that only has broadleaf weeds problems would not necessarily use cross-spectrum herbicides*".³⁶⁹

- (652) Fourth, the market investigation overall indicated that further segmentation based on timing of application is relevant. Both customers³⁷⁰ and stakeholders³⁷¹ distinguished selective herbicides based on the timing of application.³⁷²
- (653) To this effect, the Commission initially considered the following distinction: (i) pre-sowing, (ii) pre-emergence and (iii) post-emergence herbicides.³⁷³ At the beginning of the growing season farmers usually apply products that are effective against a wide range of grass and broadleaf weeds in their fields. As time goes by and weed problems occur, farmers tend to choose more selective treatment to target weeds that survived the first spray. For the purpose of the Decision, the Commission finds that only pre-emergence and post-emergence selective herbicides are relevant for the competitive assessment.
- (654) Fifth, concerning modes of action ("MoA") and chemical classes of products,³⁷⁴ from the market investigation the Commission understands that MoAs and chemical classes are overall seen as relevant distinguishing factors by crop protection players. For instance, they are taken into account in order to ensure resistance management and effectiveness of the treatment.³⁷⁵ Some market players explained that "*[t]he use of different modes of action (MoA) is generally recommended to fight against resistance. In some cases, you would alternate between one MoA and another. In other cases, you would use more than one MoA at a time. However, some weeds may have built up resistance to an MoA, so you would need to use another MoA completely (e.g. poppy and chickweed resistance to sulfonylureas)*".³⁷⁶ For chemical classes, the environmental impact is considered. Respondents to the market investigation highlighted particular chemical classes that are especially relevant for their businesses (for example ALS for cereals and rice, triazines in corn and potatoes, sulfonylureas for cereals, etc.).³⁷⁷
- (655) However, as resistance affects some weeds more than others, a farmer would still be able to choose freely among products with similar weed spectrums regardless of their MoA and chemical class if the key weeds the farmer faces are not particularly

³⁶⁷ See for instance the spray programmes recommended for cereals with low pressure from grass weeds in "Désherbage Céréales Campagne 2013/2014" [Weed control in cereals – 2013/2014 season], Chambre d'Agriculture de l'Allier, file name "PLAQUETTE_DESHERBAGE_CEREALES_2013.pdf".

³⁶⁸ See for instance agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

³⁶⁹ Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

³⁷⁰ Questionnaire to Crop Protection Customers (Q1), question 36.

³⁷¹ Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), questions 91, 93 and 94.

³⁷² Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 19.

³⁷³ See for instance Commission Decision in Case M.6141 – CNAC Industries/Makhteshim Agan Industries (2011), recital 21.

³⁷⁴ Questionnaire to Crop Protection Customers (Q1), questions 37 and 38; Questionnaire to Crop Protection Stakeholders and Trading Partners (Q3a and Q3b), question 20; Questionnaire to Crop Protection Competitors (Q2a and Q2b), questions 95 and 96.

³⁷⁵ Questionnaire to Crop Protection Customers (Q1), question 37.1.

³⁷⁶ Agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246).

³⁷⁷ Questionnaire to Crop Protection Customers (Q1), question 39; Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 21.

subject to resistance. This means that at least in such cases products with different MoAs or from different chemical classes would still directly compete with each other. Therefore, different MoAs and chemical classes will not be assessed as different segments, but will be further taken into consideration in the competitive assessment when applicable.

(656) From a supply-side perspective, [information on R&D process; quote from internal document].³⁷⁸ In addition, other herbicide suppliers that responded to the market investigation overall confirmed the segmentation of the market described in recital (643).

6.3.3.4. Conclusion

(657) On the basis of the available evidence and the results of the market investigation illustrated in recitals (643) to (656), for the purpose of the assessment of this Transaction, the Commission considers that the relevant product markets are: selective herbicides segmented by specific crop, by specific weeds targeted and by the timing of their application. However, due to the multitude of markets that result from this approach, the Commission analyses the sole groups of crops (for instance cereals) and weed categories (broadleaf weeds, grasses and cross-spectrum) that are relevant in its competitive analysis.

(658) As for the geographic dimension of those markets, in line with the findings outlined in Section V.4.2.2, the Commission takes the view that the markets for formulated herbicide products are national in their geographic scope.

6.3.4. *Cereal herbicides - assessment of non-coordinated effects*

(659) Cereal herbicide sales globally amounted to USD [...] in 2014, which represented [...]% of all crop protection sales in cereals.³⁷⁹ In 2015 total selective cereal herbicide sales in the EEA were estimated at USD [...], of which about USD [...] were used on wheat, followed by barley (USD [...]), triticale (USD [...]), rye (USD [...]), oats (USD [...]), and other cereals. Cereals amounted to [...]% of herbicides sales in the EEA in 2015.³⁸⁰

(660) In terms of time of application, post-emergence selective cereal herbicides make up the largest share (USD [...]), compared to about USD [...] for pre-emergence products.³⁸¹

(661) As for weed categories, most cereal herbicides sales in the EEA were classified as cross-spectrum products (USD [...]), followed by broadleaf herbicides (USD [...]) and graminicides (USD [...]).³⁸²

(662) Farmers across the EEA face, in particular, the following key broadleaf weeds: Galium aparine (cleavers), Matricaria species (mayweeds), Stellaria media (chickweed), Veronica species (speedwells), Viola arvensis (field pansy), and/or – locally – Cirsium species (thistles), Lamium species (deadnettle), Amaranthus retroflexus (pigweed), Centaurea cyanus (cornflower), and Xanthium (cocklebur).

³⁷⁸ [Internal document] (ID445-119), [internal document].

³⁷⁹ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), pages 56 and 57.

³⁸⁰ Parties' response to the Commission's request for information RFI 29, question 3.1.

³⁸¹ 2015 Agrowin data.

³⁸² 2015 Agrowin data.

Common key grass weeds in the EEA include *Alopecurus myosuroides* (blackgrass), *Apera spicaventi* (loose silky bent), *Avena fatua* (wild oat), *Bromus* species (bromegrass), and *Lolium multiflorum* (Italian rye grass).

- (663) If the weeds are predominantly either broadleaf or grass, the farmer will typically use a broadleaf herbicide or a graminicide. In the case of mixed weed populations of both broadleaf and grass weeds farmers either use graminicides and broadleaf herbicides successively, make their own tank mixes, or use cross-spectrum products (pre-mixed formulations of broadleaf herbicides and graminicides, or straight-AI cross-spectrum herbicides).
- (664) Resistance in both broadleaf and grass weeds is becoming an increasing issue for cereal herbicides. Resistance to at least one herbicide MoA group has been identified in at least 400 weed biotypes, many of which are present in cereal fields. According to the Parties, most resistant cases are recorded in the ALS inhibitors group, followed by the PII inhibitors and the ACCase inhibitors group.³⁸³
- (665) At the beginning of the growing season farmers usually apply products that are effective against a wide range of grass and broadleaf weeds in their fields. Later in the season they tend to choose more selective treatment to target weeds that survived the first spray.
- (666) Spray programmes for cereal herbicides are established on the basis of factors such as the weeds historically present, the crops historically grown, the geographic location and the soil type of the field. Cereal crops that are sown early face higher weed pressure, requiring pre-emergence or early post-emergence products, compared to crops that are sown later in the season, for which post-emergence contact herbicides will be used. In regions with continual weed germination due to milder winters such as Northern and Western France and the United Kingdom, both autumn and spring applications are required. By contrast, in areas with colder winters such as Germany or Poland herbicide applications in either autumn or early spring may provide sufficient control. Spray programmes also provide for rescue or spot treatments against specific weeds such as *Galium* (cleavers) or weeds that emerge later such as *Cirsium* (thistles).
- (667) This section focuses mainly on (i) broadleaf post-emergence cereal herbicides, (ii) broadleaf pre-emergence cereal herbicides and (iii) cross-spectrum post-emergence cereal herbicides.

6.3.4.1. The relevant products of the Parties and their competitors

(A) Dow

- (668) Dow has a business unit to manage its cereal and broad leaf crop (“BLC”, soybean, canola, sunflower, sugar beet, alfalfa, and cotton) herbicide portfolio, as well as geographical business units. This portfolio has sales of around USD [...].³⁸⁴

Figure 28 – [Internal document]

[...]

Source: [Internal document] (ID1328-00147)

³⁸³ Form CO, part B.I - Herbicides, page 50.

³⁸⁴ [Internal document] (ID1328-00147).

(669) Dow has a large number of AIs used in formulated selective cereal herbicide products. Based on available Agrowin data, Dow has sold the following straight or mixture broadleaf herbicides in the EEA: florasulam, florasulam mixtures, fluroxypyr, fluroxypyr mixtures, clopyralid, clopyralid mixtures, isoxaben, triclopyr, aminopyralid mixtures, picloram, 2,4-D, 2,4-D mixtures, etc. As for cross-spectrum herbicides, Dow also has various straight products and mixtures, notably: pyroxsulam, pyroxsulam mixtures³⁸⁵, pinoxaden, diflufenican mixtures, pendimethalin, propyzamide, etc. In addition, Dow is launching Arylex in Europe, targeting cereal crops first.

(A.i) *Broadleaf herbicides*

(670) Florasulam is a leading sulfonamide herbicide in the Dow portfolio, introduced in 2000. It is a large-spectrum broadleaf weed cereal herbicide for the European and Canadian markets. It retains a strong position in the cereal herbicide markets in Western Europe. Sales of florasulam globally exceeded USD [...] in 2014, of which EUR [...] in the EEA.³⁸⁶ According to a Dow internal document, in Europe, the standard margin for 2016 was estimated at [...]%.³⁸⁷ [Quote from internal document].

(671) Fluroxypyr was introduced in 1985 for broadleaf weed control in cereal crops, particularly for Galium aparine (cleavers), which is a key weed in European cereals. As Galium became an increasing problem due to intensive use of sulfonylureas in cereals, fluroxypyr achieved a strong position in the European cereal market. Union Annex I registration was obtained in 2011. Sales of fluroxypyr are estimated at USD [...] in 2014, of which EUR [...] in the EEA.³⁸⁸ In Europe, the standard margin for 2016 was estimated at [...]%.³⁸⁹ [Internal strategy information].^{390,391}

(672) Clopyralid is a broadleaf weed herbicide with main uses in cereals, oilseed rape, corn and sugar beet, mainly mixed with other herbicides such as phenoxies and other pyridines. The product was introduced in 1975 and remains an important part of Dow's herbicide portfolio. In 2014 overall sales reached an estimated USD [...], of which EUR [...] in the EEA. In Europe, the standard margin for 2016 was estimated at [...]%.³⁹²

(673) Aminopyralid is the most recent addition to Dow's range of pyridine herbicides. It was introduced in 2006 in several countries for use in cereals, pasture and rangeland. The product is sold both as a straight product and in mixtures with other AIs such as 2,4-D, fluroxypyr, glyphosate and triclopyr. Union approval was obtained in 2014. [...]. Sales of aminopyralid are estimated to have reached USD [...] in 2014.³⁹³

³⁸⁵ Including one with flupyr-sulfuron.

³⁸⁶ Form CO and Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation.

³⁸⁷ [Internal document] (ID740), [internal document], slide 24.

³⁸⁸ Form CO and Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation.

³⁸⁹ [...] (ID740), [...], slide 30.

³⁹⁰ [Information on business planning].

³⁹¹ [Internal document] (ID629) [internal document] (ID609), [internal document].

³⁹² [Internal document] (ID740), [internal document], slide 42.

³⁹³ Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation.

(674) Phenoxy herbicides were introduced in 1945 with the launch of 2,4-D and MCPA. They offer low cost, broadleaf weed control for a wide range of crops including cereals. Dow is one of the leading manufacturers of phenoxy herbicides worldwide. Its sales of this product group reached approximately USD [...] in 2014. The main product is 2,4-D, which is used both in crop and non-crop situations, followed by MCPA and a number of other analogues.

(A.ii) *Cross-spectrum herbicides*

(675) Pyroxsulam is the latest sulfonamide introduction by Dow, launched in 2007. It has been introduced in most major European cereal markets. Sales in 2014 are estimated to have reached USD [...] globally, of which EUR [...] in the EEA. In Europe, the "standard margin" for pyroxsulam for 2016 was estimated at [...].³⁹⁴

(A.iii) *Forthcoming products*

(676) Arylex is Dow's new key herbicide for use in cereals. It provides advanced post-emergence control of a broad spectrum of troublesome broadleaf weeds. It was approved at Union level in July 2015 and is being rolled out in Europe, where it obtained its first commercial registration in Denmark in February 2016, for a mixture with fluroxypyr. The standard margin for Arylex for 2016 in Europe was estimated at [...].³⁹⁵ Arylex's [...] will be described in Section V.6.3.4.4.

(B) *DuPont*

(677) DuPont has a business unit to manage its cereals and rotational crops products (cereals, sunflowers, sugarbeets, rapeseed³⁹⁶), as well as geographical units. This portfolio generated around USD [...] in revenues.

(678) DuPont also has several AIs for use in cereals, mainly from the sulfonylurea family. Based on available Agrowin data, DuPont has notably sold broadleaf herbicides in the EEA containing the following: tribenuron, thifensulfuron, metsulfuron, mixtures of those three AIs, dicamba ([...]), carfentrazone mixtures with MCPP or metsulfuron, mixtures of florasulam and/or fluroxypyr ([...]) with SUs, etc.

(B.i) *Broadleaf herbicides*

(679) Tribenuron is DuPont's leading SU. It is a selective herbicide for broadleaf weed control, primarily in cereals and sunflower. Tribenuron is mainly sold in Europe, particularly Eastern European countries. Sales in 2014 are estimated at USD [...], of which EUR [...] in the EEA.³⁹⁷

(680) Thifensulfuron is another leading SU herbicide in DuPont's portfolio. It is mainly used in cereal, soybean and maize crops for the control of broadleaved weeds. Thifensulfuron has received Annex I approval in the Union, where the [...]. Sales in 2014 were around USD [...], of which EUR [...] in the EEA.

(681) Metsulfuron is also an important SU cereal herbicide for DuPont, with global sales in 2014 estimated at USD [...], of which EUR [...] in the EEA. It is widely used for late-season control of difficult perennial broadleaf weeds in cereals. As described by

³⁹⁴ [Internal document] (ID740), [internal document], slide 18.

³⁹⁵ [Internal document] (ID740), [internal document], slide 36.

³⁹⁶ [Internal document] (ID581), [internal document].

³⁹⁷ Form CO and Phillips McDougall – AgriService, Companies Section, part 1 The Leading 15 Companies – 2014 Market Situation, page 242.

a competitor, "DuPont's metsulfuron has been on the market for a long time but is still commercially successful. [...] There is currently not much resistance to metsulfuron. The fact that metsulfuron stills sells well after several years is an indication that it works [...]".³⁹⁸ Several generic companies also sell metsulfuron in the EEA.

(B.ii) *Cross-spectrum herbicides*

- (682) DuPont's portfolio also includes cross-spectrum herbicides chlorsulfuron (EUR [...] in the EEA) and flupyrsulfuron (EUR [...] in the EEA) for use in cereals. [Information on supply sources].

(B.iii) *Forthcoming products*

- (683) [Pipeline information].³⁹⁹

- (684) [Pipeline information].⁴⁰⁰

(C) *Competitors*

- (685) With regard to the competitors of the Parties, **Bayer** has a portfolio of selective cereal herbicides, which includes cross-spectrum AIs iodoflurofen, mesosulfuron, flufenacet, chlorotoluron, isoproturon; broadleaf AIs amidosulfuron and diflufenican as well as graminicides propoxycarbazone, fenoxaprop and diclofop, which are also used in cross-spectrum mixtures. Bayer has been launching mesosulfuron mixtures in several countries. [Internal assessment of competitive relationships].⁴⁰¹
- (686) Bayer has a forthcoming cross-spectrum herbicide (iofensulfuron) for use in cereals, corn, soybeans, rice, turf and non-crops. Its driver weeds are Agrostis grass weeds among other grass and broadleaf weeds and it does not seem to target the same key weeds as Dow and DuPont products.⁴⁰² It is part of the sulfonylurea chemical class and the existing ALS MoA group.⁴⁰³
- (687) **BASF**'s portfolio includes cross-spectrum herbicides based on pendimethalin, BASF's leading herbicide molecule. Furthermore, BASF sells broadleaf AIs tritosulfuron and bentazone, and mixtures with third-party AIs such as [information on supply sources] flupyrsulfuron and [information on supply sources] florasulam.⁴⁰⁴
- (688) **Syngenta** has only limited activity in broadleaf and cross-spectrum cereal herbicides, and is more focused on graminicides. Its main AIs used for formulations of graminicides are pinoxaden, prosulfocarb and clodinafop. By mixing its premium graminicides with some other (own or third-party) broadleaf molecules, for example its broadleaf triasulfuron, Syngenta is also active in cross-spectrum herbicides.⁴⁰⁵
- (689) Syngenta has a forthcoming cross-spectrum one-shot herbicide mainly targeted at corn, but also cereals and sugarcane (bicyclopyrone).⁴⁰⁶ Weeds controlled include

³⁹⁸ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

³⁹⁹ [Internal document] (ID6827-050942), [internal document].

⁴⁰⁰ Parties' response to the Commission's request for information RFI 27, question 2, Annex 2.02.

⁴⁰¹ [Internal document] (ID6696-2698), [internal document].

⁴⁰² [Internal document], slide 3 (ID6748-9240).

⁴⁰³ [Internal document].

⁴⁰⁴ Form CO, Annex B.I.6.11 (Cereals).

⁴⁰⁵ Form CO, Annex B.I.6.11 (Cereals).

⁴⁰⁶ [Internal document], slide 3 (ID6748-9240).

foxtail, wild buckwheat and common ragweed.⁴⁰⁷ Its target key weeds therefore seem to be different from Dow and DuPont products. This AI was first registered in the US in 2014. It is part of the existing hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors MoA group.⁴⁰⁸

- (690) **Adama**'s portfolio includes several generic cross-spectrum herbicides based on pendimethalin, chlorotoluron, diflufenican, isoproturon; and generic broadleaf herbicides based on dicamba and MCPP. Adama also manufactures and sells its own broadleaf AI bifenox straight and as cross-spectrum mixtures with chlorotoluron, isoproturon and MCPP-P. Adama acquired Bifenox with Feinchemie Schwebda, to which Bayer divested Bifenox in 2000.⁴⁰⁹
- (691) **FMC, Sumitomo Chemical, and Nufarm** offer a range of broadleaf AIs and generic versions of some of the Parties' products. Some generics also offer or are working on some cereal SUs in liquid form. FMC gained access to Kumiai's herbicide molecule, fenquinotrone, which it is mainly developing for other crops, namely rice, corn and soybeans.⁴¹⁰
- (692) FMC is also developing a pre- and post-emergence broadleaf herbicide (F4050) that is targeted at cereals and sunflower crops and belongs to the existing HPPD inhibitors MoA group.⁴¹¹ It is not expected to be launched before [...].⁴¹²

6.3.4.2. Parties' arguments

- (693) The Parties argue notably that their herbicides, in particular their broadleaf cereal herbicides, do not compete closely and that competitors are active on the various markets.
- (694) First, the Parties submit that their cereal herbicide products are largely complementary as they target different key weeds, even within the same crop-pest segment. They argue that Dow products target primarily Galium (cleavers), while DuPont's products target mainly Veronica species (speedwells) and Viola arvensis (field pansy). Galium and Veronica/Viola are "hard-to kill" weeds, and as such one of the main differentiators between the Parties' products from a farmer's perspective. The Parties argue that [assessment of efficacy of Parties' products]
- (695) Second, the Parties submit that their cereal herbicide AIs belong to either different MoA groups or, to the extent they belong to one and the same MoA group, they belong to different chemical classes. For example, the overlap between the Parties is limited to MoA group 2 (ALS inhibitors), where their herbicides belong to different chemical classes. Dow's florasulam and pyroxsulam belong to the chemical class of triazolopyrimidines, while all of DuPont's AIs (metsulfuron, thifensulfuron, tribenuron, chlorsulfuron, and flupyr-sulfuron) belong to the chemical class of sulfonyleureas. Therefore, the Parties submit that Dow and DuPont's products do not compete closely (either in single ingredient or mixture herbicides) and hence do not constrain each other substantially pre-Transaction.

⁴⁰⁷ See the bicyclopiron entry in the University of Hertfordshire's Pesticide Properties Database, file name "20170201-181108_sitem.herts.ac.pdf".

⁴⁰⁸ [Internal document].

⁴⁰⁹ Form CO, Annex B.I.6.11 (Cereals).

⁴¹⁰ [Internal document] (ID7973-00015), [internal document].

⁴¹¹ Form CO, Annex B.I.6.4 "Overview Of Chemical Classes And Companies Active In The EEA", page 3.

⁴¹² Phillips McDougall –AgriService, Research Section – 2015, page 15 (ID7079-1858).

- (696) Third, the Parties submit that the Parties' combined sales shares raise no issues at the crop level in the largest EEA countries. The Parties claim that their sales shares overstate their position, for example in France, Belgium, Germany, Italy, Poland, Portugal, Spain or the United Kingdom, among others. In other EEA countries, the Parties submit that the Transaction would result in moderate shares with small increments (for example, in Denmark, Latvia, and Slovenia). Moreover, the Parties claim that their shares have declined constantly in recent years and are expected to further decline in the near future. DuPont's products are exclusively based on old, off-patent technology, and face increased weed resistance.
- (697) Fourth, the Parties state that the merged entity would continue to face strong competitive pressure in the EEA. Competition would come from both global R&D-based players that are integrated like the Parties (notably Bayer, Syngenta and BASF) and non R&D-integrated manufacturers (Adama, FMC, Rotam, Nufarm, Sumitomo Chemical, etc.), whose products compete closely with the Parties' products and effectively treat weeds such as Galium or Veronicas/Violas. The Parties state that there are several (branded and generic) manufacturers that supply AIs of the same MoA and same chemical class as the Parties' AIs. Moreover, in the cross-spectrum segment, farmers tend to buy earlier herbicide treatments (that is to say autumn-applied) for which Bayer is the leader. This new trend favours the growth of competitors' products at the expense of the Parties' core products. Additionally, at a national level, the Parties submit that they would also be constrained by tank mixing⁴¹³, which is a widespread practice across all European countries. According to the Parties, post-Transaction, farmers would continue to have a great choice of cereal herbicides.
- (698) Fifth, the Parties also raise claims common to all herbicides, namely: (i) generic competition constrains the prices of the Parties' products, fosters innovation and generic manufacturers can easily copy AIs and formulated products; (ii) customer switching analysis shows that the Parties are not close competitors; (iii) distributors exercise substantial countervailing bargaining power and put pressure on prices; and (iv) parallel trade is a relevant factor, which leads to further pricing pressure. These claims are addressed in detail in Section V.6.2.
- (699) Sixth, as for pipeline products, the Parties submit that [pipeline information]. They also state that there are many other firms with herbicide products in development. In addition, they claim that pipeline products that have not yet entered and are not about to enter the development stage cannot be taken into account for the analysis of the Parties position in cereal herbicides because the likelihood that they would be launched absent the Transaction and the timeframe within which they would be launched is too uncertain for them to exert a competitive constraint.
- (700) Seventh, the Parties also claim that Arylex and DuPont's cereal herbicides will not be close competitors on the basis that Dow's Arylex and DuPont's SUs are complementary and are primarily tank-mixing partners. They submit that Arylex has been developed, and is positioned, to target ALS-resistant weeds and that the SUs are losing efficacy against those weeds.

⁴¹³ 'Tank mixing' refers to the practice of adding two or more components of a spray program to the same spray tank in order to create mixtures. Components must be compatible to be used as spray tank mixing partners.

(701) Eighth, the Parties submit that the results of the market investigation show that in cereal broadleaf herbicides more customers considered Bayer to be Dow's closest competitor compared to DuPont.

6.3.4.3. The Transaction would lead to an increase in the Parties' combined power in the relevant markets

(702) Against this background, the Commission considers first, that the combined share of the Parties would be particularly high when looking at **post-emergence broadleaf selective cereal herbicides**, and even exceeds 50% in a large number of EEA countries. At EEA level, Bayer would be the next relevant player (including both R&D-integrated and non-integrated companies) after the Parties post-Transaction, and the only one with a market share higher than 10% ([10-20]%).

Table 4 – Market shares for post-emergence broadleaf selective cereal herbicides in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	Nufarm	BASF	Adama	Syngenta	FMC	Sumitomo	Others
EEA ⁴¹⁴	[...]	[20-30]%	[20-30]%	[50-60]%	[10-20]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%
Austria	[...]	[5-10]%	[20-30]%	[20-30]%	[20-30]%	[10-20]%	[20-30]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%
Belgium	[...]	[30-40]%	[10-20]%	[50-60]%	[30-40]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%
Bulgaria	[...]	[20-30]%	[10-20]%	[40-50]%	[40-50]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%
Croatia	°[...]	°[10-20]%	°[0-5]%	°[10-20]%	°[70-80]%	°[0-5]%	°[0-5]%	°[0-5]%	°[0-5]%	°[0-5]%	[0-5]%	°[0-5]%
Cyprus ⁴¹⁵	°N/A	*[30-40]%	*[20-30]%	*[50-60]%	*N/A%	N/A%	N/A%	*N/A%	N/A%	N/A%	N/A%	N/A%
Czech Republic	[...]	[40-50]%	[5-10]%	[50-60]%	[10-20]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%	[0-5]%
Denmark	[...]	[20-30]%	[5-10]%	[30-40]%	[40-50]%	[5-10]%	[0-5]%	[5-10]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Finland	°[...]	°[30-40]%	°[20-30]%	°[50-60]%	°[5-10]%	°[10-20]%	°[10-20]%	°[0-5]%	°[5-10]%	°[0-5]%	°[0-5]%	°[5-10]%
France	[...]	[40-50]%	[10-20]%	[60-70]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%

⁴¹⁴ The Parties submit that they have no herbicide sales in Liechtenstein or Iceland. Liechtenstein and Iceland will not be further assessed in relation to herbicides in this case. They also submit that they are not active in cereal herbicides in Malta and do not hold any registrations for cereal herbicides in Malta. Malta will not be further assessed in relation to cereal herbicides in this case.

⁴¹⁵ Both Dow and DuPont have herbicide sales in Cyprus. However, they submit they have limited information on DuPont's sales. They provide a zonal estimate.

	Market size (USD million)	Dow	DuPont	Combined	Bayer	Nufarm	BASF	Adama	Syngenta	FMC	Sumitomo	Others
Germany	[...]	[30-40]%	[20-30]%	[60-70]%	[0-5]%	[5-10]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Greece	[...]	[40-50]%	[10-20]%	[50-60]%	[10-20]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Hungary	[...]	[10-20]%	[20-30]%	[40-50]%	[20-30]%	[0-5]%	[5-10]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[10-20]%
Ireland	[...]	[10-20]%	[40-50]%	[60-70]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%
Italy	[...]	[30-40]%	[10-20]%	[40-50]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[20-30]%
Latvia	[...]	[30-40]%	[0-5]%	[30-40]%	[10-20]%	[10-20]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Lithuania	[...]	[40-50]%	[0-5]%	[50-60]%	[10-20]%	[5-10]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Luxembourg ⁴¹⁶	*[...]	*[20-30]%	*[20-30]%	*[40-50]%	*[10-20]%	*[5-10]%	*[5-10]%	*[5-10]%	*[0-5]%	*[0-5]%	*[0-5]%	*[10-20]%
The Netherlands	[...]	[50-60]%	[0-5]%	[50-60]%	[20-30]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Norway ⁴¹⁷	*[...]	*[50-60]%	*[10-20]%	*[70-80]%	*[5-10]%	*[0-5]%	*[0-5]%	*[5-10]%	*[0-5]%	*[0-5]%	*[0-5]%	*[5-10]%
Poland	[...]	[10-20]%	[5-10]%	[20-30]%	[10-20]%	[0-5]%	[0-5]%	[10-20]%	[5-10]%	[0-5]%	[0-5]%	[30-40]%
Portugal	[...]	[10-20]%	[40-50]%	[50-60]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[20-30]%
Romania	[...]	[20-30]%	[20-30]%	[40-50]%	[20-30]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%
Slovakia	[...]	[40-50]%	[10-20]%	[50-60]%	[10-20]%	[0-5]%	[10-20]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%
Slovenia ⁴¹⁸	°[...]	°N/A	°N/A	[30-40]%	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A

⁴¹⁶ The Parties submit that they both have sales of cereal herbicides in Luxembourg. In light of the limited information available, they used proxy calculation.

⁴¹⁷ The Parties submit that their activities overlap in cereal herbicides in Norway. In light of the limited information available, they note that competition conditions are similar to that of Sweden.

⁴¹⁸ The Parties submit that they both have sales of cereal herbicides in Slovenia. They submit that they have a combined market share of [30-40]% for all cereal herbicides, but this data includes glyphosate, which is a non-selective herbicide. They indicate that almost all broadleaf cereal herbicides sold in Slovenia are applied post-emergence.

	Market size (USD million)	Dow	DuPont	Combined	Bayer	Nufarm	BASF	Adama	Syngenta	FMC	Sumitomo	Others
Spain	[...]	[10-20]%	[30-40]%	[40-50]%	[10-20]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[10-20]%
Sweden	[...]	[40-50]%	[10-20]%	[60-70]%	[20-30]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
The UK	[...]	[10-20]%	[40-50]%	[50-60]%	[10-20]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[5-10]%

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)

Note: ° indicates Parties' data; * indicates proxy calculation by Parties; N/A indicates that no data are available

For information on market shares methodology and limitations reference is made to Section V.5.1

(703) At national level, when considering post-emergence broadleaf selective cereal herbicides, high combined market shares arise notably in large markets such as France [60-70]% (estimated market size USD [...]), Germany [60-70]% (USD [...]), and the United Kingdom [50-60]% (USD [...]).

(704) Second, the Commission considers that, in **pre-emergence broadleaf selective cereal herbicides**, post-Transaction the merged entity would register [30-40]% of combined sales at EEA level, with high shares in certain EEA countries.

Table 5 – Market shares for pre-emergence broadleaf selective cereal herbicides in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Adama	Bayer	Sumitomo	Syngenta	Nufarm	BASF	FMC	Others
EEA ⁴¹⁹	[...]	[30-40]%	[0-5]%	[30-40]%	[10-20]%	[10-20]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%
Austria	[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]	[90-100]	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
Belgium	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Bulgaria	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Croatia	°[...]	°[0-5]	°[0-5]	°[0-5]	°[0-5]	°[0-5]	°[0-5]	°[0-5]	°[90-100]	°[0-5]	°[0-5]	°[0-5]
Cyprus	*NA	*[60-70]	*[0-5]	*[60-70]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A

⁴¹⁹ The Parties have not been able to provide detailed information for all EEA countries. They have indicated that, overall, most of their sales are in post-emergence. However, they likely have some sales of pre-emergence products as well in most EEA countries.

	Market size (USD million)	Dow	DuPont	Combined	Adama	Bayer	Sumitomo	Syngenta	Nufarm	BASF	FMC	Others
Czech Republic	[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[60-70]%	[30-40]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Denmark	[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Estonia	°N/A	°N/A	°N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Finland	°N/A	°N/A	°N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
France	[...]	[70-80]%	[0-5]%	[70-80]%	[10-20]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Germany	[...]	[5-10]%	[30-40]%	[40-50]%	[0-5]%	[0-5]%	[20-30]%	[0-5]%	[5-10]%	[5-10]%	[10-20]%	[5-10]%
Greece	°N/A	°N/A	°N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Hungary	[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ireland	[...]	[20-30]%	[20-30]%	[40-50]%	[20-30]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%
Italy	°N/A	°N/A	°N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Latvia	°[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Lithuania	°N/A	°N/A	°N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Luxembourg	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
The Netherlands	°N/A	°N/A	°N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Norway	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Poland	[...]	[0-5]%	[10-20]%	[10-20]%	[80-90]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Portugal	°N/A	°N/A	°N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Romania	[...]	[70-80]%	[0-5]%	[70-80]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[20-30]%
Slovakia	[...]	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%

	Market size (USD million)	Dow	DuPont	Combined	Adama	Bayer	Sumitomo	Syngenta	Nufarm	BASF	FMC	Others
Slovenia	°N/A	°N/A	N/A	•N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Spain	[...]	[5-10]%	[5-10]%	[10-20]*%	[5-10]%	[0-5]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[50-60]%
Sweden	[...]	[0-5]%	[0-5]%	[0-5]*%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
The UK	[...]	[0-5]%	[0-5]%	[0-5]*%	[30-40]%	[10-20]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[40-50]%

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)

Note: ° indicates Parties' data; * indicates proxy calculation by Parties; N/A indicates that no data are available

(705) Third, in **post-emergence cross-spectrum selective cereal herbicides**, the Parties have a combined share of [20-30]% at EEA level, behind the leading company Bayer. However, the merged entity has very high combined market shares in some EEA countries.

Table 6 – Market shares for post-emergence cross-spectrum selective cereal herbicides in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	Adama	BASF	Syngenta	Nufarm	FMC	Others
EEA	[...]	[10-20]%	[0-5]%	[20-30]*%	[50-60]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Austria	[...]	[5-10]%	[20-30]%	[30-40]*%	[30-40]%	[5-10]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[10-20]%
Belgium	[...]	[20-30]%	[5-10]%	[30-40]*%	[40-50]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Bulgaria	[...]	[50-60]%	[0-5]%	[50-60]*%	[10-20]%	[0-5]%	[0-5]%	[30-40]%	[0-5]%	[0-5]%	[0-5]%
Croatia	[...]	°[0-5]%	°[0-5]%	•[0-5]*%	°[40-50]%	°[10-20]%	°[0-5]%	°[0-5]%	°[0-5]%	°[0-5]%	°[40-50]%
Cyprus	*N/A	*[10-20]%	*[0-5]%	*[10-20]*%	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Czech Republic	[...]	[40-50]%	[5-10]%	[50-60]*%	[10-20]%	[5-10]%	[10-20]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Denmark	[...]	[30-40]%	[0-5]%	[30-40]*%	[20-30]%	[40-50]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Estonia	°N/A	°N/A	°N/A	•NA	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Finland	°[...]	°[90-100]%	°[0-5]%	•[90-100]*%	°[0-5]%	°[0-5]%	°[0-5]%	°[0-5]%	°[0-5]%	°[0-5]%	°[0-5]%

	Market size (USD million)	Dow	DuPont	Combined	Bayer	Adama	BASF	Syngenta	Nufarm	FMC	Others
France	[...]	[10-20]%	[0-5]%	[10-20]%	[60-70]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%
Germany	[...]	[10-20]%	[0-5]%	[20-30]%	[40-50]%	[10-20]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Greece	[...]	[20-30]%	[0-5]%	[20-30]%	[50-60]%	[0-5]%	[0-5]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%
Hungary	[...]	[20-30]%	[0-5]%	[20-30]%	[0-5]%	[20-30]%	[0-5]%	[30-40]%	[0-5]%	[0-5]%	[5-10]%
Ireland	[...]	[10-20]%	[0-5]%	[10-20]%	[30-40]%	[0-5]%	[10-20]%	[0-5]%	[5-10]%	[0-5]%	[30-40]%
Italy	[...]	[10-20]%	[0-5]%	[10-20]%	[60-70]%	[0-5]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%
Latvia	[...]	[0-5]%	[0-5]%	[0-5]%	[20-30]%	[10-20]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[50-60]%
Lithuania	[...]	[0-5]%	[0-5]%	[0-5]%	[20-30]%	[10-20]%	[5-10]%	[30-40]%	[0-5]%	[0-5]%	[10-20]%
Luxembourg	°[...]	°[20-30]%	°[0-5]%	*[20-30]%	*[40-50]%	*[10-20]%	*[10-20]%	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%
The Netherlands	[...]	[20-30]%	[0-5]%	[20-30]	[70-80]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Norway	*[...]	*[20-30]%	*[0-5]%	*[20-30]%	*[70-80]%	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%
Poland	[...]	[30-40]%	[10-20]%	[40-50]%	[20-30]%	[10-20]%	[5-10]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Portugal	[...]	[10-20]%	[0-5]%	[10-20]%	[30-40]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[50-60]%
Romania	[...]	[20-30]%	[0-5]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[50-60]%
Slovakia	[...]	[70-80]%	[5-10]%	[70-80]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Slovenia	°[...]	°N/A	°N/A	*N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Spain	[...]	[20-30]%	[0-5]%	[20-30]%	[50-60]%	[5-10]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[10-20]%
Sweden	[...]	[30-40]%	[0-5]%	[30-40]%	[60-70]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
The UK	[...]	[10-20]%	[0-5]%	[10-20]%	[60-70]%	[5-10]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)

Note: ° indicates Parties' data; * indicates proxy calculation by Parties; N/A indicates that no data are available

(706) In contrast, the Commission considers that, in **pre-emergence cross-spectrum selective cereal herbicides**, the Parties would have a combined share of [5-10]% at EEA level. For this type of products, the leading company is Bayer, which has an EEA-wide market share of [40-50]%. In most countries, the combined market shares of the Parties remain low and an affected market exists only in the Czech Republic where the Parties combined share reaches [30-40]% (Dow [20-30]%, DuPont [10-20]%). In the Czech Republic, BASF is a market leader with [30-40]% market share while other competitors include Bayer ([10-20]%) and Nufarm ([10-20]%). The Parties have nonetheless not been able to provide exact information for all countries.

Table 7 – Market shares for pre-emergence cross spectrum selective cereal herbicides in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	Adama	BASF	Syngenta	Nufarm	FMC	Others
EEA	[...]	[0-5]%	[5-10]%	[5-10]%	[40-50]%	[10-20]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Austria	[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[30-40]%	[0-5]%	[60-70]%	[0-5]%	[0-5]%
Belgium	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Bulgaria	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Croatia	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Cyprus	°N/A	*[5-10]%	*[0-5]%	*[5-10]%	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Czech Republic	[...]	[20-30]%	[10-20]%	[30-40]%	[10-20]%	[0-5]%	[30-40]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%
Denmark	[...]	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Estonia	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Finland	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
France	[...]	[5-10]%	[0-5]%	[5-10]%	[10-20]%	[20-30]%	[20-30]%	[0-5]%	[5-10]%	[0-5]%	[20-30]%
Germany	[...]	[0-5]%	[0-5]%	[0-5]%	[40-50]%	[30-40]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Greece	[...]	[0-5]%	[90-100]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Hungary	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Ireland	[...]	[0-5]%	[0-5]%	[0-5]%	[30-40]%	[0-5]%	[10-20]%	[0-5]%	[10-20]%	[0-5]%	[20-30]%
Italy	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Latvia	[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%

	Market size (USD million)	Dow	DuPont	Combined	Bayer	Adama	BASF	Syngenta	Nufarm	FMC	Others
Lithuania	[...]	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Luxembourg	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	°N/A
The Netherlands	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Norway	*[...]	*[0-5]%	*[0-5]%	*[0-5]%	*[50-60]%	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%	*[40-50]%
Poland	[...]	[0-5]%	[50-60]%	[50-60]%	[0-5]%	[10-20]%	[20-30]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Portugal	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Romania	[...]	[0-5]%	[10-20]%	[10-20]%	[0-5]%	[0-5]%	[80-90]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Slovakia	[...]	[0-5]%	[20-30]%	[20-30]%	[0-5]%	[20-30]%	[40-50]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Slovenia	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Spain	[...]	[0-5]%	[5-10]%	[5-10]%	[30-40]%	[30-40]%	[0-5]%	[20-30]%	[0-5]%	[0-5]%	[5-10]%
Sweden	[...]	[0-5]%	[0-5]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
The UK	[...]	[0-5]%	[5-10]%	[5-10]%	[60-70]%	[5-10]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)

Note: ° indicates Parties' data; * indicates proxy calculation by Parties; N/A indicates that no data are available

(707) In crop protection markets such as those referred to in recitals (702) to (706), the Commission considers, however, that a review of market shares alone merely gives a measure of the current market position of market participants, and may be subject to change over time if companies have pipeline products which will reach the market. [Pipeline information]. Against this background, the Commission considers that the market shares listed in recitals (702) to (706) do not take into consideration the impact of new products being developed, which the Commission considers to be relevant for the competitive assessment. Thus, the Commission considers that current calculations of combined market shares may understate the Parties' competitive position, in particular in light of the expected success on the market of Dow's new Arylex (halauxifen) AI, which is being launched.

- 6.3.4.4. The Parties' position in markets for cereal herbicides will be strengthened significantly through the launch of Arylex [pipeline information] on those markets
- (708) The Commission finds that **Dow's Arylex** is a new broadleaf auxinic herbicide specialised in [quote from internal document]⁴²⁰, with utility in multiple crops or uses that would be likely to strengthen the Parties' competitive position on the market post-Transaction beyond the mere projection of the current combined market shares.
- (709) According to Dow internal documents, [pipeline information].⁴²¹ [Pipeline information].
- (710) Based on the Form CO, Dow expects to register Arylex for cereals in [pipeline information – registration strategy].
- (711) An internal Dow document indicates that Arylex benefited from [quote from internal document, internal assessment].⁴²²
- (712) In the EEA, the launch of Arylex for use in cereals was planned for 2016–2017. Arylex will also be positioned in the EEA for use in oilseed rape [pipeline information].
- (713) The latest Arylex project update dated [pipeline information].⁴²³
- (714) According to an internal Dow document, the portfolio guidance for Arylex is to [quote from internal document].⁴²⁴ The same document describes the market strategy for Arylex as follows: [quote from internal document].
- (715) Another internal document shows that Dow expects Arylex to [quote from internal document]⁴²⁵ [pipeline information].⁴²⁶ Sales of herbicides with Arylex as a primary active in cereals are forecast at USD [...].⁴²⁷ The same document indicates that Arylex [pipeline information].

Figure 29 – [Extract form internal document; pipeline information re Arylex strategy]

[...]

Source: [Internal document]

- (716) In most of the markets Arylex [quote from internal document; pipeline information].⁴²⁸
- (717) [Quote from internal document; pipeline information].⁴²⁹
- (718) [Quote from internal document; pipeline information].^{430,431}
- (719) [Quote from internal document; pipeline information].^{432,433}

⁴²⁰ [Internal document], (ID00455-00036), [internal document].

⁴²¹ [Internal document] (ID644-16), [internal document].

⁴²² [Internal document] (ID00561-00012), [internal document].

⁴²³ Dow's response to the Commission's request for information RFI 59, question 14, Annex 14.2, slide 14.

⁴²⁴ [Internal document].

⁴²⁵ [Pipeline information].

⁴²⁶ [Internal document] (ID8833-92), [internal document], slides 4 and 37.

⁴²⁷ [Internal document] (ID8833-92), [internal document], slides 4 and 37.

⁴²⁸ [Internal document] (ID00561-00012), [internal document].

⁴²⁹ Dow's response to the Commission's request for information RFI 59, Question 14, Annex 14.2, slide 14.

⁴³⁰ [Internal document] (ID445-119), [internal document].

⁴³¹ [Internal document] (ID6696-25459), [internal document], page 5.

(720) [Quote from internal document; pipeline information].^{434,435}

(721) [Quote from internal document; pipeline information].

(722) [Quote from internal document; pipeline information].^{436,437}

Figure 30 – [Extract from internal document; pipeline information re Arylex strategy]

[...]

Source: [Internal document]

Figure 31 – [Extract from internal document; pipeline information re Arylex strategy]

[...]

Source: [Internal document]

(723) [Quote from internal document; pipeline information].⁴³⁸

(724) [Quote from internal document; pipeline information].^{439,440}

(725) The Commission also finds that **DuPont** is working on its herbicide portfolio in the EEA, [pipeline information].⁴⁴¹

Figure 32 – [Extract from internal document; pipeline information re DuPont strategy]

[...]

Source: [Internal document] (ID7830-020603), [internal document]

(726) [Pipeline information].⁴⁴²

(727) [Pipeline information].^{443,444}

(728) [Pipeline information].⁴⁴⁵ For further information on this line of research see Section V.8.8.1.3.

(729) In light of the considerations set out in recitals (708) to (728), the Commission takes the view that expected developments of DuPont's and Dow's respective cereal herbicide portfolios, and mostly Dow's Arylex [pipeline information], indicate that the Parties' strong current position in cereal herbicides would not only be maintained but is also likely to be reinforced going forward, subject to developments of competitors' offers, which, however, the Commission finds are not likely to exercise limiting competitive constraints, as mentioned in Section V.6.3.4.6.

⁴³² [Internal document] (ID00561-00012), [internal document].

⁴³³ [Internal document] (ID1328-147-7), [internal document, quote from internal document].

⁴³⁴ [Internal document] (ID6696-24737), [internal document].

⁴³⁵ [Internal document] (ID6696-00173), [internal document].

⁴³⁶ [Internal document].

⁴³⁷ [Internal document].

⁴³⁸ Dow's response to the Commission's request for information RFI 59, question 14, Annex 14.2, slide 12.

⁴³⁹ [Internal document] (ID6827-26716), [internal document].

⁴⁴⁰ [Internal document] (ID1329-166), [internal document].

⁴⁴¹ [Internal document] (ID6827-050942), [internal document].

⁴⁴² [Internal document].

⁴⁴³ Parties' response to the Commission's request for information RFI 27, question 2, Annex 2.01

⁴⁴⁴ [Internal document], slide 41 (ID6825-7771).

⁴⁴⁵ [Internal document].

6.3.4.5. The Parties are important and close competitors

(A) The Parties' current portfolios

- (730) The Commission considers that the Parties' internal documents indicate that Dow and DuPont are significant players and close competitors with their respective cereal herbicide portfolios. [Information extracted from internal documents].
- (731) [Information extracted from internal documents]⁴⁴⁶. Another document shows that DuPont sees the two companies as [information extracted from internal documents; quote from internal document].

Figure 33 – [Extract from internal document]

[...]

Source: [Internal document] (ID719-7)

- (732) In another DuPont internal document [information extracted from internal documents],⁴⁴⁷ [information extracted from internal documents; quote from internal document].⁴⁴⁸
- (733) A DuPont document presenting herbicide innovations [information extracted from internal documents; quote from internal document]⁴⁴⁹.
- (734) Moreover, a report prepared for DuPont [information extracted from internal documents].⁴⁵⁰
- (735) As for Dow, a document prepared by a marketing consultancy for example indicates that [quote from internal document].⁴⁵¹
- (736) The Commission finds that market participants pointed to the Parties' market strengths in cereal herbicides as a clear sign of their closeness. Respondents to the market investigation highlighted the Parties' high market shares, especially in post-emergence broadleaf herbicides. Although a degree of complementarity in weeds targeted is acknowledged by some market participants, Dow's and DuPont's offers are seen as competing. Market participants stressed concerns of dominance in some segments, and underlined the expected success of Dow's new product Arylex.
- (737) The Commission refers to a technological institute noting that "*DuPont has an indispensable herbicide for wheat, namely Granstar [tribenuron], but recently, to avoid resistance problems, farmers started mixing it with other AIs. Dow also has an indispensable product, Starane [fluroxypyr]. These two products are alternatives*"⁴⁵², while Starane has a more specific focus on Galium aparine.
- (738) Another institute indicated that there is a degree of complementarity between Dow's and DuPont's broadleaf cereal products in terms of weeds targeted, as well as overlaps on some weeds.⁴⁵³

⁴⁴⁶ [Internal document] (ID1329-166), [internal document].

⁴⁴⁷ Parties' response to the Commission's request for information RFI 66, question 4, Annex 4.02.

⁴⁴⁸ [Internal document] (ID1329-189), [internal document], slides 172 and 196.

⁴⁴⁹ [Internal document] (ID6827-05922), [internal document].

⁴⁵⁰ [Internal document] (ID6827-016668), [internal document].

⁴⁵¹ [Internal document] (ID6696-25459), [internal document], page 5.

⁴⁵² Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

⁴⁵³ Agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

- (739) A competitor explained that "*[i]n the overall segment for herbicides, Dow and DuPont have a combined market share of 18% (15% for insecticides) in Western and Eastern Europe (excluding CIS). In post-emergence broadleaf herbicides, the combined entity would have a market share above 50%, and over 25% for post-emergence cross-spectrum herbicides*"⁴⁵⁴.
- (740) A crop protection customer stated: "*[w]e believe that there risks to become a monopolistic situation on the sale of broadleaf herbicides in the cereal market for spring applications.*"⁴⁵⁵ Another market participant noted specifically the risk of "*a decrease in the range of cereal herbicides*"⁴⁵⁶.
- (741) A competitor stated that in France, Dow-DuPont would constitute a duopoly with Bayer while in the United Kingdom Parties would post-Transaction become one of the three leading players in cereal herbicides, with a dominant market share: "*[w]hen such duopolies are on the market, there are strong incentives to tacitly or even explicitly 'agree' not to compete.*"⁴⁵⁷
- (742) The same competitor stated: "*[...] the merger will eliminate head-to-head competition in these fields. [...] In order to restore competition on these markets it would be necessary to find an alternative competitor which would need to be national, if not global, in scale and scope in order to compete effectively post merger.*"⁴⁵⁸
- (743) A distributor stated that "*[t]he merger will likely have an impact on wheat herbicides as Dow is, with Bayer, particularly strong and DuPont is also quite strong on this market, with a risk of high market power*"⁴⁵⁹.
- (744) Similarly, a German crop protection consultancy noted that "*[a] merged entity would have a monopolistic position for broadleaf (dicots) herbicides*"⁴⁶⁰.
- (745) A Belgian customer singled out cereals and pasture as the two main areas where the Transaction's impact would be most felt: "*[i]n certain segments, such as broadleaf herbicides for cereals and grassland, the two companies will have combined market shares of more than 50%. Some of these activities will have to be divested*"⁴⁶¹.
- (746) Finally, the Commission observes that the Parties' submission that the results of the market investigation would indicate that market participants do not consider Dow and DuPont to be each other's closest competitors cannot change the Commission's conclusion that the Parties are important and close competitors in the relevant markets for herbicides. To this effect, the Commission notes that it is not necessary for the Parties to be each other's closest competitors for the Transaction to be detrimental to competition. While an indication of closeness is not the sole or even necessarily a decisive factor in the Commission's assessment, it is one of the factors considered by the Commission. In this context, the fact that market participants consider Dow and DuPont as close competitors supports the finding that market participants consider them to exert some competitive pressure against each other pre-

⁴⁵⁴ Agreed non-confidential minutes of a call with a competitor, 7 April 2016 (ID8260).

⁴⁵⁵ Questionnaire to Crop Protection Customers (Q1), question 99.1 (ID2673).

⁴⁵⁶ Questionnaire to Crop Protection Customers (Q1), question 101.1 (ID4036).

⁴⁵⁷ Questionnaire to Crop Protection Competitors (Q2b), question 133.1 (ID4055).

⁴⁵⁸ Questionnaire to Crop Protection Competitors (Q2b), question 133.1 (ID4055).

⁴⁵⁹ Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

⁴⁶⁰ Agreed non-confidential minutes of a call with a German consultancy, 9 September 2016 (ID7046).

⁴⁶¹ Agreed non-confidential minutes of a call with a customer, 12 October 2015 (ID8855).

Transaction. In addition, market participants' opinions are mainly informed by current product offerings [pipeline information].

(B) Dow's Arylex vs. DuPont's SUs

- (747) A DuPont document⁴⁶² from [pipeline information; information extracted from internal documents; document date], indicates that DuPont views Dow's forthcoming product Arylex (halauxifen) [pipeline information; information extracted from internal documents]. The document refers to Arylex as a [quote from internal document].⁴⁶³ [Information extracted from internal documents; quote from internal document]. However, this more recent version dates from [document date], which is after the announcement of the Transaction. The Commission thus takes the view that the version of the document prepared in the ordinary course is indicative of the expected competitive pressure to be exerted by the forthcoming Dow product.

Figure 34 – [Extract from internal document]

[...]

Source: [Internal document] (ID1329-166)

- (748) In another internal document DuPont expressed [quote from internal document].⁴⁶⁴
- (749) Other documents confirm that DuPont sees Arylex as [information extracted from internal documents].^{465,466}
- (750) A Dow internal document suggests that Arylex could [quote from internal document].⁴⁶⁷ A document by the same consultancy reporting to Dow on an agronomist survey later states: [quote from internal document].⁴⁶⁸
- (751) Another Dow document sets out the objective for Arylex [pipeline information; quote from internal document].⁴⁶⁹
- (752) The same document cites [quote from internal document; information extracted from internal documents].⁴⁷⁰
- (753) Internal Dow documents show that during Arylex's development it was benchmarked against [information extracted from internal documents]: see Section V.8.8.1.1(B).
- (754) Competitive closeness between Dow's forthcoming product Arylex and DuPont SUs is also shown by Dow marketing communication documents. The only two comparative videos on Arylex found on the Dow Agrosiences Youtube channel both assess the product against DuPont SUs: one compares Arylex with metsulfuron

⁴⁶² [Internal document] (ID1329-166), [internal document].

⁴⁶³ [Internal document] (ID6827-26716), [internal document].

⁴⁶⁴ [Internal document] (ID1329-189), [internal document], slides 172 and 196.

⁴⁶⁵ [Internal document] (ID583), [internal document], slide 37.

⁴⁶⁶ [Internal document] (ID6353-00005), [internal document], slide 196.

⁴⁶⁷ [Internal document] (ID6696-25459), [internal document], page 6.

⁴⁶⁸ [Internal document] (ID6696-24737), [internal document].

⁴⁶⁹ [Internal document] (ID9304-55), page 30.

⁴⁷⁰ [Internal document] (ID9304-55), page 13.

on key weed Lamium (deadnettle) and another contrasts Pixxaro EC with tribenuron on key weed Stellaria media (chickweed).⁴⁷¹

- (755) The fact that the Arylex product videos feature only DuPont SUs in comparative tests indicates that the SUs are key competing products against which Arylex has been positioned.
- (756) The Commission has found that market participants underlined the promising market prospects of Arylex in cereal herbicides. A competitor stated that "*Dow's new cereal herbicide Arylex is expected to be a market success.*"⁴⁷²

(C) Weed spectrum

- (757) Although the Parties argue that the assessment of closeness also depends on weeds targeted, and in particular they argue that their respective products are complementary and have a different spectrum, focusing on notably Galium for Dow, and Viola and Veronica for DuPont, the Commission considers that the complementarity of certain features in specific products in their portfolios does not offset the finding that in many more instances the Parties are close competitors in the relevant product and geographic markets for cereal herbicides.
- (758) The Parties cite as evidence for the alleged complementarity of their herbicides the fact that their products are used as mixing partners. However the Commission considers that the fact that AIs may be used as mixing partners does not in itself mean that those AIs do not compete closely. As explained in recitals (759) to (766), the Commission's investigation has shown that the Parties' cereal herbicides have overlapping weed spectrums which include important key weeds such as Sonchus (sow thistle), Cirsium arvense (creeping thistle) and Stellaria media (chickweed). The Commission is therefore of the view that the Parties' products are alternatives for farmers looking to eliminate those key weeds.
- (759) In response to a Commission request for information the Parties provided tables detailing the weeds targeted by their various AIs and formulated products.⁴⁷³ These tables show clear overlaps in weeds targeted, including those key weeds where the Parties claim a difference of spectrum.
- (760) In the United Kingdom for instance, both Parties have 14 products that target cleavers (Galium) in cereals, albeit with better susceptibility rates for the Dow products. In the case of speedwells (Veronica) different subspecies exist with varying product offers from the Parties. According to the same tables, DuPont has 13 products against common field speedwell in cereals, while Dow has five. As for ivy-eaved speedwell, DuPont has 11 products for use in cereals while Dow has four. Neither company has any products against green field speedwell or slender speedwell in cereals. In the case of field pansy (Viola arvensis) Dow has three products for use in cereals, while DuPont has 19. Against common chickweed (Stellaria media), which is a different key weed orienting farmers' choices, Dow appears to have 23 products and DuPont 25.

⁴⁷¹ See Dow video "Arylex™ Active versus metsulfuron - speed of kill", file name "20170201-181040_youtube.pdf", and Dow video "Pixxaro EC und Tribenuron", file name "20170201-181854_youtube.pdf" respectively.

⁴⁷² See for instance agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

⁴⁷³ Parties' response to the Commission's request for information RFI 44, question 5, Annex 5.01.

- (761) On the basis of the comparative analysis set out in recital (760) the Commission considers that the Parties, even though the number and the efficacy of their products vary, still target similar crop-weed combinations.
- (762) The market investigation has provided ample evidence that there are also other weeds than those indicated by the Parties which drive farmers' choices. A technical institute in France explains that, for cereals, "*there are about 20 weeds that guide the reasoning of farmers to start a treatment*".⁴⁷⁴ Companies typically indicate on their labels only the main weeds targeted.
- (763) Similarly, crop protection recommendations from authoritative sources indicate that Galium, Viola and Veronica are not the only key weeds that direct farmers' choices.
- (764) For instance, a document from the Flemish Agriculture Ministry on herbicide use in winter wheat recommends mainly Dow and DuPont products for their efficacy on various other key weeds. For Sonchus (sow thistle) and Cirsium arvense (creeping thistle), which are listed as the main perennial weeds, the Ministry offers a choice between Allië (DuPont), Matrigon (Dow), Primus (Dow), Bofix (Dow) and Hussar (Bayer). For Polygonum (knotweed), another major perennial weed, the choice is between Allië (DuPont) and Bofix (Dow). In the annual weeds category four DuPont and two Dow products are recommended for key weeds Matricaria (mayweed) and Stellaria media (chickweed).⁴⁷⁵
- (765) Another key weed directing farmers' choices seems to be Rumex (dock). For the post-emergence treatment of this weed in cereals a French farming institute recommends the use of either Allië, Harmony Extra (DuPont products) or Ariane or Bofix (Dow products).⁴⁷⁶
- (766) The comparative tests in the Dow videos referred to in recital (753) indicate that Lamium and Stellaria media are also important key weeds that are part of a spectrum overlap where Arylex and DuPont SUs metsulfuron and tribenuron compete closely.
- (767) In addition, regardless of variations in spectrum and efficacy on specific target weeds, the Parties market their products using broad designations such as "broadleaf weeds".⁴⁷⁷
- (768) As for the Parties' claim that farmers typically face mixed populations of both grass weeds and broadleaf weeds, herbicide guidance documents from farming institutes and public authorities show that farmers may also face mostly broadleaf weeds, with low pressure from grass weeds.⁴⁷⁸ For this type of weed situation both Dow and DuPont have very strong portfolios of post-emergence herbicides. The solutions

⁴⁷⁴ Courtesy translation from French: "*Ce sont ces environ 20 herbes qui déterminent le raisonnement des agriculteurs pour déclencher un traitement*". Agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

⁴⁷⁵ "Gewasbescherming wintertarwe en wintergerst" [Crop Protection in Winter Wheat and Winter Barley], Flemish Ministry of Agriculture, file name "teelthandleiding-wintertarwe.pdf", pages 21 and 26.

⁴⁷⁶ "Guide pratique Désherbage des céréales à paille" [Practical guide on weed control in straw cereals], Chambre régionale d'agriculture des Pays de la Loire, file name "guide_10_desherbages_cereales_maj_fiches_web.pdf".

⁴⁷⁷ See for instance the homepage of the dedicated Arylex website at <http://www.arylex.com/en>, file name "20170201-110223_arylex.pdf".

⁴⁷⁸ See for instance "Désherbage Céréales Campagne 2013/2014" [Weed control in cereals – 2013/2014 season], Chambre d'Agriculture de l'Allier, file name "PLAQUETTE_DESHERBAGE_CEREALES_2013.pdf".

recommended are often Dow and DuPont products, sometimes to the exclusion of any others.

- (769) It would seem that in cases of low grass weed pressure, for which the Parties have particularly strong offerings, farmers would not consider choosing cross-spectrum products as an alternative, especially as these tend to be more expensive. As stated by a competitor, "*a farmer that only has broadleaf weeds problems would not necessarily use cross-spectrum herbicides*".⁴⁷⁹

(D) Time of application

- (770) As regards the time of application of herbicides, various crop protection guidance documents from authoritative sources show that Dow and DuPont offer the main AIs that can be used in the latter stages of the growing season.
- (771) Figure 35 shows a document from French farming institute Arvalis which recommends only products containing Dow and DuPont AIs for use in the treatment of broadleaf weeds in winter cereals after the second-node stage. Of the 17 formulated products the institute recommends, four are sold by Dow and five by DuPont. The document lists only products containing florasulam, fluroxypyr, clopyralid, MCPA (Dow) and metsulfuron, thifensulfuron and tribenuron (DuPont) as suitable for use up to the BBCH37/39 growth stages.⁴⁸⁰ The document recommends no AIs from competitors, indicating that the Parties' products are uniquely suited to such late applications, including spot and rescue treatments.

⁴⁷⁹ Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

⁴⁸⁰ "Herbicides anticycotyledone utilisables apres le stade 2 noeuds des céréales hiver 2016" [Broadleaf herbicides suitable for use in cereals after the two-node stage – winter 2016], Arvalis, file name "tab_herbi_antodicots2129779609708213182.pdf".

Figure 35 – Recommended products against broadleaf weeds in winter cereals after the second-node stage

HERBICIDES ANTIDICOTYLEDONE UTILISABLES APRES LE STADE 2 NŒUDS DES CEREALES HIVER

● dose homologuée sur la culture
● dose la plus faible sur la culture
● produit non autorisé

CEREALES					SPECIALITES COMMERCIALES	Firmes	Doses autorisées kg/ha ou l/ha ou g m.a./ha	MATIERES ACTIVES ET MODE
Hiver								RACINAIRE ET FOLIAIRE
Ble tendre	Ble dur	Orge	Avoine	Sorgo	Triticale			
Anti-dicotylédones								
●	●	●	●	●	AKA/SEKENS (2)	Dow AgroSciences	1	forasulame 2,5
●	●	●	●	●	ALLIE DUO SX (4)	Du Pont de N.	0,075	metsulfuron-méthyl 6,7% thifensulfuron-méthyl 33,3%
●	●	●	●	●	ALLIE MAX SX / POINTER ULTRA SX	Du Pont de N.	0,035	metsulfuron-méthyl 14,3% bibénuuron-méthyl 14,3%
●	●	●	●	●	ALLIE STAR SX / BIPLAY SX	Du Pont de N.	0,045	metsulfuron-méthyl 11,1% bibénuuron-méthyl 22,2%
●	●	●	●	●	BASTION (3)	Dow AgroSciences	1,8	forasulame 2,5
●	●	●	●	●	BOUDHA / BLUSKY (4)	Philagro	0,02	metsulfuron-méthyl 25% bibénuuron-méthyl 25%
●	●	●	●	●	CHARDEX/EFFIGO (1)	Dow AgroSciences	1,5	
●	●	●	●	●	ERSON / CONNEX (4)	Philagro	0,06 - 0,09	metsulfuron 6,8% thifensulfuron 68,2%
●	●	●	●	●	Forasulame	nombreuses spécialités		forasulame 50
●	●	●	●	●	Fluroxypyr	nombreuses spécialités	200	
●	●	●	●	●	HARMONY EXTRA SX / PRAGMA SX	Du Pont de N.	0,075	thifensulfuron-méthyl 33,3% bibénuuron-méthyl 16,7 %
●	●	●	●	●	HARMONY M SX (4)	Du Pont de N.	0,1 - 0,15	metsulfuron-méthyl 4 % thifensulfuron-méthyl 40 %
●	●	●	●	●	KART/STARANE GOLD	Dow AgroSciences	1,8	forasulame 1
●	●	●	●	●	Metsulfuron (4)	nombreuses spécialités	0,03	metsulfuron-méthyl 20%
●	●	●	●	●	NIMBLE / AURIOS	Chemimova	0,05	thifensulfuron-méthyl 50% bibénuuron-méthyl 25%
●	●	●	●	●	PRIMA STAR (5)	Chemimova	0,02 - 0,03	thifensulfuron 75%
●	●	●	●	●	RACING TF / DAYTONA TF	Chemimova	0,06 - 0,075	metsulfuron 7% thifensulfuron 68,2%

(1) Utilisation possible jusqu'au stade dernière feuille étalée à la dose de 1,5 l/ha pour les céréales d'hiver

Source: Arvalis crop protection guidance document

- (772) With regard to the Parties' claim that there is a general trend towards the use of cross-spectrum cereal herbicides in autumn applications, it would seem that there are several other dynamics that may counteract this alleged trend.
- (773) First, cross-spectrum products tend to be more expensive than broadleaf herbicides and graminicides, which for most farmers would be a disincentive to use them.⁴⁸¹ In addition, the practice of tank mixing allows farmers to broaden the weed spectrum of broadleaf herbicides and create cross-spectrum mixtures that are a more targeted response to the weed situation they are dealing with.
- (774) Second, there appears to be a growing preference in wider society for herbicides to be applied later in the crop cycle, as this allows a more targeted and measured approach.⁴⁸² After weeds have fully emerged it is easier to identify them and to apply smaller amounts of herbicides with a narrower spectrum, which is preferable also from an environmental perspective.

⁴⁸¹ See for instance agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).
⁴⁸² See section "Désherbage, du « tout-en-post » pour demain..." [Weed control: all post-emergence soon ...] of article published in French farming journal Le Syndicat Agricole, file name "20170201-110313_syndicat-agricole.pdf".

(775) Third, specialist crop protection guidance documents seem to suggest that even in the case of autumn application, subsequent spring application is generally required.⁴⁸³ This is for example to address specific weed problems occurring late in the growing season in spot or rescue treatments, for which both Parties are particularly strong portfolios.

(776) Fourth, even though the Parties have effective offerings in late post-emergence cereal herbicides, they do also have products that target the autumn market, including cross-spectrum herbicides. Dow has various products suitable for autumn application, such as those based on fluroxypyr, florasulam or pyroxsulam. DuPont has chlorsulfuron and flupyrsulfuron, which is discussed in an internal DuPont document [information extracted from internal documents].⁴⁸⁴

(E) Resistance

(777) With regard to the Parties' claim that they are particularly affected by the problem of growing resistance, the Commission points out that the Parties are not the only crop protection companies facing weed resistance.

(778) In this respect, the Commission refers to a DuPont internal document [quote from internal document].⁴⁸⁵

(779) In a 2010 document DuPont identified [information extracted from internal document].⁴⁸⁶

(F) Mode of action

(780) As for the Parties' claim that their products do not compete closely because their cereal herbicide AIs belong to different MoA groups, the Commission's investigation has shown that the use of different MoAs is primarily linked to resistance management.

(781) As pointed out by a customer, "*t]he use of different modes of action (MoA) is generally recommended to fight against resistance*".⁴⁸⁷ However, considering that resistance affects some weeds more than others, a farmer would still be able to choose freely among products with similar weed spectrums regardless of their MoA if the key weeds he faces are not particularly subject to resistance. This means that at least in such cases the Parties' products would still directly compete with each other.

(782) In conclusion, the Commission finds that the Parties are important and close competitors in cereal herbicides.

6.3.4.6. Competitive constraints imposed by competitors are limited

(783) The Commission finds that among the leading crop protection players, Dow and DuPont are the only companies with a clear focus on broadleaf weed herbicides for cereals.

⁴⁸³ See for instance the spray programmes recommended for cereals in "Désherbage Céréales Campagne 2013/2014" [Weed control in cereals – 2013/2014 season], Chambre d'Agriculture de l'Allier, file name "PLAQUETTE_DESHERBAGE_CEREALES_2013.pdf"

⁴⁸⁴ [Internal document] (ID6827-37373), [internal document].

⁴⁸⁵ [Internal document], pages 3 and 62.

⁴⁸⁶ [Internal document], page 47.

⁴⁸⁷ Agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246).

- (784) The Commission notes that R&D-integrated players BASF and Syngenta currently have limited portfolios in broadleaf herbicides. Syngenta is a distant competitor as its current sales are mostly in graminicides.⁴⁸⁸
- (785) Bayer is a larger player, but its cereals portfolio is more balanced between graminicides and broadleaf herbicides.⁴⁸⁹ A DuPont document [quote from internal document; information extracted from internal document].⁴⁹⁰
- (786) As for Monsanto, this company specialises in pre-plant and non-selective applications, mainly on the basis of glyphosate, which is a different segment from those on which the Parties focus.
- (787) It follows that those competitors are unlikely to be able to exercise significant competitive pressure on the Parties post-Transaction.
- (788) Moreover, the Commission considers that the fact that crop protection guidance documents from authoritative sources, as discussed in Section V.6.3.4.5, predominantly recommend Dow and DuPont products for various key target weeds and similar times of application suggests that the Parties have the products of choice in these areas, and that competition from other players is limited.
- (789) In addition, the Commission refers to a Dow document [information extracted from internal document].⁴⁹¹
- (790) The Commission similarly refers to an internal document on other companies' current and pipeline portfolios showing that Dow expects [information extracted from internal documents].⁴⁹²
- (791) Second, competitive pressure coming from competitors' pipeline products is limited. Very few of Dow's and DuPont's competitors appear to have new products in their pipelines which could create a competitive constraint in the foreseeable future.
- (792) Overall, the Commission's investigation has shown that very few compounds currently being developed by competitors target the same markets as the Parties' products. In addition, very few of them are likely to capture significant share from the Parties, as they are all part of existing chemical classes (including sulfonylureas) and existing modes of action (ALS and HPPD), as shown in recitals (793) to (795).
- (793) Bayer's forthcoming cross-spectrum herbicide (iofensulfuron) for use in cereals and other crops for instance, appears to target different key weeds compared to Dow and DuPont products.⁴⁹³ Moreover, it is part of the sulfonylurea chemical class and the ALS MoA group, which is affected by resistance.⁴⁹⁴
- (794) Syngenta's bicyclopyrone is a cross-spectrum one-shot herbicide, mainly developed for corn, but also cereals and sugarcane.⁴⁹⁵ Weeds controlled include foxtail, wild

⁴⁸⁸ [Internal document], slide 23 [internal document].

⁴⁸⁹ [Internal document], slide 23 [internal document].

⁴⁹⁰ [Internal document] (ID6827-050942), [internal document].

⁴⁹¹ [Internal document] (ID6696-08236), [internal document].

⁴⁹² [Internal document] (ID6696-2352), [internal document].

⁴⁹³ [Internal document], slide 3 (ID6748-9240).

⁴⁹⁴ [Internal document].

⁴⁹⁵ [Internal document].

buckwheat and common ragweed.⁴⁹⁶ The key weeds targeted therefore seem to be different from Dow and DuPont products.

- (795) FMC is developing a pre- and post-emergence broadleaf herbicide (F4050) that is targeted at cereals and sunflower crops and belongs to the existing HPPD inhibitors MoA group.⁴⁹⁷ However, it is not expected to be launched before [...].⁴⁹⁸
- (796) Moreover, an internal DuPont document states that, with regard to the problem of growing weed resistance in the herbicide market in general, [information extracted from internal document].⁴⁹⁹
- (797) Third, constraints imposed by generic competitors are limited. As set out in Section V.6.2.1 generic players exert a limited competitive constraint on R&D-integrated companies such as the Parties.
- (798) Moreover, Dow documents [information extracted from internal documents].⁵⁰⁰
- (799) The Commission also notes that its investigation has shown that Arylex [pipeline information]. As discussed in Section V.6.3.4.4 Arylex [pipeline information].
- (800) The Commission's investigation has indicated that [pipeline information]. In particular, the Commission considers that [pipeline information].
- (801) Constraint from generics on pricing is limited for DuPont as well, [information extracted from internal documents]. However, these documents also describe [information extracted from internal documents] (see also Section V.6.2.1).
- (802) While the Parties argue that the DuPont SUs are off-patent, margins remain [...]. As noted in an internal DuPont document [quote from internal document].⁵⁰¹ The Commission's investigation has shown that generics tend to follow DuPont pricing.
- (803) Moreover, DuPont has a supplier-customer relationship with some of the generics, which it sells mainly off-patent AIs that are widely available.⁵⁰² "[t]here are typically two options to obtain a widespread off-patent AI such as metsulfuron: (i) get the AI in China, register it in Europe by equivalence, prepare its own data package, and then register the finished product, or (ii) ask the originator company, in this case DuPont, for supply and access to patents if any".⁵⁰³
- (804) To some extent, generics are seen as competing with one another. For instance in the United Kingdom [quote from internal document].⁵⁰⁴
- (805) The Parties have argued that some generic players also have liquid SUs in their portfolios. While this was confirmed by the market investigation, the Commission's investigation has nonetheless indicated that only a limited selection of liquid SUs are offered and that the offer is limited to a number of countries. It follows that generic

⁴⁹⁶ See the bicyclopiron entry in the University of Hertfordshire's Pesticide Properties Database, file name "20170201-181108_sitem.herts.ac.pdf".

⁴⁹⁷ Form CO, Annex B.I.6.4 "Overview Of Chemical Classes And Companies Active In The EEA", page 3.

⁴⁹⁸ Phillips McDougall – AgriService, Research Section – 2015, page 15 (ID7079-1858).

⁴⁹⁹ [Internal document] (ID6827-5041), [internal document].

⁵⁰⁰ [Internal document] (ID611), [internal document].

⁵⁰¹ Parties' response to the Commission's request for information RFI 66, question 4, Annex 4.02. [Internal document] (ID1329-189), [internal document], slide 206.

⁵⁰² Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

⁵⁰³ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

⁵⁰⁴ [Internal document] (ID1329-189), [internal document].

players are unlikely to be able to exercise a significant competitive pressure on the Parties post-Transaction, even in liquid SUs.

(806) The Commission's investigation has shown that brands play an important role in the herbicide industry. According to a competitor both Dow and DuPont "*sell important brands in the segment of cereal herbicides*".⁵⁰⁵ "*By way of comparison between SUs sold by generics and by DuPont, the generic products cost less (around 5-10% less) – large multinationals such as DuPont are able to leverage their brand and services that they provide to farmers. DuPont was the originator for the SUs and the DuPont brands remain valuable in the market.*"⁵⁰⁶

(807) In conclusion, the Commission considers that constraints imposed by competitors are limited.

6.3.4.7. Conclusion on the assessment of non-coordinated effects in the markets for cereal herbicides

(808) The Commission considers that the considerations described in Sections V.6.3.4.1 to V.6.3.4.6 justify the finding that, in the absence of adequate remedies, the Transaction would be likely to lead to a significant impediment of effective competition because of its non-coordinated effects on the market for cereal herbicides.

(809) At the relevant geographic level (national) and based on the assessment conducted in Sections V.6.3.4.1 to V.6.3.4.6, and in light of the general features of crop protection markets as described in Section V.6.2, the Commission finds that the Transaction would be likely to lead to either the creation of a dominant position, the strengthening of a dominant position or the elimination of an important competitive constraint in several EEA countries as illustrated in recitals (810) to (837).

(A) Post-emergence broadleaf selective cereal herbicides

(A.i) *Markets where a significant impediment to effective competition would be likely*

(810) With regard to post-emergence broadleaf selective cereal herbicides, the Commission finds that there are several EEA countries where the Transaction would lead to the creation of a dominant position, with a very large combined market share: Ireland ([60-70]%), Germany ([60-70]%), Sweden ([60-70]%), France ([60-70]%), the United Kingdom ([50-60]%), Portugal ([50-60]%), Greece ([50-60]%), Slovakia ([50-60]%), Cyprus ([50-60]%),⁵⁰⁷ Finland ([50-60]%), Belgium ([50-60]%), the Czech Republic ([50-60]%), Italy ([40-50]%) and Luxembourg ([40-50]%).⁵⁰⁸

(811) In several EEA countries, the Commission finds that the Transaction would be likely to lead to the strengthening of a dominant position, where one of the Parties has a

⁵⁰⁵ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

⁵⁰⁶ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

⁵⁰⁷ There is limited available data. Dow and DuPont have sales of post-emergence broadleaf cereal herbicides in this EEA country ([sales data]). The combined share is a best estimate provided by the Parties.

⁵⁰⁸ There is limited available data. Dow and DuPont have sales of cereal herbicides in this EEA country. The combined share is a proxy estimate provided by the Parties.

very large pre-Transaction market share and a dominant position. This is the case for Norway ([70-80]%),⁵⁰⁹ the Netherlands ([50-60]%),⁵¹⁰ and Lithuania ([50-60]%).⁵¹¹

- (812) The Commission finds that the Transaction is also likely to lead to the elimination of an important competitive constraint in several EEA countries in which the Parties would have a significant or large combined market share. These countries are: Romania ([40-50]%), Hungary ([40-50]%), Bulgaria ([40-50]%) and Spain ([40-50]%).

(A.ii) Other markets

- (813) In contrast, the Commission notes that while the Parties' combined market share rises to [30-40]% in Latvia, the market share increment brought about by the Transaction would be limited ([0-5]%). The merged entity would continue to be challenged by a number of competitors with non-negligible shares of the market, including BASF ([20-30]%), Bayer ([10-20]%) and Nufarm ([10-20]%).
- (814) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not be likely to significantly impede effective competition with respect to the market for post-emergence broadleaf selective cereal herbicides in Latvia.
- (815) In addition, the Transaction would result in an overlap in the market for post-emergence broadleaf selective cereal herbicides in Austria ([20-30]%), Denmark ([30-40]%), Poland ([20-30]%) and Slovenia ([30-40]%)⁵¹². However, the merged entity would continue to be challenged by a number of competitors with non-negligible shares of the market, namely Bayer ([20-30]%), BASF ([20-30]%) and Syngenta ([10-20]%) in Austria, Bayer ([40-50]%), Adama ([5-10]%) and Nufarm ([5-10]%) in Denmark and Bayer ([10-20]%), Adama ([10-20]%) and Syngenta ([5-10]%) in Poland.
- (816) Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of DuPont's AIs thifensulfuron, tribenuron and metsulfuron proposed by the Parties in the market for post-emergence broadleaf selective cereal herbicides in the 21 EEA markets discussed in recitals (810) to (812).
- (817) In addition, the Commission notes that one or both of the Parties is/are active in a number of other EEA countries. The Parties submitted that no affected markets arise in those countries due to no overlaps or limited overlaps; however, they have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of DuPont's AIs

⁵⁰⁹ There is limited available data. The Parties submit that conditions and products sold are overall similar to Sweden. Dow's best estimate share: [50-60]%; DuPont's best estimate share: [10-20]%.
⁵¹⁰ Dow's share: [50-60]%; DuPont's share: [0-5]%.
⁵¹¹ Dow's share: [40-50]%; DuPont's share: [0-5]%.
⁵¹² The Parties submit that they both have sales of cereal herbicides in Slovenia. They submit that they have a combined market share of [30-40]% for all cereal herbicides, but this data includes glyphosate, which is a non-selective herbicide. They indicate that almost all broadleaf cereal herbicides sold in Slovenia are applied post-emergence.

thifensulfuron, tribenuron and metsulfuron proposed by the Parties in the market for post-emergence broadleaf selective cereal herbicides in the 21 EEA markets discussed in recitals (810) to (812).

(B) Pre-emergence broadleaf selective cereal herbicides

(B.i) *Markets where significant impediment to effective competition would be likely*

- (818) As for pre-emergence broadleaf selective cereal herbicides, in two EEA countries, the Commission finds that the Transaction would be likely to lead to the strengthening of a dominant position, when one of the Parties has a very large pre-Transaction market share and a dominant position. This is the case for France ([70-80]%) and Cyprus ([60-70]).
- (819) With regard to *France*, the Commission finds that the increment from DuPont is small ([0-5]%) but competition from other R&D-integrated players is very limited: only Bayer ([5-10]%) is present. The next competitor is generic player Adama ([10-20]%).
- (820) The Commission finds that the Transaction is also likely to lead to the elimination of an important competitive constraint in two EEA countries in which the Parties would have a significant or large combined market share. These countries are Germany ([40-50]%) and Ireland ([40-50]%).
- (821) With regard to *Germany*, the Commission finds that the Transaction would result in the combination of the number 1 and number 3⁵¹³ competitors, the number 2 being Sumitomo ([20-30]%). Competition from other R&D-integrated players is very limited with BASF and Bayer at [5-10] and [0-5] respectively.
- (822) With regard to *Ireland*, the Commission finds that the Transaction would result in the combination of the number 1 and number 3 competitors, the number 2 being Adama ([20-30]%). Competition from other R&D-integrated players is limited with Bayer at [10-20] and BASF at [0-5].

(B.ii) *Other markets*

- (823) In addition, the Commission notes that the Parties are active in a number of other EEA countries. However, they have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of DuPont AIs thifensulfuron and tribenuron proposed by the Parties in the market for post-emergence broadleaf selective cereal herbicides in the five EEA countries discussed in recitals (810) to (812).

⁵¹³ Nufarm is in joint third position ([5-10]%).

(C) Post-emergence cross-spectrum selective cereal herbicides

(C.i) *Markets where significant impediment to effective competition would be likely*

- (824) As for post-emergence cross-spectrum selective cereal herbicides, the Transaction would be likely to lead to the creation of a dominant position, with a very large combined market share in Slovakia ([70-80]%) and the Czech Republic ([50-60]%).
- (825) The Transaction is also likely to lead to the elimination of an important competitive constraint in several EEA countries in which the Parties would have a significant or large combined market share. These countries are: Poland ([40-50]%), Belgium ([30-40]%) and Denmark ([30-40]%).
- (826) With regard to *Poland*, the Transaction would result in the combination of the number 1 and number 4 players, facing competition from a limited number of R&D-integrated players: only Bayer ([20-30]%) and BASF ([5-10]%).
- (827) In the case of *Belgium*, the Transaction would result in the combination of the number 2 and number 3 players, facing competition from a limited number of R&D-integrated players: only Bayer ([40-50]%) and BASF ([5-10]%). However, BASF's sales derive in part from sales of mixes of its AIs with [information on supply sources] flupyr-sulfuron and [information on supply sources] florasulam. Furthermore, Dow's pyroxsulam is patent-protected until 2022; therefore, mixes between Dow's and DuPont's AIs including this AI would be protected from generic competition. Finally, according to the Form CO, before the Transaction there were three suppliers of post-emergence cross-spectrum selective cereal herbicides applicable in spring: Dow, DuPont and Syngenta. After the Transaction, farmers' choices would be reduced from three to two suppliers.
- (828) With regard to *Denmark*, the Transaction would result in the combination of the number two and number four players, which would leave only two other competitors: Bayer ([20-30]%), and BASF ([40-50]%). Post-Transaction, farmer's choices would be reduced from four to three suppliers.

(C.ii) *Other markets*

- (829) In contrast, the Commission notes that the Parties' combined shares in the market for post-emergence cross-spectrum selective cereal herbicides amount to [20-30]% in Germany, [20-30]% in Romania, [20-30]% in Spain, [20-30]% in Greece, [20-30]% in Norway and [20-30]% in Luxembourg. The merged entity would continue to be challenged by a number of competitors, namely Bayer ([40-50]%), Adama ([10-20]%) and BASF ([10-20]%) in Germany; Syngenta ([10-20]%) Adama ([0-5]%) and others in Romania; Bayer ([50-60]%), Syngenta ([5-10]%) and Adama ([5-10]%) in Spain; Bayer ([50-60]%) and Syngenta ([20-30]%) in Greece; Bayer ([70-80]%) and others in Norway and Bayer ([40-50]%), BASF ([10-20]%) and Adama ([10-20]%) in Luxembourg.
- (830) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not significantly impede effective competition with respect to the market for post-emergence cross-spectrum selective cereal herbicides in Germany, Romania, Spain, Greece, Norway and Luxembourg.
- (831) The Commission further notes that the Parties' combined market share rises to [30-40]% in Austria. However, the merged entity would continue to be challenged

by a number of competitors in Austria, including Bayer ([20-30]%), Syngenta ([10-20]%) and Monsanto ([10-20]%).

(832) Nonetheless, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to Austria given that the overlap would in any case be eliminated by the global divestment of DuPont AIs flupyrsulfuron and chlorsulfuron proposed by the Parties in the market for post-emergence cross-spectrum cereal herbicides in the five EEA countries discussed in recitals (824) to (828).

(833) In addition, the Commission notes that one or both of the Parties are active in a number of other EEA countries with typically limited market shares and no affected markets; however, the Parties have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of DuPont AIs flupyrsulfuron and chlorsulfuron proposed by the Parties in the market for post-emergence cross-spectrum cereal herbicides in the five EEA countries discussed in recitals (824) to (828).

(D) Pre-emergence cross-spectrum selective cereal herbicides

(834) The Commission finds that the Parties' combined market share would rise to [30-40]% in the Czech Republic. However, the merged entity would continue to be challenged by a number of competitors, including Bayer ([10-20]%), BASF ([30-40]%) and Nufarm ([10-20]%).

(835) Moreover, the Commission finds that there is no need for it to determine whether the Transaction would significantly impede effective competition with regard to that market, given that the overlap would in any case be eliminated by the global divestment of the DuPont AIs flupyrsulfuron and chlorsulfuron proposed by the Parties in the market for post-emergence cross-spectrum cereal herbicides in the five EEA countries discussed in recitals (824) to (828).

(836) In addition, the Commission notes that one or both of the Parties are active in a number of other EEA countries. Although the Parties have submitted that no affected markets arise in those countries due to no overlaps or limited overlaps; however, they have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of DuPont AIs flupyrsulfuron and chlorsulfuron proposed by the Parties in the market for post-emergence cross-spectrum cereal herbicides in the five EEA countries discussed in recitals (824) to (828).

(E) Conclusion

(837) In conclusion, and considering all evidence available to the Commission and also in light of the general features of crop protection markets as described in Section V.6.2 the Commission considers that, in the absence of adequate remedies, the Transaction would be likely to significantly impede effective competition, notably by creating a dominant position, strengthening a dominant position and/or eliminating important competitive constraints in the markets for post-emergence broadleaf selective cereal

herbicides in Ireland, Germany, Sweden, France, the United Kingdom, Portugal, Greece, Slovakia, Cyprus, Finland, Belgium, the Czech Republic, Italy, Luxembourg, Norway, the Netherlands, Lithuania, Romania, Hungary, Bulgaria and Spain; pre-emergence broadleaf selective cereal herbicides in France, Cyprus, Germany and Ireland; and post-emergence cross-spectrum selective cereal herbicides in Slovakia, the Czech Republic, Poland, Belgium and Denmark.

6.3.5. *Rice herbicides - assessment of non-coordinated effects*

- (838) The Commission understands that rice herbicide sales were worth approximately USD [...] globally and more than USD [...] in the EEA in 2015. Sales of cross-spectrum herbicides amounted to USD [...], graminicides more than USD [...] and broadleaf herbicides approximately USD [...] in the EEA.⁵¹⁴
- (839) The main countries in the EEA for sales of rice crop protection products are Italy, Spain, Greece and Portugal. Rice is also grown in Bulgaria, France, Hungary and Romania, but to a lesser extent. The Dow slide shown in [...] summarises the characteristics of the four key markets and Dow's positioning.

Figure 36 – [Extract from internal document re rice herbicides]

[...]

Source: [Internal document] (ID8833-7), [...], slides 13-14

- (840) The Commission understands that grasses pose the main weed problem in the four main EEA countries where rice is grown. The key grass weed family for rice in these countries is Echinochloa (barnyard grass), followed by sedges such as Cyperus difformis (flatsedge) and other Cyperus species (the largest genus of sedges), which are particularly common in Italy and Spain. In Italy rice farmers also face Oryza sativa (red rice) and Heteranthera species (mud plantains).
- (841) To protect their crops against such weeds, farmers can either purchase separate rice herbicides for grass, sedges and broadleaf weed control and tank-mix them, or buy cross-spectrum rice herbicides, which may contain only one AI or a mixture of AIs. Most cross-spectrum rice herbicides are single-AI products. There are few pre-mixed cross-spectrum rice herbicides.
- (842) Increasing resistance issues also influence the type of products that farmers purchase. In addition to conventional synthetic chemistry, new herbicide-tolerant crop technologies based on native (non-GM) traits offer alternative solutions to manage resistance issues. BASF offers Clearfield rice seed, based on non-GM seed technology, and has another herbicide-resistant rice system in development called Provisia. [...] the various surface areas for the various types of rice seed planted including BASF's Clearfield and Provisia systems for 2015 and forecast for 2020 in the four main rice growing countries in Europe.

Table 8 – [Extract from internal document re rice herbicides]

[...]

Source: [Internal document] (ID6696-010939), [...]

⁵¹⁴ Parties' response to the Commission's request for information RFI 29, question 3.1.

6.3.5.1. The relevant products of the Parties and their competitors

(A) Dow

(A.i) Existing products

(843) The Commission notes that Dow's leading AIs in rice are currently penoxsulam and cyhalofop. Based on Agrowin data, Dow has had sales of several rice herbicide AIs in the EEA: penoxsulam, penoxsulam mixtures, propanil⁵¹⁵ as cross-spectrum; triclopyr as broadleaf; cyhalofop as a graminicide.

(844) Penoxsulam is Dow's leading sulfonamide herbicide, sold under the brand names Viper and Boa in Europe. It was introduced in 2005, offering a broad spectrum of weed control in dry-seeded, transplanted and water-seeded rice. It is sold in most major rice producing countries, notably China, the US, Vietnam, Brazil, Japan and Italy. The product has been very successful since it was introduced, and is now the leading rice herbicide worldwide,⁵¹⁶ with sales reaching an estimated USD [...] in 2014, of which about EUR [...] in the EEA. As an illustration, the standard margin for sales in Southern Europe was estimated at [...] % for 2013, and [...] % in 2016.⁵¹⁷

(845) Cyhalofop was introduced in 1996 for use in rice to control grass weeds, including barnyard grass. The product is mainly used in Japan, followed by China and other East-Asian countries such as Thailand and Vietnam. It is also sold in Latin America, and to a lesser extent in the US and Italy, where it is sold under the brand name Clincher. Sales in 2014 are estimated to have reached USD [...], benefiting from both co-formulations and tank-mix usage. EEA sales of cyhalofop were approximately EUR [...] in 2015. As an illustration, the standard margin for sales in Southern Europe was estimated at [...] % for 2013, and at [...] % in Europe for 2016.⁵¹⁸

(A.ii) Forthcoming products

(846) Dow is also rolling out its new rice herbicide Rinskor (florpyrauxifen-benzyl), which is a cross-spectrum product belonging to the arylpicolinate chemical class and the synthetic auxin MoA group. Rinskor targets problem grasses such as barnyard grass, sedges and broadleaf weeds including ALS- and ACCase-resistant species, offering a new MoA for rice crops. Formulated products based on this molecule are not yet registered in the Union. Dow applied for Union registration of Rinskor in March 2016 [date of expected approval and launch plans].

(B) DuPont

(B.i) Existing products

(847) As for DuPont, further to having divested bensulfuron in Europe, the Commission understands that DuPont has the rice herbicide AI azimsulfuron (Gulliver), positioned as a cross-spectrum product for post-emergence control of grass and broadleaf weeds in rice. The Union Annex I registration of azimsulfuron expires in 2021 [...].⁵¹⁹ DuPont also has broadleaf rice herbicides.

⁵¹⁵ Propanil was originally a Dow product but was divested to UPL in 2006.

⁵¹⁶ [Quote from internal document; internal document] (ID705), [...], slide 4.

⁵¹⁷ [Internal document] (ID725), [...], slide 8. [Internal document] (ID742), [...], slide 12.

⁵¹⁸ [Internal document], slide 15 (ID725). [Internal document], slide 17 (ID742), [...].

⁵¹⁹ [Quote from internal document; internal document].

(B.ii) Forthcoming products

(848) The Commission takes note that DuPont is conducting development of [pipeline information] herbicide [pipeline information], aimed at controlling grass and certain broadleaf weeds in rice. The product offers a completely new MoA [pipeline information].⁵²⁰

(849) [Pipeline information].⁵²¹

(850) [Pipeline information].⁵²²

(C) Competitors of the Parties

(851) **BASF** has a portfolio mainly based on imazamox, profoxydim and cycloxydim. Imazamox is an off-patent, post-emergence cross-spectrum herbicide, which is used in the BASF Clearfield system based on rice seeds non-genetically modified to be tolerant to certain herbicides. Profoxydim is an off-patent, post-emergence graminicide, and the closest competitor to Dow's cyhalofop. It is registered for use on rice in Italy, Portugal and Greece but not in Spain, where only emergency use exemptions have been granted. Cycloxydim is an off-patent graminicide that is applied on rice pre-plant. Furthermore, BASF sells its off-patent post-emergence graminicide quinclorac, and its off-patent post-emergence broadleaf herbicide bentazone.⁵²³

(852) BASF also has the forthcoming new rice production system Provisia, which is to complement its existing Clearfield system. Provisia is designed around a trait that makes seeds tolerant to cycloxydim, a post-emergence herbicide targeting grass weeds, including ALS-resistant grasses, weedy rice and red rice. BASF is expected to launch Provisia in the EEA in 2018/2019.⁵²⁴

(853) **Bayer's** main rice herbicides in the EEA are oxadiazon and flufenacet. Oxadiazon is an off-patent, pre-emergence and early post-emergence cross-spectrum rice herbicide registered for use in rice in Italy with emergency use authorisation in Spain and Portugal. Bayer sells oxadiazon straight and in mixture with flufenacet. Flufenacet is an off-patent cross-spectrum herbicide developed for use in mixtures, and applied pre-plant, pre- and post-emergence.⁵²⁵

(854) Bayer also has a forthcoming cross-spectrum rice herbicide (triafamone) which appears to be benchmarked against Dow AIs penoxsulam and cyhalofop. It is part of the existing ALS MoA group, which is affected by resistance issues. Global launch is planned for 2017, while it is not clear whether Bayer is seeking registration in the Union. [Internal assessment].⁵²⁶

(855) **FMC** has a forthcoming herbicide (fenquino-trione) for weed control in rice paddy fields, which it acquired from Kumiai. The compound seems to be targeted at the

⁵²⁰ Parties' response to the Commission's request for information RFI 38, question 8, Annex 8.1

⁵²¹ See Parties' submission entitled [...], page 7.

⁵²² Form RM, 17 February 2017, page 61.

⁵²³ Form CO, part.B.I. – Herbicides, page 10.

⁵²⁴ Form CO, part.B.I. – Herbicides, page 10.

⁵²⁵ Form CO, part.B.I. – Herbicides, page 12.

⁵²⁶ [Internal document] (ID7973-00005), [...].

Asian market and field trials are ongoing in Japan. Its weed spectrum shows that it mostly targets broadleaf weeds. [Internal assessment].⁵²⁷

- (856) The Parties also face competition from **Japanese companies** Kumiai, Sumitomo and SDS Biotech. Kumiai sells bispyribac-sodium in Europe, a post-emergence cross-spectrum rice herbicide, [internal assessment]. Sumitomo sells limited quantities of its early post-emergence broadleaf rice herbicide orthosulfamuron, an ALS inhibitor that is patent-protected until 2018.
- (857) **SDS Biotech** and US-brand manufacturer Gowan together developed benzobicyclon, a cross-spectrum rice herbicide, which can be used for pre- and early post application. It will target grasses (including Echinochloa), sedges and broadleaf weeds.⁵²⁸ Benzobicyclon is listed as never notified or authorised in the Union.⁵²⁹ [Internal assessment]⁵³⁰.
- (858) **Mitsui** is currently conducting development of cyclopyrimorate, a rice herbicide targeting annual broadleaf weeds. It belongs to the existing chemical class of pyridazines. [Internal assessment].⁵³¹

6.3.5.2. Parties' arguments

- (859) The Parties argue notably that, with regard to rice herbicides, the Transaction would not materially strengthen Dow's position on the basis that in the EEA DuPont does not exert a significant constraint on competitors, including Dow.
- (860) The Parties submit that they have only small portfolios focusing on post-emergence applications and that they are not close competitors. DuPont divested bensulfuron outside of Asia in 2006, [expected development].
- (861) The Parties submit that their shares overstate their market position. They argue that [expected development] due to growing weed resistance to ACCase and ALS MoA group herbicides, to which their products belong.
- (862) The Parties further submit that the market investigation showed that more customers considered BASF and Bayer to be Dow's closest competitors in rice herbicides compared to DuPont.
- (863) The Parties also claim that they would continue to face intense competition from other R&D-integrated companies, in particular BASF and Bayer. They submit that Bayer's products currently face fewer resistance issues than their products. Moreover, the Parties claim that they face strong competition from alternative crop technologies, notably BASF's alternative herbicide-tolerant rice technologies (Clearfield and Provisia), which deal with the issue of increasing resistance.
- (864) The Parties also expect competition from manufacturers such as Sumitomo and Kumiai as Dow's cyhalofop and DuPont's azimsulfuron are already off-patent and protection for penoxsulam will expire in 2017. They argue that generic competitors are working on generic versions of penoxsulam.

⁵²⁷ [Internal document].

⁵²⁸ Form CO, part.B.I. – Herbicides, pages 12-13.

⁵²⁹ See the benzobicyclon entry in DG SANTE's pesticide online database, file name "20170201-110507_ec.europa.pdf".

⁵³⁰ [Internal document], page 3.

⁵³¹ [Internal document], (ID7973-00005), [...].

(865) In addition, the Parties argue that parallel imports exert pricing pressure, which would prevent the Parties from increasing prices post-Transaction. This claim and the relevance of generic players are addressed in detail in Section V.72.

(866) [Pipeline information].⁵³² They also state that there are many other firms with rice herbicide products in development.

(867) [...].

6.3.5.3. The Transaction would be likely to lead to an increase in the Parties' combined power in the relevant markets

(868) Against this background, the Commission considers that the most relevant EEA countries for the sale of rice herbicides are in Southern Europe. High combined market shares arise in **selective cross-spectrum post-emergence rice herbicides** as illustrated in Table 9.

Table 9 – Market shares for post-emergence cross-spectrum selective rice herbicides in the EEA⁵³³

	Market size (USD million)	Dow	DuPont	Combined	BASF	Bayer	UPL	FMC	Others
EEA	[...]	[30-40]%	[0-5]%	<i>[30-40]%</i>	[30-40]%	[5-10]%	[5-10]%	[0-5]%	[10-20]%
Bulgaria	[...]	[0-5]%	[0-5]%	<i>[0-5]%</i>	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[90-100]%
France	*[...]	*N/A	*N/A	<i>*[30-40]%</i>	*N/A	*N/A	*N/A	*N/A	*N/A
Greece	[...]	[30-40]%	[5-10]%	<i>[40-50]%</i>	[20-30]%	[5-10]%	[20-30]%	[0-5]%	[0-5]%
Hungary ⁵³⁴	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Italy	[...]	[30-40]%	[0-5]%	<i>[40-50]%</i>	[40-50]%	[5-10]%	[0-5]%	[0-5]%	[5-10]%
Portugal	[...]	[10-20]%	[0-5]%	<i>[10-20]%</i>	[30-40]%	[0-5]%	[0-5]%	[0-5]%	[40-50]%
Romania ⁵³⁵	[...]	[0-5]%	[0-5]%	<i>[0-5]%</i>	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%
Spain	[...]	[30-40]%	[0-5]%	<i>[30-40]%</i>	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[50-60]%

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)

Note: ° indicates Parties' data; * indicates proxy calculation by Parties; N/A indicates that no data are available

(869) [Expected development].⁵³⁶

⁵³² See further details about these DuPont's pipeline products in Section V.8.8.1.

⁵³³ The relevant countries for rice in the EEA are Italy, Spain, Greece, Portugal, Bulgaria, France, Hungary and Romania.

⁵³⁴ The Parties submit that limited information is available on Hungary, [...] of rice herbicides. DuPont has registered azimsulfuron and based on the Form CO, Dow has registered broadleaf rice herbicides in Hungary. On the basis of available information, no overlap arises in Hungary.

⁵³⁵ The Parties submit that they do not have sales or registration for rice herbicides in Romania.

⁵³⁶ [Internal document] (ID6827-45297), [...].

6.3.5.4. The Parties' position in markets for rice herbicides is likely to be strengthened significantly through the launch of Rinskor and [pipeline information] on those markets

(870) **Dow's pipeline product Rinskor** (florpyrauxifen-benzyl) is a cross-spectrum herbicide for the post-emergent control of grasses such as Echinochloa, broadleaf weeds such as Amaranth, and sedges, including resistant species, primarily in rice. It is an arylpicolinate with a synthetic auxin MoA, in the same chemical class and MoA group as Dow's Arylex.

(871) Rinskor offers a new MoA for rice, [pipeline information].⁵³⁷

(872) [...] Dow anticipates first registrations of Rinskor in late 2017, subject to regulatory approvals. As for Europe, Dow submitted an application for Union registration in March 2016. [Pipeline information].^{538,539,540}

(873) [Pipeline information].⁵⁴¹

(874) **DuPont** [...].⁵⁴² It has one compound in early development.

(875) DuPont is conducting **development programme** [pipeline information]^{543,544}.

(876) It offers a new MoA [pipeline information].^{545,546}

(877) [Pipeline information]^{547,548,549,550}.

(878) As for the Parties' claim that Rinskor and [product name] will not compete closely because they belong to different MoA groups, the Commission's investigation has shown that the use of different MoAs is primarily linked to resistance management. As pointed out by a customer, "*[t]he use of different modes of action (MoA) is generally recommended to fight against resistance*".⁵⁵¹ However, considering that resistance affects some weeds more than others, a farmer would still be able to choose freely among products with similar weed spectrums regardless of their MoA if the key weeds he faces are not particularly subject to resistance. This means that at least in such cases [pipeline information].

(879) In light of the considerations set out in recitals (870) to (878), the Commission takes the view that expected developments of DuPont's and Dow's respective rice herbicide portfolios, notably Dow's Rinskor and DuPont's [pipeline information], indicate that the Parties' strong current position in cereal herbicides would not only be maintained but is also likely to be strengthened in the future, subject to developments of

⁵³⁷ [Internal document], slide 13.

⁵³⁸ [Internal document], slide 34.

⁵³⁹ [Internal document], slide 5.

⁵⁴⁰ [Internal document] (ID8833-000007), [...], slide 19.

⁵⁴¹ [Internal document] (ID742), [...].

⁵⁴² [Internal document].

⁵⁴³ [Pipeline information].

⁵⁴⁴ [Internal document], slide 14.

⁵⁴⁵ [Internal document].

⁵⁴⁶ Parties' response to the Commission's request for information RFI 38, question 8, Annex 8.1.

⁵⁴⁷ [Internal document], slide 25.

⁵⁴⁸ [Internal document], slide 17.

⁵⁴⁹ [Internal document], slide 21.

⁵⁵⁰ Parties' submission [...], page 7.

⁵⁵¹ Agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246).

competitors' offers, which, however, the Commission finds are not likely to exercise limiting competitive constraints, as mentioned in Section V.6.3.5.5.

6.3.5.5. Dow is a significant player, with DuPont a smaller but close competitor

(880) Dow is a major player in post-emergence cross-spectrum rice herbicides.⁵⁵² However, DuPont is also an established player, whose product azimsulfuron is currently in the same space as Dow's offering.

(881) [...] Dow's and DuPont's products are competitors in post-emergence cross-spectrum rice herbicides.^{553,554}

(882) [Pipeline information].⁵⁵⁵

Figure 37 – [Extract from internal document re rice]

[...]

Source: [Internal document] (ID8833-7), [...]

(883) [Pipeline information].⁵⁵⁶

(884) For further examples of internal documents [pipeline information], see Section V.8.8.1.1(C).

(885) [Internal assessment of competitive landscape].⁵⁵⁷

(886) [Internal assessment of competitive landscape].⁵⁵⁸

(887) Market participants overall indicated that Dow and DuPont are close competitors, though also noting that DuPont is a smaller or declining player. To this effect, the Commission further notes that it is not necessary for the Parties to be each other's closest competitors for the Transaction to be detrimental to competition. While an indication of closeness is not the sole or even necessarily a decisive factor in the Commission's assessment, it is one of the factors considered by the Commission. In this context, the fact that market participants consider Dow and DuPont as close competitors – even if not the closest – supports the finding that market participants consider them to exert some competitive pressure against each other pre-Transaction. In addition, market participants' opinions on closeness of competition are mainly informed by current product offerings [pipeline information].

(888) The French rice institute noted that DuPont's azimsulfuron had been the leading product between 1999 to about 2007 and was still being used in France but faced resistance issues and was therefore often used in mixtures.⁵⁵⁹ Meanwhile, "*Dow has two products which are widely used by farmers. The first is the molecule cyhalofop ("Clincher") and the second is penoxsulam ("Boa"). Cyhalofop [...] is the best product for post-emergence weed control.*" As cross-spectrum products, "*the Dow and DuPont products overall have the same spectrum of control*".

⁵⁵² [Internal document].

⁵⁵³ [Internal document] (ID6696-1356).

⁵⁵⁴ [Internal document].

⁵⁵⁵ [Internal document] (ID8833-000007), [...].

⁵⁵⁶ [Internal document] (ID6696-30972), [...] (ID8833-000007), [...].

⁵⁵⁷ [Internal document] (ID6827-4652), [...], slide 6.

⁵⁵⁸ [Internal document].

⁵⁵⁹ Agreed non-confidential minutes of a call with an institute, 21 September 2016 (ID8144).

- (889) Another institute confirmed that DuPont's azimsulfuron, previously used in the same way as Dow's Viper, was declining and used as a secondary product.⁵⁶⁰ Therefore, in Italy, "*Dow and DuPont compete with azimsulfuron and halosulfuron. However, the competition is not significant since these products are used complementarily for secondary weeds. Both have Clomazone.*"
- (890) A customer indicated that Dow is a strong player in rice herbicides and that many molecules for rice herbicides had disappeared over the last twenty years (for example quinclorac, propanil), which had reduced choice and contributed to resistance problems.⁵⁶¹
- (891) Similarities in weed spectrum between Dow's and DuPont's rice herbicides are borne out by various crop protection recommendation documents which show that both Dow and DuPont products target similar key weeds, notably barnyard grass (*Echinochloa*).
- (892) A document from the Veneto Regional Authority in Italy recommends penoxsulam, azimsulfuron and cyhalofop for post-emergence treatment against barnyard grass in rice crops after the first-leaf stage.⁵⁶² A doctoral thesis from the Spanish university of Lleida identifies *Echinochloa* as the grass weed with the highest occurrence in rice fields and lists both azimsulfuron and cyhalofop as effective AIs against this weed.⁵⁶³
- (893) It appears that resistance is a growing problem especially affecting grass weeds in rice, against which BASF has developed effective solutions through its herbicide tolerant systems Clearfield and Provisia. [Pipeline information].⁵⁶⁴
- (894) In conclusion, the Commission finds that Dow is a significant player in rice herbicides, with DuPont a smaller but close competitor.

6.3.5.6. Competitive constraints imposed by competitors are limited

- (895) [...], there are few products competing in the same area.⁵⁶⁵

Figure 38 – [Extract from internal document re rice herbicides]

[...]

Source: [Internal document], slides 14-15 (ID6827-4652)⁵⁶⁶

Figure 39 – [Extract from internal document re rice herbicides]

[...]

Source: [Internal document] (ID857)

⁵⁶⁰ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

⁵⁶¹ Questionnaire to Crop Protection Customers (Q1), questions 25.1 and 65.1 (ID9109).

⁵⁶² "Linee Tecniche di Difesa Integrata - Anno 2016" [Technical Guidelines for Integrated Pest Control – 2016], Regione del Veneto, Settore Fitosanitario, file name "RISO – Oryza sativa.pdf".

⁵⁶³ Blanco Alibés (2014) "Agronomía del cultivo del arroz en riego por aspersión: variedades, riego, fertilización y control de malas hierbas" [Agronomy of rice cultivation using sprinkling irrigation: varieties, irrigation, fertilisation and weed control], file name "Agronomia del cultivo del arroz.pdf", pages 142 and 143.

⁵⁶⁴ [Internal document] (ID742), [...].

⁵⁶⁵ [Internal document] (ID6696-1356). [Internal document] (ID6696-010939), [internal document] (ID6696-010933), [internal document].

⁵⁶⁶ [Internal document].

- (896) First, competitive pressure coming from competitors' products is limited. Although BASF's system Clearfield has indeed been launched in several countries, it is for instance not present in France due to the limited size of the market compared to Italy and Spain.⁵⁶⁷
- (897) In Italy, Clearfield is seen as a different system from traditional varieties, leading to different crop protection needs.⁵⁶⁸ For instance, Clearfield fields are treated post-emergence with BASF's imazamox and another AI to complete the spectrum of activity. Resistance to imazamox was indicated as appearing in "Americas/EU", and [internal strategy].^{569,570}
- (898) Dow has already entered into partnerships with BASF to join the Clearfield program in several countries including the US and Brazil.⁵⁷¹ In a US promotional video from 2011 Dow recommends the use of its products Grasp Xtra (penoxsulam) and Clincher (cyhalofop) in combination with competitor products Command and Newpath as part of a spray programme in Clearfield rice fields.⁵⁷²
- (899) The press release announcing the commercial name of Dow's rice herbicide Rinskor specifically stated "*Loyant herbicide is expected to offer excellent crop safety and fit well in CLEARFIELD® and conventional rice systems*".⁵⁷³
- (900) [Internal market evaluation].⁵⁷⁴

Figure 40 – [Extract from internal document re rice]

[...]

Source: [Internal document] (ID8833-7), [...]

- (901) Second, competitive pressure coming from competitors' pipeline products is limited in the foreseeable future.
- (902) [Internal market evaluation].⁵⁷⁵
- (903) The Commission considers that none of the forthcoming products from the Parties' competitors discussed in Section V.6.3.5.16.3.5.1(C) would be likely to capture significant shares from the Parties, as they are all part of existing chemical classes and existing modes of action.
- (904) In addition, [internal market evaluation].⁵⁷⁶
- (905) The same document notes that [internal market evaluation].⁵⁷⁷

⁵⁶⁷ Agreed non-confidential minutes of a call with an institute, 21 September 2016 (ID8144).

⁵⁶⁸ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

⁵⁶⁹ [Internal document], slides 5 and 10 (ID705), [...].

⁵⁷⁰ [Internal document].

⁵⁷¹ See BASF press release "BASF and DOW agrosiences announce partnership in the Clearfield production system in Brazil" (http://www.agro.basf.com/agr/AP-Internet/en/content/news_room/news/04_11_24-BASFand-DOW-agrosiences-announce-partnership-in-the-clearfield-production-system-in-brazil).

⁵⁷² See Dow video "Dow AgroSciences 2011 Rice Concept Plot Tours", file name "20170201-112408_youtube.pdf".

⁵⁷³ See Dow press release "Dow AgroSciences Announces Name of New Rice Herbicide", 13 January 2016, file name "20170201-112547_dowagro.pdf"

⁵⁷⁴ [Internal document] (ID6696-010939), [...].

⁵⁷⁵ [Internal document] (ID6696-2352), [...].

⁵⁷⁶ [Internal document] (ID8833-000007), [...].

(906) As a result the rice herbicide pipeline products from competitors are not likely to have the potential to pose a serious threat to the Parties' market positions in Europe.

Figure 41 – [Extract from internal document re rice]

[...]

Source: [Internal document](ID8833-7), [...]

(907) Third, constraints imposed by generic competitors are limited. [Internal market assessment].⁵⁷⁸ A technical institute confirmed that no generic product was available in France.⁵⁷⁹

(908) As for the Parties' claim that Dow's penoxsulam will face generic competition as it will lose its patent protection in 2017, the Commission notes that its investigation has shown [pipeline information].

(909) The Commission's investigation has indicated that [pipeline information]. In particular, the Commission considers that [pipeline information and assessment of competitive landscape].

(910) [Pipeline information and assessment of competitive landscape].^{580,581}

(911) In conclusion, the Commission considers that constraints imposed by competitors are limited.

6.3.5.7. [...]

(912) In a [...] email exchange [...].^{582,583}

(913) [...].

(914) [...], this would further reduce the choice in rice herbicides available to farmers, which, as the French rice institute indicated, has been narrowing dramatically over the last decade: "*[i]ndeed, while 10 years ago there were at least 14 active ingredients, nowadays the number has dropped to 6. Moreover, with the emergence of the resistance problem, the situation continues to worsen and is worrying*".⁵⁸⁴

(915) Moreover, few new products are expected to come to the European market in the foreseeable future and most new rice herbicides in competitors' pipelines seem to be targeted at the Asian market with little chance of being launched in Europe.

6.3.5.8. Conclusion on the assessment of non-coordinated effects in the markets for rice herbicides

(916) The Commission considers that the considerations described in Sections V.6.3.5.1 to V.6.3.5.7 justify the finding that, in the absence of appropriate remedies, the Transaction would be likely to lead to a significant impediment of effective competition because of its non-coordinated effects on the markets for rice herbicides.

⁵⁷⁷ [Internal document].

⁵⁷⁸ [Internal document].

⁵⁷⁹ Agreed non-confidential minutes of a call with an institute, 21 September 2016 (ID8144).

⁵⁸⁰ [Internal document], slide 5 (ID705), [...].

⁵⁸¹ [Internal document] (ID742), [...].

⁵⁸² [Internal document].

⁵⁸³ [Internal document].

⁵⁸⁴ Agreed non-confidential minutes of a call with an institute, 21 September 2016 (ID8144).

(917) At the relevant geographic market level (national), and based on the assessment conducted in Sections V.6.3.5.1 to V.6.3.5.7, and in light of the general features of crop protection markets as described in Section V.6.2, the Commission is of the view that the Transaction would be likely to lead to the elimination of an important competitive constraint in several EEA countries as set out in recitals (918) to (922).

(A) Post-emergence cross-spectrum selective rice herbicides

(918) In post-emergence cross-spectrum selective rice herbicides, the Transaction would be likely to lead to the elimination of an important competitive constraint in several EEA countries in which the Parties would have a significant or large combined market share. These countries are: Greece ([40-50]%), Italy ([40-50]%), and Spain ([30-40]%).⁵⁸⁵

(919) [...]. The Union Annex I registration of the AI azimsulfuron will not expire until 2021. [...].⁵⁸⁶

(920) In addition, the Commission notes that one or both of the Parties are active in a number of other EEA countries, in particular in France; however, the Parties have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of DuPont's AI azimsulfuron proposed by the Parties in the market for post-emergence cross-spectrum selective rice herbicides in the three EEA markets discussed in recital (918).

(B) Pre-emergence cross-spectrum selective rice herbicides

(921) In the Statement of Objections, the Commission preliminarily concluded that the Transaction would be likely to significantly impede effective competition in the market for pre-emergence cross-spectrum rice herbicides in Spain. That finding was, in part, based on the fact that the Agrowin dataset suggested both Dow and DuPont to make sales in that market. However, Dow's and DuPont's own data show that they have not actually made any such sales, [pipeline information]. In addition, no other information has come to the Commission's knowledge during the investigation that would suggest Dow or DuPont to be potential entrants on the market capable of constraining the present market participants.

(922) Therefore, in light of the evidence available to it, the Commission considers that the Transaction would not be likely to significantly impede effective competition with respect to the market for pre-emergence cross-spectrum rice herbicides in Spain.

(C) Conclusion

(923) In conclusion, and considering all evidence available to the Commission and also in light of the general features of crop protection markets as described in Section V.6.2, the Commission considers that, in the absence of appropriate remedies, the Transaction would be likely to significantly impede effective competition in relation to post-emergence cross-spectrum selective rice herbicides by eliminating an

⁵⁸⁵ With regard to France, the Parties submit that in (total) cross-spectrum herbicides they have a combined share of [40-50]% (Dow: [40-50]%, DuPont: [0-5]%).

⁵⁸⁶ [Internal document].

important competitive constraint in Greece, Italy and Spain and likely further limiting choice for farmers in those countries [...].

6.3.6. *Pasture herbicides - assessment of non-coordinated effects*

- (924) It is difficult to give a precise estimate of pasture selective herbicide sales in the EEA: estimates range from around [...] ⁵⁸⁷ to [...] ⁵⁸⁸. The main markets for pasture herbicides are in Central European countries which typically have intensive dairy farming such as Germany, the Netherlands and Poland, but also in France.
- (925) High levels of weeds not only reduce pastures' nutritional value, but also restrict grazing areas. Most weeds reduce the nutritional value of the grassland and provide excessive competition for valuable grasses, particularly in newly sown pastures.
- (926) Nettles, thistles and ragwort discourage grazing and can make hay and silage unpalatable for cattle. A number of weeds are listed as injurious weeds including common ragwort, spear thistle, creeping or field thistle, broad-leaved and curled dock. These require management to prevent their spread. Common problem weeds include buttercups, common chickweed, dock, nettles, ragwort and thistles.
- (927) Tackling grassland weeds early, in newly sown pasture, helps improve palatability, productivity and reduce costs. Tribenuron (DuPont) is a recommended herbicide for use on new grass. On established grass, aminopyralid and triclopyr (both Dow) set the standard for dock, thistle and nettle control.
- (928) Dow is active in most EEA countries, while DuPont has pasture sales in only some EEA countries, such as Germany and Poland. Many of the Parties' AIs used in pasture are also used for cereals.

6.3.6.1. The relevant products of the Parties and their competitors

(A) Dow

- (929) [Dow has several broadleaf herbicides for pasture: picloram, aminopyralid, florasulam, fluroxypyr and triclopyr.]
- (930) Picloram is a broadleaf weed herbicide used for the control of annual and perennial weeds in non-crop situations, notably range and pasture. It is sold under the brand name Tordon. [Internal strategy]. ⁵⁸⁹
- (931) Aminopyralid is the latest addition to Dow's range of pyridine herbicides. It was introduced in 2006 in several countries for use in cereals, pasture and rangeland. [Internal strategy]. Sales of aminopyralid are estimated to have reached USD [...] in 2014. ⁵⁹⁰ Aminopyralid's margin [...]: in Europe it was estimated at [...] % in 2016. ⁵⁹¹
- (932) Triclopyr was introduced in 1979 and is mainly used for the control of broadleaf and woody weeds and scrub, mainly in non-crop situations such as forestry, industrial sites and permanent pastureland. It is sold under the brand name Garlon. The product

⁵⁸⁷ Agrowin data.

⁵⁸⁸ Estimates of the Parties (Parties' response to the Commission's request for information RFI 29, question 3.1).

⁵⁸⁹ [Internal document] (ID698), [...].

⁵⁹⁰ Phillips McDougall – AgriService, Companies Section, Part 1 The Leading 15 Companies – 2014 Market Situation

⁵⁹¹ [Internal document] (ID698), [...], slide 13.

continues to generate significant sales, reaching an estimated [...] in 2014 globally, of which [...] in the EEA. The margin for triclopyr sales in Europe was estimated at [...] % in 2016.⁵⁹²

(933) Florasulam is a leading sulfonamide herbicide in the Dow portfolio, introduced in 2000. It is a broadleaf weed herbicide used in various crops as well as pasture in the European and Canadian markets. It is sold under the brand name Primus. Sales of florasulam exceeded [...] globally in 2014, of which [...] in the EEA.

(934) [...].

(935) [...]⁵⁹³.

(936) [...].^{594,595}

(B) DuPont

(937) DuPont has the AI thifensulfuron, sold under the brand name Harmony. It is used for the control of broadleaf weeds in various crops and non-crop situations including range and pasture. Thifensulfuron has received Annex I approval in the Union, where key markets are Germany, France, the United Kingdom and Poland. Sales in 2014 were around [...], of which [...] in the EEA. Thifensulfuron's gross margin [...].⁵⁹⁶

(938) Metsulfuron is a leading SU cereal herbicide for DuPont, with global sales estimated at [...] in 2014, of which [...] in the EEA. It is widely used for control of difficult perennial broadleaf weeds in various crops and non-crop situations including pasture. It is sold under the brand name Ally. Several generic companies also sell metsulfuron in the EEA.

(939) DuPont's SU tribenuron is mainly a cereal herbicide but is also used in pasture. A specialist farmers' publication in the United Kingdom recommends tribenuron for use on new grass: "*[t]he weed control options in newly drilled grass in the first year that are clover safe are few. Tribenuron has a recommendation for use on new grass and is clover safe*".⁵⁹⁷

(940) Furthermore, DuPont has the AI aminocyclopyrachlor, which is sold outside Europe. Aminocyclopyrachlor is a pyrimidine carboxylic acid herbicide for the control of annual and perennial broadleaf weeds, including woody species, in non-crop situations. The product received US approval in 2011 for the control of brush and broadleaf weeds in roadsides, railroad sites, nature preserves, parks and other areas, but is not registered in the Union. [Internal strategy].

(C) Competitors of the Parties

(941) **Nufarm**'s portfolio mainly includes post-emergence broadleaf herbicides MCPA and 2,4-DP (sold both straight and in mixtures), as well as fluroxypyr in Austria, Croatia, Czech Republic, Denmark, Estonia, Finland, Hungary, Ireland, Latvia,

⁵⁹² [Internal document] (ID698), [...], slide 27.

⁵⁹³ [Internal document], (ID00455-00036), [...].

⁵⁹⁴ [Internal document].

⁵⁹⁵ [Internal document].

⁵⁹⁶ [Internal document].

⁵⁹⁷ See "Grassland weed control", article on the Farmers Weekly website, 11 October 2015, file name "20170201-112637_fwi.co.pdf".

Lithuania, Norway, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. In Germany, Nufarm sells MCPA for pasture.⁵⁹⁸

- (942) **Adama's** portfolio includes generic 2,4-D, fluroxypyr, tribenuron and bifenox, which it sells in: Austria, Czech Republic, Denmark, Estonia, Finland, Hungary, Ireland, Latvia, Slovenia, Slovakia, Spain and Sweden. In Germany, Adama sells generic fluroxypyr, branded as Tomigan, for use in pasture.⁵⁹⁹
- (943) **Bayer's** portfolio includes post-emergence broadleaf herbicide amidosulfuron in France, Finland, Ireland, Latvia, Sweden and Norway; cross-spectrum herbicide asulam in the United Kingdom; 2,4-DP/MCPP in Spain; and bromoxynil/ioxynil in Finland and Ireland.⁶⁰⁰
- (944) Bayer has a forthcoming cross-spectrum herbicide (iofensulfuron) for use in cereals, corn, soybeans, rice, turf and non-crops. It is not clear whether turf and non-crop applications would also include pasture. Its driver weeds are *Agrostis* grass weeds among other grass and broadleaf weeds and therefore it does not seem to target the same key weeds as Dow and DuPont products.⁶⁰¹ It is part of the sulfonylurea chemical class and the ALS MoA group.⁶⁰²
- (945) **FMC's** portfolio includes a broadleaf mixture of dicamba/MCPA/MCPP-P and 2,4-D in the United Kingdom; post-emergence broadleaf herbicide florasulam and diflufenican/florasulam in Estonia, Lithuania and Sweden; florasulam in Finland; and MCPA, 2,4-DP and generic fluroxypyr in Spain.⁶⁰³
- (946) **BASF's** portfolio includes cross-spectrum herbicides mixture imazamox/pendimethalin and bentazone in France; pendimethalin and bentazone/MCPA in Estonia; tritosulfuron and bentazone in Finland; and bentazone in Lithuania, Norway and Slovenia.⁶⁰⁴
- (947) **Syngenta's** portfolio includes dicamba and dicamba/triasulfuron as well as mesotrione in the Czech Republic; dicamba and dicamba/ioxynil/MCPP-P in Hungary. In Germany, Syngenta sells dicamba in a mixture with MCPA targeting key weeds in pasture.⁶⁰⁵
- (948) **Platform's** subsidiaries **Arysta LifeScience** and **Agriphar** mainly sell the post-emergence broadleaf mixture 2,4-D/triclopyr in France; generic clopyralid in the Czech Republic; and 2,4-DP-P/dicamba/MCPA/MCPP-P in Hungary.⁶⁰⁶
- (949) **UPL** sells generic fluroxypyr branded as Lodin for use in pasture in Germany.⁶⁰⁷
- (950) The Parties did not provide information regarding the portfolio of their competitors in Poland.

⁵⁹⁸ Form CO, part.B.I. – Herbicides, pages 112-171.

⁵⁹⁹ Form CO, part.B.I. – Herbicides, pages 112-171.

⁶⁰⁰ Form CO, part.B.I. – Herbicides, pages 112-171.

⁶⁰¹ [Internal document], slide 3 (ID6748-9240).

⁶⁰² [Internal document].

⁶⁰³ Form CO, part.B.I. – Herbicides, pages 112-171.

⁶⁰⁴ Form CO, part.B.I. – Herbicides, pages 112-171.

⁶⁰⁵ Form CO, part.B.I. – Herbicides, pages 112-171.

⁶⁰⁶ Form CO, part.B.I. – Herbicides, pages 112-171.

⁶⁰⁷ Form CO, part.B.I. – Herbicides, pages 112-171.

6.3.6.2. Parties' arguments

- (951) The Parties submit that they have moderate shares and that their position would not significantly change after the Transaction. According to the Parties, DuPont is an 'insignificant' player for pasture and rangeland in the EEA and adds very little to Dow's position. Moreover, the Parties argue that they are not close competitors on the basis that their products are complementary, as they target different broadleaf weeds.
- (952) In addition, the Parties submit that the results of the market investigation show that more customers consider Nufarm, Bayer or BASF to be Dow's closest competitor in pasture herbicides compared to DuPont.
- (953) According to the Parties, after the Transaction, the merged entity would continue to face intense competitive pressure in the EEA from strong branded manufacturers with significant portfolios targeting pasture and rangeland; and from generic competitors since the products of the Parties used in pasture herbicides are off-patent.
- (954) Furthermore, the Parties raise claims which are addressed in detail in Section V.6.2, namely: (i) generic competition constrains the prices of the Parties' products and fosters innovation; (ii) distributors exercise substantial countervailing bargaining power and put pressure on prices; and (iii) parallel imports lead to further pricing pressure.
- (955) [...].
- (956) [...].

6.3.6.3. The Transaction would be likely to lead to an increase in the Parties' combined power in the relevant markets

- (957) Estimates of the EEA market for selective pasture herbicides vary between [...] and [...]. Market shares for this category are difficult to estimate.

Table 10 – Market shares for selective pasture herbicides in the EEA⁶⁰⁸

	Market size (USD million)	Dow	DuPont	Combined	Nufarm	UPL	Adama	Syngenta	Others
EEA	[...]	[40-50]%	[5-10]%	[50-60]%	[20-30]%	[5-10]%	[5-10]%	[0-5]%	[10-20]%
Austria	[...]	[10-20]%	[10-20]%	[20-30]%	[30-40]%	[0-5]%	[10-20]%	[5-10]%	[10-20]%
Belgium	[...]	[90-100]%	[0-5]%	[90-100]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Bulgaria ⁶⁰⁹	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Croatia	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A

⁶⁰⁸ The overall figure is given to account for a large part of sales being classified as "Selective herbicides – Pasture – Broadleaf – Unknown" ([...] in the EEA). The majority of selective herbicide pasture sales are in "Selective herbicides – Pasture – Broadleaf – Post-emergence" ([...] in the EEA), with only very limited sales in graminicides and cross-spectrum (together about [...]).

⁶⁰⁹ [...] proxy calculation indicating a *[50-60]% share for Bulgaria and several other EEA countries, the Parties submit that [...].

	Market size (USD million)	Dow	DuPont	Combined	Nufarm	UPL	Adama	Syngenta	Others
Cyprus ⁶¹⁰	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Czech Republic	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Denmark	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Estonia	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Finland	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
France	[...]	[20-30]%	[0-5]%	[20-30]%	[0-5]%	[10-20]%	[0-5]%	[0-5]%	[50-60]%
Germany	[...]	[40-50]%	[30-40]%	[70-80]%	[5-10]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%
Greece ⁶¹¹	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Hungary	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Ireland	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Italy ⁶¹²	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Latvia	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Lithuania	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Luxembourg ⁶¹³	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Malta ⁶¹⁴	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
The Netherlands	[...]	[40-50]%	[0-5]%	[40-50]%	[40-50]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Norway ⁶¹⁵	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Poland	[...]	[60-70]%	[0-5]%	[60-70]%	[0-5]%	[0-5]%	[20-30]%	[0-5]%	[10-20]%
Portugal ⁶¹⁶	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Romania	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Slovakia	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A

⁶¹⁰ The Parties submit that [...].

⁶¹¹ The Parties submit that they are not active in pasture herbicides in Greece. They are active in herbicides for alfalfa but submit that their products do not overlap, as Dow only sells a broadleaf herbicide, while DuPont only sells a graminicide.

⁶¹² The Parties submit that they are not active in pasture herbicides in Italy.

⁶¹³ The Parties submit that Dow is currently not active in pasture herbicides in Luxembourg.

⁶¹⁴ The Parties submit that DuPont is not active in pasture herbicides in Malta.

⁶¹⁵ The Parties submit that limited information is available on Norway. Both companies have products registered in Norway for pasture.

⁶¹⁶ The Parties submit that DuPont does not hold any registrations in pasture herbicides in Portugal.

	Market size (USD million)	Dow	DuPont	Combined	Nufarm	UPL	Adama	Syngenta	Others
Slovenia ⁶¹⁷	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Spain	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
Sweden	N/A	N/A	N/A	*[50-60]%	N/A	N/A	N/A	N/A	N/A
The UK	[...]	[70-80]%	[0-5]%	[70-80]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%

Source: Parties' submission based on Agrowin (2015)

Note: * indicates proxy calculation by Parties; N/A indicates that no data are available

(958) Contrary to the [0-5]% shares estimated for the Netherlands and Belgium in Table 10, [...].⁶¹⁸

(959) The Parties have very high combined market shares across the EEA, with shares of at least [50-60]% in all countries except France ([20-30]%) and Austria ([20-30]%).

6.3.6.4. [...]

(960) [...].

(961) [...].

(962) [...].

(963) [...].⁶¹⁹

(964) [...].⁶²⁰

(965) [...].⁶²¹

(966) [...].⁶²²

(967) [...].

6.3.6.5. Dow is a significant player, with DuPont a smaller but close competitor

(968) Dow is the leading company in pasture, and is actively developing a pasture market in the EEA. [Internal strategy].^{623,624}

Figure 42 – [Extract from internal document re pasture]

[...]

Source: [Internal document] (ID6696-08397), [...]

(969) [...] notes that [internal assessment].⁶²⁵

⁶¹⁷ The Parties submit that limited information is available on Slovenia. Both companies have products registered in Slovenia for pasture.

⁶¹⁸ [Internal document] (ID6827-11935), [...].

⁶¹⁹ [Internal document] (ID00561-00012), [...].

⁶²⁰ [Internal document], slide 3.

⁶²¹ [Internal document], page 12.

⁶²² [Internal document], page 35.

⁶²³ [Internal document] (ID6696-08397), [...].

⁶²⁴ [Internal document] (ID940), [...].

- (970) A [...] internal document [internal assessment].⁶²⁶
- (971) The Commission observes that the Parties have submitted that the results of the market investigation indicate that market participants do not consider Dow and DuPont to be each other's closest competitors. To this effect, the Commission notes that it is not necessary for the Parties to be each other's closest competitors for the Transaction to be detrimental to competition. While an indication of closeness is not the sole or even necessarily a decisive factor in the Commission's assessment, it is one of the factors considered by the Commission. In this context, the fact that market participants consider Dow and DuPont to be close competitors – even if not the closest – supports the finding that market participants consider them to exert some competitive pressure against each other pre-Transaction. In addition, market participants' opinions on closeness of competition are mainly informed by current product offerings [...].
- (972) A German customer stated that Dow and DuPont were by far the two leading companies in pasture herbicides in Germany, noting however differences in spectrum within broadleaf weeds.⁶²⁷ He pointed out that Dow and DuPont products make up 80% of his pasture herbicide sales, "*50% of which are Dow products and 30% DuPont*".
- (973) A Belgian customer singled out pasture and cereals as the two main areas where the Transaction's impact would be most felt: "*[i]n certain segments, such as broadleaf herbicides for cereals and grassland, the two companies will have combined market shares of more than 50%. Some of these activities will have to be divested*".⁶²⁸
- (974) The Parties also argue that their pasture herbicides are not close competitors but are complementary products on the basis that they target different broadleaf weeds.
- (975) The Commission considers however that the fact that the weed spectrums of the Parties' pasture products do not totally coincide does not in itself mean that they do not compete closely. The complementarity of certain features in specific products in their portfolios does not offset the finding that in many more instances the Parties are close competitors in the relevant product and geographic markets for pasture herbicides.
- (976) The Commission's investigation has revealed that Dow's and DuPont's pasture herbicides have overlapping weed spectrums which include important key weeds such as *Cirsium* (thistle), *Urtica* (nettle) and *Rumex* (dock). The Commission is therefore of the view that the Parties' products are alternatives for farmers looking to eliminate those key weeds.
- (977) A crop protection guidance document from SCAR, the leading Walloon cooperative distributor, for instance, recommends exclusively Dow and DuPont herbicides for use in pastures: Primus, Starane, Bofix (Dow), and Allié, Accurate and Harmony Pasture (DuPont).⁶²⁹ The document includes a table showing that the weed spectrums

⁶²⁵ [Internal document] (ID1329-000541), page 1.

⁶²⁶ [Internal document] (ID6696-8397), [...].

⁶²⁷ Agreed non-confidential minutes of a call with a customer, 14 October 2015 (ID8443).

⁶²⁸ Agreed non-confidential minutes of a call with a customer, 12 October 2015 (ID8855).

⁶²⁹ "Onkruidbestrijding van weiden en grasperken – Keuze van het goede product" [Weed control in pasture and lawns – Choosing the right product], SCAR, file name "desherbage-prairies-vn.pdf".

of the various Dow and DuPont products are largely overlapping, including such weeds as dock, dandelion, thistle, nettle, buttercup and various umbelliferae.

- (978) A similar document from a German regional farming institute describes the efficacy of Dow's Starane, Starane Ranger, Simplex and DuPont's Harmony SX products for the selective treatment of dock in pasture. The document refers to dock as the "*most significant weed in pasture farming*" in Europe.⁶³⁰
- (979) A crop protection guidance publication by the Walloon Ministry of Agriculture recommends eight products for the treatment of four types of dock in pastures, five of which are Dow products and two DuPont.⁶³¹ The only alternative recommended is a product from generic player UPL.
- (980) The same publication recommends 23 products for the treatment of key weeds dock, nettles and thistles in pastures, 20 of which are Dow or DuPont products. The few alternatives recommended are products from generic players UPL and Nufarm.⁶³²
- (981) Therefore, the guidance documents referred to in recitals (977) to (980) indicate that Dow's and DuPont's pasture herbicides have overlapping weed spectrums which include important key weeds and that their products are therefore alternatives for farmers who need to eliminate those weeds.
- (982) In conclusion, the Commission finds that Dow is a significant player in pasture herbicides, with DuPont a smaller but close competitor.

6.3.6.6. Competitive constraints imposed by competitors are limited

- (983) First, competitive pressure coming from competitors' products is limited. Competitors in pasture herbicides in the EEA are mainly generic companies.
- (984) The market share data submitted by the Parties regarding meadow and pasture herbicides in Germany in 2014 show that competitors are far behind: Syngenta [5-10]%, Nufarm [5-10]%, UPL [0-5]%, Adama [0-5]%, BASF [0-5]%, Others [0-5]%.⁶³³
- (985) A [...] internal document [internal assessment].⁶³⁴
- (986) A German distributor notes that a Nufarm pasture herbicide is facing regulatory risk: "*[o]ther pasture herbicides offered by Würth include U46M (dimethylamine) from Nufarm, which is facing regulatory pressure*".⁶³⁵
- (987) The crop protection guidance documents referred to in (978) and (979) indicate that Dow and DuPont are very strong in the pasture herbicide market in Belgium and Germany, especially for key weeds such as dock, nettles and thistles. The only alternatives listed by those documents are products from UPL and Nufarm.

⁶³⁰ "Schadpflanzenregulierung auf dem Grünland" [Weed control in pasture], Rheinland-Pfalz Dienstleistungszentren Ländlicher Raum, 2013, file name "Ampfer+Unkraeuter_2013".

⁶³¹ "Le contrôle des populations indésirables de rumex, chardons et orties dans les prairies permanentes", [Control of dock, thistle and nettle weeds in permanent pasture], Ministère de la Région wallonne, Direction générale de l'Agriculture, file name "Rumex, chardons et orties.pdf", page 73.

⁶³² "Le contrôle des populations indésirables de rumex, chardons et orties dans les prairies permanentes", [Control of dock, thistle and nettle weeds in permanent pasture], Ministère de la Région wallonne, Direction générale de l'Agriculture, file name "Rumex, chardons et orties.pdf", page 73.

⁶³³ Form CO, part B.I, paragraph 399.

⁶³⁴ [Internal document] (ID940), [...].

⁶³⁵ Agreed non-confidential minutes of a call with a customer, 14 October 2015 (ID8443).

- (988) Second, competitive pressure coming from competitors' pipeline products is limited. Very few of Dow's and DuPont's competitors appear to have new products in their pipelines which could create a competitive constraint in the foreseeable future. Overall, the Commission's investigation revealed very few forthcoming new products aimed at the pasture herbicide market in competitors' pipelines.
- (989) Third, constraints imposed by generic competitors are limited. The Parties claim that the merged entity would continue to face intense competitive pressure in the EEA from generic competitors since the products of the Parties used in pasture herbicides are off-patent. However, the Commission notes that its investigation has shown that [...].
- (990) The Commission's investigation has indicated that [...]. In particular, the Commission considers [...].
- (991) In conclusion, the Commission considers that constraints imposed by competitors are limited.
- 6.3.6.7. Conclusion on the assessment of non-coordinated effects in the markets for pasture herbicides
- (992) The Commission considers that the considerations described in Sections V.6.3.6.1 to V.6.3.6.6 justify the finding that, in the absence of appropriate remedies, the Transaction would lead to a significant impediment of effective competition because of its non-coordinated effects on the market for selective pasture herbicides.
- (993) At the relevant geographic market level (national), and based on the assessment conducted in Sections V.6.3.6.1 to V.6.3.6.6, and in light of the general characteristics of the crop protection markets as described in Section V.6.2, the Commission is of the view that the Transaction would be likely to lead to either the creation of a dominant position or the strengthening of a dominant position in several EEA countries as specified in recitals (994) to (998).
- (A) Markets where significant impediment to effective competition would be likely
- (994) The Commission considers that the Transaction would be likely to lead to the creation of a dominant position in selective pasture herbicides in Germany ([70-80]%).
- (995) The Transaction is also likely to lead to the strengthening of Dow's dominant position in selective pasture herbicides in: the United Kingdom ([70-80]%) and Poland ([60-70]%).
- (996) With regard to *United Kingdom*, even though the increment from DuPont is small, the competition from other R&D-integrated players appears to be limited. The main competitor is generic player Nufarm ([5-10]%).
- (997) In the case of *Poland*, the increment from DuPont is small, but the competition from other R&D-integrated players is limited. The main competitor is Adama ([20-30]%), which is a generic company.
- (998) With regard to *Belgium* and the *Netherlands*, the Transaction would be likely to lead to the strengthening of Dow's dominant position [...] in selective pasture herbicides.

Dow has a dominant position in Belgium ([90-100]%) and in the Netherlands ([40-50]%). [...].^{636,637}

(B) Other markets

- (999) In addition, the Commission notes that one or both of the Parties are active in a number of other EEA countries. The Parties have submitted that no affected markets arise in those countries due to no overlaps or limited overlaps; however, they have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of DuPont's AIs thifensulfuron, tribenuron and metsulfuron proposed by the Parties in the market for post-emergence broadleaf selective cereal herbicides in the 21 EEA markets referred to in recitals (810) to (812).

(C) Conclusion

- (1000) In conclusion, and considering all evidence available to it and also in light of the general characteristics of the crop protection market as described in Section V.6.2, the Commission considers that, in the absence of appropriate remedies, the Transaction would be likely to significantly impede effective competition in relation to **selective pasture herbicides**, notably by creating a dominant position and strengthening a dominant position [...] in Germany, the United Kingdom, Poland, Belgium and the Netherlands.

6.3.7. *Oilseed rape herbicides – assessment of non-coordinated effects*

- (1001) The Commission understands that selective oilseed rape ("OSR") herbicide sales are worth nearly USD [...] globally. The EEA market was about USD [...] in 2015, of which USD [...] in broadleaf, USD [...] in cross-spectrum and USD [...] in graminicides.⁶³⁸
- (1002) Major markets for oilseed rape are EMEA and China. The main EEA countries for oilseed rape are Germany, France, the United Kingdom, Poland, the Czech Republic, as well as other Eastern European and Nordic countries.
- (1003) In oilseed rape, most farmers currently have to target weeds at an early stage, that is to say around the time the oilseed rape crop emerges, when it is small and particularly sensitive to competition from weeds. Winter oilseed rape is sown in August or early September and herbicides are mainly applied in pre-emergence (between 3–10 days after sowing), or early post-emergence (10–12 days after sowing). At that stage, weeds are still small and can be controlled more effectively. Some herbicides are applied later or in the following spring if the treatment in autumn was not effective enough, for instance due to weather conditions.
- (1004) As with other crops, farmers face a variety of weed situations (grasses, broadleaf weeds or both) in oilseed rape fields across Europe. Key grasses are *Alopecurus myosuroides* (blackgrass), *Apera spica-venti* (loose silky-bent), and volunteer cereals. Key broadleaf weeds are *Matricaria* species (mayweeds), *Galium aparine*

⁶³⁶ [Internal document] (ID6827-11935), [...].

⁶³⁷ [Internal document] (ID6827-45297), [...] (ID6827-31557), [...].

⁶³⁸ Parties' response to the Commission's request for information RF129, question 3.1.

(cleavers), *Sonchus* species (sow thistles), *Chenopodium* (lambsquarters), *Stellaria media* (chickweed) and several (other) weeds belonging to the Magnoliopsida class.

6.3.7.1. The relevant products of the Parties and their competitors

(A) Dow

(A.i) *Existing products*

(1005) The Commission notes that Dow's main AIs used in its formulated oilseed rape herbicides are propyzamide, clopyralid, and aminopyralid, which together account for approximately [...] % of its total herbicide sales. Dow sells formulated oilseed rape herbicide products containing a single AI and formulated mixes of two or more AIs in almost all EEA countries. In addition to those main molecules, Dow produces and sells mixtures of several second-tier molecules such as picloram, haloxyfop-P, isoxaben and oxyfluorfen.

(1006) Propyzamide is a post-emergence cross-spectrum herbicide used straight and in mixtures with aminopyralid. It is a benzamide belonging to MoA group 3 (microtubule inhibitors) and is used primarily for oilseed rape, fruits and vegetables. Dow sells it as a straight product branded as Kerb and in mixtures with aminopyralid under several brand names such as Milestone in Germany. Dow's EEA-wide sales of mixes containing propyzamide as a main ingredient for use on all crops were approximately USD [...] in 2015.⁶³⁹

(1007) Clopyralid, described in recital (672), is used in cereals, sugar beet and OSR, with OSR and sugar beet in Europe amounting to about [...] % of total sales in 2014.⁶⁴⁰ It is sold under the brand name Galera in mixtures with picloram in Europe.

(1008) Aminopyralid, described in recital (673), is a broadleaf herbicide used in cereals and OSR, which is used only in mixtures with other AIs such as 2,4-D, fluroxypyr, glyphosate and triclopyr.

(A.ii) *Forthcoming products*

(1009) Dow's forthcoming product Arylex is also selective for oilseed rape. This is a post-emergence broadleaf herbicide, in the new arylpicolinate chemical class belonging to the MoA group of synthetic auxins. Arylex will mainly be used in cereals, where Dow expects to launch it in the EEA in 2016/2017. Dow anticipates launch of Arylex for OSR in the EEA in [pipeline information].

(B) DuPont

(1010) The Commission notes that DuPont has the AI ethametsulfuron for oilseed rape, sold under the brand names Salsa and Muster. This is an effective herbicide for the control of wild mustard, stinkweed and other broadleaf weeds, especially in oilseed rape. It is a triazinylsulfonylurea and belongs to the acetohydroxyacid synthase AHAS MoA group.

(1011) Annex I approval of ethametsulfuron was applied for in June 2010 and is currently progressing through the Union regulatory system. The Union registration process is ongoing and its outcome cannot be anticipated. [Regulatory strategy].⁶⁴¹

⁶³⁹ Form CO, part.B.I. – Herbicides.

⁶⁴⁰ [Internal document] (ID729).

⁶⁴¹ [Internal document] (ID9031), [...].

(1012) In the meantime, DuPont is selling ethametsulfuron under national provisional authorisations⁶⁴² (NPA) for limited periods of time. [Regulatory strategy]. However, in 2016 DuPont had national authorisations in several EEA countries: [regulatory strategy].⁶⁴³ Ethametsulfuron is therefore an existing product in EEA countries where it is currently sold and a forthcoming product subject to Annex I registration in all other EEA countries.

(C) Competitors of the Parties

(1013) The Commission notes that **BASF**'s main herbicides in oilseed rape are metazachlor, dimethenamid, quinmerac, imazamox and cycloxydim. Metazachlor is the leading pre- and post-emergence cross-spectrum herbicide. It is off-patent and targets broadleaf weeds and grasses. Dimethenamid is an off-patent, pre-plant and pre-emergence cross-spectrum herbicide that is predominantly sold in mixtures with metazachlor and with metazachlor and quinmerac. Quinmerac is a pre- and post-emergence broadleaf herbicide, which BASF only sells in mixtures. Imazamox and Cycloxydim are described in recital (851).⁶⁴⁴

(1014) **Syngenta**'s portfolio includes clomazone (off-patent, pre-plant and pre-emergence broadleaf herbicide), dimethaclar (off-patent, pre-emergence cross-spectrum herbicide), napropamide (off-patent, pre-plant and pre-emergence cross-spectrum herbicide) and fluzafop-p-b (off-patent, post-emergence graminicide).⁶⁴⁵

(1015) **Adama** mainly sells generic metazachlor, described in recital (1013), and propaquizafop, which is an off-patent post-emergence graminicide.⁶⁴⁶

(1016) **FMC** sells the off-patent pre-emergence graminicides clomazone and pethoxamid.⁶⁴⁷

6.3.7.2. Parties' arguments

(1017) On oilseed rape, the Parties notably argue that their position would not be significantly different from their position pre-Transaction. They submit that DuPont's only post-emergence oilseed rape herbicide ethametsulfuron (Salsa) generates negligible sales, which add little to Dow's position and portfolio.

(1018) [Internal assessment]. The Parties argue that the outcome of the ongoing Union registration process cannot be predicted or anticipated.

(1019) Moreover, the Parties argue that their oilseed rape herbicide portfolios are complementary on the basis that they target different weeds and therefore do not compete closely. They cite as evidence the fact that ethametsulfuron is mainly used in tank mixes, including with Dow oilseed rape herbicides.

⁶⁴² Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market lays down arrangements allowing Member States, pending the Community's decision to include a new active substance in the positive list, to authorise the plant protection product concerned for a maximum of three years if the dossier submitted for inclusion of the active substance and the dossier for the authorisation of the plant protection product are in order and if it is established that the active substance and the product pose no risk.

⁶⁴³ Parties' response to the Commission's request for information RFI 61.

⁶⁴⁴ Form CO, Annex B.I.6.24, pages 1-2.

⁶⁴⁵ Form CO, Annex B.I.6.24, pages 2-3.

⁶⁴⁶ Form CO, Annex B.I.6.24, page 4.

⁶⁴⁷ Form CO, Annex B.I.6.24, pages 4-5.

- (1020) In addition, the Parties submit that the market investigation suggests that more customers considered BASF, Syngenta or Bayer to be Dow's closest competitor in oilseed rape broadleaf herbicides compared to DuPont.
- (1021) The Parties argue that for each weed targeted by their products, there are a number of alternative products available on the market. Therefore, the Parties would continue to face intense competitive pressure from branded manufacturers, as well as generic competitors since Dow's oilseed rape portfolio is mostly off-patent. They further claim that they face the threat of generic picloram and clopyralid entering the market. Moreover, according to the Parties, rival products compete closely with their products in oilseed rape herbicides.
- (1022) Furthermore, the Parties raise claims which are addressed in detail in Section V.6.2, namely: (i) generic competition constrains the prices of the Parties' products and fosters innovation; (ii) distributors exercise substantial countervailing bargaining power and put pressure on prices; and (iii) parallel imports lead to further pricing pressure.
- (1023) With regard to pipeline products, the Parties submit that the launch of its forthcoming product Arylex for oilseed rape is not expected before [pipeline information].⁶⁴⁸
- 6.3.7.3. The Transaction would be likely to lead to dominance or an increase in the Parties' combined power in the relevant markets
- (1024) The Parties have very high combined market shares in selective broadleaf post-emergence oilseed rape herbicides in a few EEA countries.
- (1025) DuPont's current market shares for selective oilseed rape herbicides reflect the fact that its product was sold under national provisional authorisations.

Table 11 – Market shares for post-emergence broadleaf selective OSR herbicides in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Adama	Syngenta	BASF	Platform	Others
EEA	[...]	[80-90]%	[0-5]%	[80-90]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Austria	[...]	[30-40]%	[0-5]%	[30-40]%	[60-70]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Belgium	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Bulgaria	[...]	[90-100]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Croatia	*[...]	*[50-60]%	*[0-5]%	*[50-60]%	*[5-10]%	*[5-10]%	[0-5]%	*N/A	*N/A
Cyprus	°N/A	*[50-60]%	*[0-5]%	*[50-60]%	*N/A	*N/A	*N/A	*N/A	*N/A
Czech Republic	[...]	[90-100]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%

⁶⁴⁸ Form CO, part B I, paragraph 121.

	Market size (USD million)	Dow	DuPont	Combi- ned	Adama	Syngent a	BASF	Platform	Others
Denmark	[...]	[90-100]%	[0-5]%	<i>[90-100]%</i>	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Estonia ⁶⁴⁹	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Finland	[...]	°[90-100]%	°[0-5]%	° <i>[90-100]%</i>	°[0-5]%	°[0-5]%	°[0-5]%	°N/A	°[0-5]%
France	[...]	[50-60]%	[0-5]%	<i>[50-60]%</i>	[0-5]%	[10-20]%	[0-5]%	[10-20]%	[10-20]%
Germany	[...]	[90-100]%	[0-5]%	<i>[90-100]%</i>	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Greece	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Hungary	[...]	[70-80]%	[10-20]%	<i>[90-100]%</i>	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ireland ⁶⁵⁰	*[...]	*[80-90]%	*[0-5]%	* <i>[80-90]%</i>	*[5-10]%	*[0-5]%	*[0-5]%	*N/A	*N/A
Italy	*[...]	*[50-60]%	*[0-5]%	* <i>[50-60]%</i>	*[5-10]%	*[10-20]%	*[0-5]%	*N/A	*N/A
Latvia	[...]	[90-100]%	[0-5]%	<i>[90-100]%</i>	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Lithuania	*[...]	[90-100]%	[0-5]%	<i>[90-100]%</i>	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Luxembourg ⁶⁵¹	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Malta	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
The Netherlands ⁶⁵²	*[...]	*[80-90]%	*[0-5]%	* <i>[80-90]%</i>	*[5-10]%	*[0-5]%	*[0-5]%	*N/A	*N/A
Norway ⁶⁵³	*[...]	*[90-100]%	*[0-5]%	* <i>[90-100]%</i>	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%	*[0-5]%
Poland	[...]	[90-100]%	[0-5]%	<i>[90-100]%</i>	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Portugal	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Romania	[...]	[90-100]%	[0-5]%	<i>[90-100]%</i>	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%

⁶⁴⁹ The Parties submit [...] but no available estimate. For all broadleaf oilseed rape herbicides they submit that Dow has a [20-30]% market share. The Parties submit in the Form CO that DuPont's sales are [...].

⁶⁵⁰ [...]. Due to the limited information available, the Parties used an estimate.

⁶⁵¹ The Parties submit that their activities in OSR herbicide currently do not overlap in Luxembourg as DuPont holds no registration.

⁶⁵² The Parties submit that their activities in OSR herbicide currently do not overlap in the Netherlands as DuPont holds no registration.

⁶⁵³ The Parties submit that their activities in OSR herbicide currently do not overlap in Norway as DuPont holds no registration.

	Market size (USD million)	Dow	DuPont	Combined	Adama	Syngenta	BASF	Platform	Others
Slovakia	[...]	[90-100]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Slovenia ⁶⁵⁴	*[...]	*[80-90]%	*[0-5]%	*[80-90]%	*[5-10]%	*[0-5]%	*[0-5]%	*N/A	*N/A
Spain	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Sweden	[...]	[90-100]%	[0-5]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
The UK	[...]	[50-60]%	[0-5]%	[50-60]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[20-30]%

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015); N/A indicates that no data are available

Note: ° indicates Parties' data; * indicates proxy calculation by Parties; N/A indicates that no data are available

(1026) According to the Parties' response to the Commission's request for information RFI 61, in 2016, DuPont had sales of ethametsulfuron in the following EEA countries: Estonia, Poland, Ireland, Sweden, Czech Republic, Slovakia, Hungary, and Romania.⁶⁵⁵

6.3.7.4. The Parties' position in markets for oilseed rape herbicides is likely to be strengthened significantly through the launch of Arylex and ethametsulfuron on those markets

(1027) **Dow** intends to develop its OSR business with Arylex.⁶⁵⁶ [Internal assessment].⁶⁵⁷

(1028) According to the Form CO, Dow expects to register Arylex for OSR in [pipeline information].

(1029) [Pipeline information].⁶⁵⁸

(1030) [Pipeline information].⁶⁵⁹

(1031) [Pipeline information].⁶⁶⁰

(1032) [Pipeline information].⁶⁶¹

(1033) **DuPont** [internal strategy/assessment].⁶⁶²

⁶⁵⁴ The Parties submit that their activities in OSR herbicide currently do not overlap in Slovenia as DuPont holds no registration.

⁶⁵⁵ Parties' response to the Commission's request for information RFI 61.

⁶⁵⁶ [Internal document] (ID729), [...].

⁶⁵⁷ [Internal document], slide 3.

⁶⁵⁸ [Internal document] (ID6696-460), [...], slide 3.

⁶⁵⁹ [Internal document], slide 6.

⁶⁶⁰ [Internal document] (ID00561-00012), [...].

⁶⁶¹ [Internal document] (ID6696-317).

⁶⁶² Parties' response to the Commission's request for information RFI 1, question 18a, [internal document] (ID982), [...].

- (1034) The Parties argue that ethametsulfuron is under regulatory pressure and that the outcome of the ongoing Union registration process cannot be predicted or anticipated.
- (1035) However, the Commission has found that [internal assessment].
- (1036) According to an internal document, [internal strategic plans].^{663,664}
- (1037) A [...] email [quote from internal document; internal assessment].⁶⁶⁵
- (1038) A [...] document [quote from internal document; internal assessment].^{666,667}
- (1039) According to another document [internal assessment].⁶⁶⁸
- (1040) A [...] internal document [quote from internal document; internal assessment].⁶⁶⁹
- (1041) Another [...] internal document [quote from internal document; internal assessment].^{670,671}
- (1042) Even though ethametsulfuron registration has not yet been obtained in many EEA countries, it has already received positive reviews in the trade press in recent years, suggesting that it enjoys a positive image among potential customers looking for a new oilseed rape herbicide product, as explained in recitals (1052) to (1055).
- (1043) In light of the considerations set out in recitals (1027) to (1042), the Commission takes the view that expected developments of DuPont's and Dow's respective oilseed rape herbicide portfolios, mostly Dow's Arylex but also DuPont's ethametsulfuron, indicate that the Parties' strong current position in oilseed rape herbicides would not only be maintained but is also likely to be strengthened in the future, subject to developments of competitors' offers, which, however, the Commission finds are not likely to exercise limiting competitive constraints, as mentioned in Section V.6.3.7.6.
- 6.3.7.5. Dow is a significant player, with DuPont a smaller but close competitor
- (1044) Internal documents suggest [internal assessment].
- (1045) According to a [...] presentation [internal assessment].⁶⁷²
- (1046) The [...] presentation [quote from internal document; internal assessment].⁶⁷³
- (1047) The Commission's finding that Dow and DuPont herbicides for oilseed rape compete in the same space [quote from internal document; internal assessment].⁶⁷⁴
- (1048) The Parties argue that their herbicides for use in oilseed rape do not compete closely on the basis that they target different weeds, citing as evidence the fact that ethametsulfuron is mainly used in tank mixes. In their response to the Statement of Objections and their response to the First Letter of Facts the Parties also argue that

⁶⁶³ [Internal document] (ID581), [...].

⁶⁶⁴ [Internal document] (ID6825-9307), [...].

⁶⁶⁵ [Internal document] (ID6827-3489).

⁶⁶⁶ [Internal document], page 6.

⁶⁶⁷ [Internal document], slides 7 and 8.

⁶⁶⁸ [Internal document], slides 26 and 31.

⁶⁶⁹ [Internal document] (ID9213-442).

⁶⁷⁰ [Internal document] (ID6827-47418), slide 25.

⁶⁷¹ [Internal document] (ID6825-30716), [...].

⁶⁷² [Internal document] (ID6827-022977), [...].

⁶⁷³ [Internal document] slide 4 (ID6696-460), [...].

⁶⁷⁴ [Internal document] (ID6696-30964).

Dow's and DuPont's products are frequently used as tank-mixing partners to close weed gaps. The Commission considers that the fact that Arylex and tribenuron may be used as mixing partners does not in itself mean that those AIs do not compete closely. Dow's and DuPont's oilseed rape broadleaf herbicides also have a spectrum overlap which includes key weeds, as confirmed by the Form CO.⁶⁷⁵ The Commission is therefore of the view that the Parties' products are alternatives for farmers looking to eliminate those key weeds.

- (1049) The Commission observes that the Parties' submission that the results of the market investigation would indicate that market participants do not consider Dow and DuPont to be each other's closest competitors cannot change the Commission's conclusion that the Parties are important and close competitors in the relevant markets for herbicides. To this effect, the Commission notes that it is not necessary for the Parties to be each other's closest competitors for the Transaction to be detrimental to competition. While an indication of closeness is not the sole or even necessarily a decisive factor in the Commission's assessment, it is one of the factors considered by the Commission. In this context, the fact that market participants consider Dow and DuPont as close competitors – even if not the closest – supports the finding that market participants consider them to exert some competitive pressure against each other pre-Transaction. In addition, market participants' opinions on closeness of competition are mainly informed by current product offerings and do not fully reflect convergences in product portfolios due to forthcoming products such as Dow's Arylex or DuPont's ethametsulfuron.
- (1050) Some market participants stressed that the Parties' AIs for oilseed rape were significant.
- (1051) Several respondents to the market investigation stated that Galera (cloprialid+picloram) was an indispensable product and some indicated that the same applied to Salsa (ethametsulfuron). For instance, a Czech customer stated that DuPont's Salsa and Dow's Galera are both must-have products.⁶⁷⁶
- (1052) In addition, recent market information suggests that both Dow and DuPont have both been important innovators developing key new products for post-emergence treatment of broadleaf weeds in oilseed rape.
- (1053) A 2014 article on crop protection in oilseed rape published on a French agricultural trade journal's website reports on two new products developed by Dow and DuPont that would give farmers innovative post-emergence options. Experts from CETIOM (Centre Technique Interprofessionnel des Oléagineux Métropolitains) are quoted as saying that the products would enable weeds to be tackled "*more specifically and reasonably*". The article points out that, at the time, there were "*no real solutions*" to address broadleaf weeds in post-emergence oilseed rape. Under the heading "*Weed control: all post-emergence soon ...*"⁶⁷⁷, the article describes how DuPont's broadleaf weed product based on ethametsulfuron and Dow's broadleaf weed product, a mixture of propyzamide and aminopyralid, will compete directly with solutions

⁶⁷⁵ Form CO, part.B.I. – Herbicides, page 379.

⁶⁷⁶ Questionnaire to Crop Protection Customers (Q1a), question 64 (ID2896).

⁶⁷⁷ Courtesy translation of the title "Désherbage, du « tout-en-post » pour demain...".

offered by BASF's Clearfield programme, with the advantage of not requiring any particular type of seed.⁶⁷⁸

- (1054) Even though ethametsulfuron has not yet been registered for use in France, this publication suggests that it would be an important new product which would target a similar area to Dow's new product and could cater for a largely untapped market in post-emergence oilseed rape herbicides. Ethametsulfuron's positive reviews in the trade press suggest that potential customers in important oilseed rape markets such as France are looking forward to its launch.
- (1055) Since the 2014 article referred to in recital (1053) the Dow mixture of propyzamide and aminopyralid has been launched on the French market. An article in a French farming journal dated June 2016 reports that the 2015-2016 oilseed rape growing season had been marked by booming sales in the post-emergence market, spearheaded by Ielo, the new Dow mixture. The new Dow product was described as a game changer, creating new spring application options and causing a shift from pre-emergence to post-emergence treatments.⁶⁷⁹ As this product is a new arrival on the market, its sales may be expected to grow considerably in coming years.
- (1056) In conclusion, the Commission finds that Dow is a significant player in oilseed rape herbicides, with DuPont a smaller but close competitor.

6.3.7.6. Competitive constraints imposed by competitors are limited

- (1057) The Commission finds that in the EEA countries where DuPont has sales, the combined entity reaches very high market shares, and few other players are active.
- (1058) First, current competition from other R&D-integrated players is very limited, as none of them exceed a [0-5]% market share in the EEA.
- (1059) BASF has a [0-5]% market share in post-emergence broadleaf herbicides for oilseed rape in the EEA. The company offers a number of products for oilseed rape, which are predominantly graminicides or cross-spectrum herbicides.
- (1060) Syngenta also has a [0-5]% market share in post-emergence broadleaf herbicides for oilseed rape in the EEA, offering a number of products, which are mainly graminicides or cross-spectrum herbicides.
- (1061) Second, very few of Dow's and DuPont's competitors appear to have new products in their pipelines which could create a competitive constraint in the foreseeable future. Overall, the Commission's investigation revealed very few forthcoming new products aimed at the oilseed rape market in competitors' pipelines.
- (1062) [Internal competitor assessment].⁶⁸⁰
- (1063) Third, competition from generics is also very limited. The only generics company with any market presence of any significance appears to be Adama, with a [5-10]% market share in post-emergence broadleaf herbicides in the EEA, mainly selling generic metazachlor and propaquizafop. Adama's main target markets in oilseed rape in the EEA are pre-emergence broadleaf and post-emergence cross-spectrum.

⁶⁷⁸ Article published in French farming journal Le Syndicat Agricole, 21 February 2014, file name "20170201-110313_syndicat-agricole.pdf".

⁶⁷⁹ "Herbicides colza: Montée de la postlevée" [Oilseed rape herbicides: the surge of postemergence], Agro Distribution, June 2016, file name "2016-06-13-1560AGRO_DISTRIBUTION.pdf".

⁶⁸⁰ [Internal document] (ID6696-2352), [...].

- (1064) The Parties claim that the merged entity would continue to face intense competitive pressure in the EEA from generic competitors on the basis that most of Dow's products for oilseed rape are off-patent, and that they face the threat of generic picloram and clopyralid entering the market.
- (1065) The Commission however notes that its investigation has shown that Arylex will be used to rejuvenate Dow's portfolio of existing oilseed rape herbicides. [Pipeline information]. The [...] presentation [pipeline information].⁶⁸¹
- (1066) The Commission's investigation has indicated [pipeline information]. In particular, the Commission considers that [pipeline information].
- (1067) In conclusion, the Commission considers that constraints imposed by competitors are limited.
- 6.3.7.7. Conclusion on the assessment of non-coordinated effects in the markets for oilseed rape herbicides
- (1068) In conclusion, the Commission is of the view that the considerations described in Sections V.6.3.7.1 to V.6.3.7.6 justify the finding that, in the absence of appropriate remedies, the Transaction would be likely to lead to a significant impediment of effective competition because of its non-coordinated effects on the market for oilseed rape herbicides.
- (1069) At the relevant geographic market level (national), and based on the assessment set out in Sections V.6.3.7.1 to V.6.3.7.6, and considering the general characteristics of the crop protection markets as described in Section V.6.2, the Commission is of the view is that the Transaction would be likely to lead to the strengthening of a dominant position in post-emergence broadleaf selective OSR herbicides due to the elimination of an actual and potential competitor in several EEA countries as specified in recitals (1067) to (1074).
- (1070) The Transaction would be likely to lead to the strengthening of Dow's dominant position due to the elimination of DuPont as an actual competitor in: Hungary ([90-100]%),⁶⁸² Ireland ([80-90]%),⁶⁸³ and Poland ([90-100]%).⁶⁸⁴ In those countries, the Transaction is a 2-to-1 merger (Poland), a 3-to-2 merger (Ireland) or a 4-to-3 merger (Hungary).
- (1071) The Commission also takes the view that for those EEA countries in which Dow is a dominant player and DuPont reports sales of ethametsulfuron in 2016 and/or, according to the market investigation, is likely to launch ethametsulfuron, the Transaction would be likely to lead to the strengthening of Dow's dominant position due to the elimination of DuPont as a potential competitor.
- (1072) According to DuPont's 2016 sales done on the basis of national provisional authorisations, the countries concerned include Sweden (Dow's market share [90-100]%), the Czech Republic ([90-100]%), Slovakia ([90-100]%) and

⁶⁸¹ [Internal document] slide 1 (ID6696-460), [...].

⁶⁸² DuPont reports sales of ethametsulfuron in 2016.

⁶⁸³ DuPont reports sales of ethametsulfuron in 2016.

⁶⁸⁴ DuPont reports sales of ethametsulfuron in 2016.

Romania ([90-100]%).⁶⁸⁵ In those countries, the Transaction is a 2-to-1 merger (Sweden⁶⁸⁶) or a 3-to-2 merger (the Czech Republic, Slovakia and Romania).

- (1073) Moreover, in the case of Hungary and Romania, the expiration dates of the national provisional authorisations are [expiry date] and [expiry date] respectively; therefore, in the absence of the Transaction, DuPont would have exerted competitive pressure on Dow for at least [...] more years. [Status national authorisation].⁶⁸⁷ Therefore, DuPont would have exerted competitive pressure on Dow for [status national authorisation]. In the case of Poland, Sweden (emergency authorisation), the Czech Republic and Slovakia, DuPont's national authorisation expired in 2016, hence becoming a source of potential competitive constraint for Dow pending the approval of ethametsulfuron at Union level (Annex I registration).
- (1074) In addition, DuPont also had national provisional authorisation submissions pending for ethametsulfuron [countries with pending submissions].
- (1075) Moreover, if ethametsulfuron obtains Annex I registration at Union level, DuPont could launch it in more EEA countries than the sales based on national authorisations indicate.
- (1076) [Internal strategic plans].^{688,689}
- (1077) As a result, the Transaction would be likely to lead to the strengthening of Dow's dominant position due to the elimination of DuPont as a potential competitor in all EEA countries except for Austria (where Dow is not likely to have a dominant position); and potentially, for Belgium, Estonia, Greece, Luxembourg, Malta, Portugal and Spain, for which there are no market share data available.
- (1078) In addition, the Commission notes that one or both of the Parties are active in a number of other EEA countries. The Parties have submitted that no affected markets arise in those countries due to no overlaps or limited overlaps; however, they have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of ethametsulfuron proposed by the Parties in the market for post-emergence broadleaf herbicides for oilseed rape in the countries discussed in recitals (1070) and (1077).
- (1079) In conclusion, and considering all evidence available to it and also in light of the general features of crop protection markets as described in Section V.6.2, the Commission considers that, in the absence of appropriate remedies, the Transaction would be likely to significantly impede effective competition in relation to **post-emergence broadleaf selective oilseed rape herbicides**, notably by strengthening a dominant position in the EEA countries mentioned in recital (1077) and in light of the elimination of actual and potential competition pending further authorisations (or renewals) of ethametsulfuron at national level or Union registration of this AI or both.

⁶⁸⁵ Although both Parties have sales in Estonia, no estimate is available.

⁶⁸⁶ After the Transaction, only 'Other' competitors would remain with a market share of [0-5]%.

⁶⁸⁷ Parties' response to the Commission's request for information RFI 61, question 1, Annex 1.01.

⁶⁸⁸ [Internal document], page 6.

⁶⁸⁹ [Internal document], slides 7 and 8.

6.3.8. Sunflower herbicides – assessment of non-coordinated effects

- (1080) Sunflower herbicide sales were worth more than USD [...] globally and more than USD [...] in the EEA in 2015. Broadleaf post-emergence selective sunflower herbicides accounted for USD [...] in the EEA.⁶⁹⁰
- (1081) The main countries in the EEA for sunflowers are France, Hungary, Romania and Bulgaria. Sunflower production is concentrated in Eastern Europe. With 23% of sunflower production in 2014, Romania was the largest producer, followed closely by Bulgaria, France and Hungary. Sunflower is also grown in Spain, which has an [10-20]% share of the total Union-28 production.⁶⁹¹
- (1082) Conventional sunflower herbicides currently have to be applied pre-plant or pre-emergence as they cannot be used to chemically destroy the weeds once the plant has emerged. With current conventional herbicides, farmers therefore treat "blindly" before crop emergence and without certainty about the presence or not of weeds.
- (1083) By contrast, weed control systems such as DuPont's Express Sun and BASF's Clearfield Sunflower systems combine post-emergence herbicides with tolerant seed varieties in the same technique. They allow the herbicide to be applied after the plant has emerged, about one month after sowing and only if the weeds appear. This new technology has proved to be successful as farmers can thus better control particularly competitive weeds based on a targeted risk assessment. The main key weeds for farmers growing sunflower in the EEA are *Abutilon theophrasti* (velvetleaf) and *Ambrosia artemisiifolia* (common ragweed).

6.3.8.1. The relevant products of the Parties and their competitors

(A) Dow

- (1084) [The Commission observes that Dow currently has limited presence in sunflower herbicides in the EEA. In 2015 the company divested two products to Gowan (benfluralin) and Nutrichem (oxyfluorfen / Goal). Dow has retained the authorisation to distribute Goal [information on external relationship]. In addition, Dow sells the cross-spectrum herbicide propyzamide and the graminicide haloxyfop.]
- (1085) [...].⁶⁹²

(B) DuPont

- (1086) [The Commission notes that DuPont's main AI used in its formulated sunflower herbicides is tribenuron, a sulfonyleurea belonging to the ALS MoA group. In sunflowers, this post-emergence broadleaf herbicide is mainly used in a straight formulation branded as Express-SX as part of DuPont's Express Sun tolerant seed system.]
- (1087) [DuPont Pioneer sells the seeds for its Express Sun system. In France for instance, tribenuron is only sold with DuPont seeds, whereas in Bulgaria and Romania other seed manufacturers offer tribenuron-resistant seeds.]⁶⁹³
- (1088) The Commission takes note that [...].⁶⁹⁴

⁶⁹⁰ The Parties' response to the Commission's request for information RFI 29, question 3.1.

⁶⁹¹ "Main annual crop statistics", Eurostat, July 2015, file name "20170201-112856_ec.europa.pdf".

⁶⁹² [Internal document] (ID8833-92), [...], slide 55.

⁶⁹³ Agreed non-confidential minutes of a call with an institute, 22 September 2016 (ID7939).

(1089) In addition, various internal documents indicate [...].⁶⁹⁵

(C) Competitors of the Parties

(1090) The Commission takes note that **BASF's** main herbicide for sunflowers is cross-spectrum post-emergence AI imazamox, described in recital (851), used as part of its Clearfield Sunflower tolerant seed system. Furthermore, BASF's portfolio includes cross-spectrum herbicides dimethenamid (straight and in mixture with pendimethalin); pendimethalin (straight and in mixture with dimethenamid); a mixture of metazachlor and quinmerac; a mixture of imazamox and pendimethalin; and the graminicide cycloxydim.⁶⁹⁶

(1091) **Syngenta's** portfolio includes cross-spectrum herbicides, in particular, s-metolachlor (straight and in a mixture with terbuthylazine or oxyfluorfen), as well as limited quantities of the graminicide fluazifop.⁶⁹⁷

(1092) **Adama's** portfolio includes broadleaf herbicide flurochloridone, a cross-spectrum mixture of flurochloridone and smetolachlor, pendimethalin, oxyfluorfen, a mixture of pendimethalin and oxyfluorfen, linuron and s-metolachlor, as well as the graminicides propaquizafop and quizalofop (each straight).⁶⁹⁸

(1093) **FMC** is developing a pre- and post-emergence broadleaf herbicide (F4050) that is targeted at cereals and sunflower crops and belongs to the existing HPPD MoA group.⁶⁹⁹ [Expected launch date].⁷⁰⁰

6.3.8.2. Parties' arguments

(1094) The Parties submit that Dow and DuPont are very small players in sunflower herbicides, arguing that their combined shares do not exceed [10-20]% in any sub-segment or countries in which their activities overlap, namely, Bulgaria, France, Hungary and Romania.

(1095) Moreover, Dow's presence will be reduced to a *de minimis* position taking into account the divestiture in 2015 of Dow's main AIs for cross-spectrum herbicides used on sunflower crops, namely benfluralin and oxyfluorfen.

(1096) In addition, the Parties submit that after the Transaction they would continue to face intense competition from BASF, Bayer, Syngenta and Adama on the basis of their sales shares in all the overlapping sub-segments and countries. The Parties also contend that BASF and Adama would continue to constrain the merged entity with their cross-spectrum sunflower herbicides, and that their products are closer competitors to DuPont's tribenuron [...].

(1097) [...].

(1098) [...].

(1099) [...].⁷⁰¹

⁶⁹⁴ [Internal document] (ID6827–5041), [...], slide 16.

⁶⁹⁵ [Internal document], slide 32.

⁶⁹⁶ Form CO, part.B.I. – Herbicides, page 50.

⁶⁹⁷ Form CO, part.B.I. – Herbicides, page 50.

⁶⁹⁸ Form CO, part.B.I. – Herbicides, page 50.

⁶⁹⁹ Form CO, Annex B.I.6.4 "Overview Of Chemical Classes And Companies Active In The EEA", page 3.

⁷⁰⁰ Phillips McDougall – Agriservice, Research Section – 2015, page 15 (ID7079-1858).

⁷⁰¹ Parties' response to the SO.

(1100) [...].

6.3.8.3. DuPont has very high shares in some EEA markets

(1101) The Commission takes note that DuPont has around [90-100]% of the market for selective broadleaf post-emergence sunflower herbicides in the EEA and also has a very high share in several countries.

Table 12 – Market shares for post-emergence broadleaf selective sunflower herbicides in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Adama	UPL	Others
EEA	[...]	[0-5]%	[90-100]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%
Austria	*[...]	*[0-5]%	*[90-100]%	*[90-100]%	*[5-10]%	*[0-5]%	*[0-5]%
Belgium	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Bulgaria	[...]	[0-5]%	[90-100]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%
Croatia	*[...]	*[0-5]%	*[80-90]%	*[80-90]%	*[10-20]%	*[0-5]%	*[0-5]%
Cyprus	*N/A	*[0-5]%	*[80-90]%	*[80-90]%	*N/A	*N/A	*N/A
Czech Republic ⁷⁰²	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Denmark	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Estonia	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Finland	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
France	[...]	[0-5]%	[90-100]%	[90-100]%	[10-20]%	[0-5]%	[0-5]%
Germany	*[...]	*[0-5]%	*[90-100]%	*[90-100]%	*[5-10]%	*[0-5]%	*[0-5]%
Greece	°[...]	°[0-5]%	°[90-100]%	°[90-100]%	°[0-5]%	°[0-5]%	°[0-5]%
Hungary	°[...]	°[0-5]%	°[90-100]%	°[90-100]%	°[5-10]%	°[0-5]%	°[0-5]%
Ireland	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Italy ⁷⁰³	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Latvia	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Lithuania	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Luxembourg	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Malta	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
The Netherlands	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Norway	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
Poland	*[...]	*[0-5]%	*[90-100]%	*[90-100]%	*[5-10]%	*[0-5]%	*[0-5]%
Portugal	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A

⁷⁰² The Parties submit that [...].

⁷⁰³ The Parties submit that [...].

	Market size (USD million)	Dow	DuPont	Combined	Adama	UPL	Others
Romania	°[...]	°[0-5]%	°[90-100]%	°[90-100]%	°[0-5]%	°[0-5]%	°[0-5]%
Slovakia ⁷⁰⁴	°[...]	°[0-5]%	°[90-100]%	°[90-100]%	°[0-5]%	°[0-5]%	°[0-5]%
Slovenia	*[...]	*[0-5]%	*[90-100]%	*[90-100]%	*[0-5]%	*[0-5]%	*[10-20]%
Spain ⁷⁰⁵	°[...]	°N/A	°N/A	°N/A	°N/A	°N/A	°N/A
Sweden	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A
The UK	*[...]	*N/A	*N/A	*N/A	*N/A	*N/A	*N/A

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)
Note: ° indicates Parties' data; * indicates proxy calculation by Parties; N/A indicates that no data are available

6.3.8.4. The Parties' position in markets for sunflower herbicides is likely to be strengthened significantly through [...]

(1102) **DuPont** is currently the main player in broadleaf post-emergence sunflower herbicides in the EEA.⁷⁰⁶

(1103) [...].^{707,708}

(1104) [...], the Parties argue [...].

(1105) [...].

(1106) A [...] presentation [...].⁷⁰⁹

(1107) A [...] email [...].⁷¹⁰

(1108) Multiple internal documents [...].

(1109) An internal [...] document [...].^{711,712}

(1110) A [...] document [...].⁷¹³

(1111) Another document [...].⁷¹⁴

(1112) Moreover, the Commission's investigation has shown that [...].⁷¹⁵

⁷⁰⁴ The Parties submit that Dow had no sales of sunflower herbicides.

⁷⁰⁵ The Parties submit that they had no sales of sunflower herbicides.

⁷⁰⁶ See for instance agreed non-confidential minutes of a call with an institute, 22 September 2016 (ID7939); Questionnaire to Crop Protection Customers (Q1d), question 65 (ID4318).

⁷⁰⁷ [Internal document], [...] slide 16.

⁷⁰⁸ [Internal document] (ID6827-29535), slide 29.

⁷⁰⁹ [Internal document], (ID9031), [...].

⁷¹⁰ [Internal document] (ID6827-3489).

⁷¹¹ [Internal document] (ID6827-117).

⁷¹² [Internal document] (ID9213-1283).

⁷¹³ [Internal document] (ID9213-442).

⁷¹⁴ [Internal document], slide 32.

⁷¹⁵ [Internal document] (ID6827-5066), page 1.

(1113) In addition, there are indications that DuPont could be leveraging its position in sunflower seeds to the benefit of its sunflower herbicides. During the market investigation, a Romanian customer noted that "*a supplier can develop his seed plant protection products specific to his seeds, which can negatively affect a farmer from point of view of price negotiation: for example sunflower treatment from Pioneer with tribenuron methyl originated from DuPont.*"⁷¹⁶

(1114) [...].⁷¹⁷

(1115) [...].⁷¹⁸

(1116) [...].^{719,720}

(1117) [...].⁷²¹

(1118) [...].⁷²²

(1119) [...].

Table 13 – [Extract from internal document]

[...]

Source: [Internal document] (ID6696-161), [...]

(1120) [...].⁷²³

(1121) [...].

(1122) [...].

(1123) [...].

6.3.8.5. Competitive constraints imposed by competitors are limited

(1124) DuPont has very high shares throughout the EEA, with [90-100]% of sales in post-emergence broadleaf herbicides for sunflower. It has limited sales of pre-emergence and pre-plant and cross-spectrum broadleaf herbicides.

(1125) First, current competition from R&D-integrated players is very limited, as they have hardly any sales or market shares above [0-5]% in post-emergence broadleaf herbicides for sunflower in the EEA. Bayer, BASF and Syngenta focus more on cross-spectrum and graminicides, with BASF dominating the post-emergence cross-spectrum market ([90-100]%). Monsanto is hardly present with sunflower herbicides in the EEA.

(1126) Second, very few of Dow's and DuPont's competitors appear to have new products in their pipelines which could create a competitive constraint in the foreseeable future. FMC is developing F4050, a pre- and post-emergence broadleaf herbicide that is targeted at sunflower crops and is not expected to be launched before [launch date].

⁷¹⁶ Questionnaire to Crop Protection Customers (Q1g), question 96 (ID2315).

⁷¹⁷ [Internal document], slide 55 (ID8833-92), [...].

⁷¹⁸ [Internal document] (ID8833-92), [...].

⁷¹⁹ The abbreviation WG stands for Water-dispersible Granules.

⁷²⁰ [Internal document] (ID8833-92), [...].

⁷²¹ [Internal document] (ID8833-92), [...].

⁷²² [Internal document] (ID6696-000161), [...].

⁷²³ Parties' Response to the Statement of Objections, page 310.

- (1127) Third, competition from generics companies is also limited. Adama is DuPont's only competitor on post-emergence broadleaf herbicides for sunflower in the EEA, with a [0-5]% market share. Adama focuses more on broadleaf pre-emergence and pre-plant, where it is dominant, and on cross-spectrum herbicides for sunflower. This was confirmed by a Hungarian customer, who noted that Adama is also strong in sunflower herbicides.⁷²⁴
- (1128) In conclusion, the Commission considers that constraints imposed by competitors are limited.
- 6.3.8.6. Conclusion on the assessment of non-coordinated effects in the markets for sunflower herbicides
- (1129) The Commission considers that the considerations described in Sections V.6.3.8.1 to V.6.3.8.5 justify the finding that, in the absence of appropriate remedies, the Transaction would be likely to lead to a significant impediment of effective competition because of its non-coordinated effects on the market for sunflower herbicides.
- (1130) [At the relevant geographic level (national), and based on the assessment set out in Sections V. 6.3.8.1 and V.6.3.8.5, and in light of the general characteristics of the crop protection markets as described in Section V.6.2, the Commission is of the view that the Transaction would be likely to lead to the strengthening of a dominant position in post-emergence broadleaf selective sunflower herbicides in all EEA countries where DuPont is a significant player].
- (1131) DuPont has a dominant position in post-emergence broadleaf selective sunflower herbicides in all EEA countries for which there is available data, namely Austria, Bulgaria, Croatia, Cyprus, France, Germany, Greece, Hungary, Poland, Romania, Slovakia, and Slovenia (see Section V.6.3.8.3). It cannot be ruled out that it has a similar position in the countries for which no data is available.
- (1132) [...].
- (1133) [...]. After the Transaction, Adama would be the only remaining competitor with shares of [5-10]% or above, and such presence is limited to six (excluding Romania)⁷²⁵ out of the 12 EEA countries in which DuPont has a dominant position based on the available data. These countries are Austria, Croatia, France, Germany, Hungary, and Poland.
- (1134) In addition, the Commission notes that one or both of the Parties are active in a number of other EEA countries. The Parties have submitted that no affected markets arise in those countries due to no overlaps or limited overlaps; however, they have not been able to provide exact market information and therefore the Commission will not make any conclusive findings on those countries. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of tribenuron proposed by the Parties in the market for post-emergence broadleaf selective cereal herbicides in the 21 EEA countries referred to in recitals (810) to (812).

⁷²⁴ Questionnaire to Crop Protection Customers (Q1d), question 62 (ID4318).

⁷²⁵ Adama's market share in Romania is below [5-10]%, namely [0-5]%.

(1135) In conclusion, and considering all evidence available to the Commission and also in light of the general features of crop protection markets as described in Section V.6.2, the Commission considers that, in the absence of appropriate remedies, the Transaction would be likely to significantly impede effective competition in relation to **post-emergence broadleaf selective sunflower herbicides**, notably by strengthening a dominant position in Austria, Bulgaria, Croatia, Cyprus, France, Germany, Greece, Hungary, Poland, Romania, Slovakia, and Slovenia [...].

6.3.9. *Beets herbicides – assessment of non-coordinated effects*

(1136) Sales of beets herbicides in 2015 amounted to USD [...] globally and USD [...] in the EEA.⁷²⁶ Beets account for approximately [...] % of total herbicides sales in the EEA, making it the fifth largest market for selective herbicides.

(1137) Sugarbeets represent approximately [...] % of all beets herbicides sales in the EEA, chards approximately [...] % and all other beet types (chicory beets, fodder beets, red beets, etc.) less than [...] %.⁷²⁷

(1138) The EEA accounts for [...] of total global sugarbeet herbicide sales, followed by Russia, Ukraine and the US. However, the market has been shrinking since the Union stopped subsidising sugarbeet cultivation about 10 years ago. [...].⁷²⁸

(1139) In beet crops early application of herbicides is important to prevent weeds from growing taller than the beets, which are a low-growing crop. Four to eight weeks after emergence the plants are usually well enough established not to be outcompeted by weeds.

6.3.9.1. The relevant products of the Parties

(A) Dow

(1140) Dow is a small player in the EEA, generating almost no sales in the Member States which have the largest beets herbicide markets in the EEA, namely Germany and France. Its portfolio includes one broadleaf, one grass and one cross-spectrum AI.

(1141) Dow's beets herbicides are all straight products, containing a single AI. Its main AI used in formulated beets herbicides is clopyralid, a broadleaf AI. Other Dow beets herbicides contain cross-spectrum AI propyzamide and graminicide haloxyfop-P.

(B) DuPont

(1142) DuPont has two broadleaf AIs in its beets herbicides portfolio, namely triflusaluron and lenacil. Its formulated beets herbicides are either straight products or mixtures of those two AIs.

6.3.9.2. The Parties' market shares

(1143) The Commission notes that the Transaction would give rise to affected markets in post-emergence broadleaf herbicides for beets in several countries, with the highest increment coming from DuPont, except in Greece.

⁷²⁶ Estimates of the Parties (Parties' response to the Commission's request for information RFI 29, question 3.1).

⁷²⁷ Form CO, part B.I - Herbicides, section 5, page 1.

⁷²⁸ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 207.

Table 14 – Market shares for post-emergence broadleaf selective beets herbicides in the EEA (affected national markets)

	Market size (USD million)	Dow	DuPont	Combined	BASF	Bayer	UPL	FMC	Others
EEA	[...]	[0-5]	[20-30]	[20-30]	[5-10]	[10-20]	[10-20]	[0-5]	[40-50]
Austria	[...]	[10-20]	[10-20]	[20-30]	[5-10]	[0-5]	[20-30]	[0-5]	[40-50]
Czech Republic	[...]	[0-5]	[40-50]	[40-50]	[5-10]	[10-20]	[5-10]	[0-5]	[20-30]
France	[...]	[0-5]	[20-30]	[20-30]	[10-20]	[0-5]	[5-10]	[0-5]	[50-60]
Germany	[...]	[0-5]	[20-30]	[20-30]	[5-10]	[0-5]	[30-40]	[0-5]	[40-50]
Greece	[...]	[50-60]	[10-20]	[70-80]	[0-5]	[0-5]	[5-10]	[0-5]	[10-20]
Netherlands	[...]	[10-20]	[10-20]	[20-30]	[5-10]	[10-20]	[0-5]	[0-5]	[50-60]
Slovakia	[...]	[5-10]	[30-40]	[30-40]	[5-10]	[10-20]	[10-20]	[0-5]	[20-30]
UK	[...]	[5-10]	[30-40]	[30-40]	[0-5]	[5-10]	[10-20]	[0-5]	[30-40]

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)

6.3.9.3. Conclusion on the assessment of non-coordinated effects in the markets for beets herbicides

(1144) The Commission notes that the Parties' combined market shares amount to [20-30]% in Austria, [20-30]% in France, [20-30]% in Germany and [20-30]% in the Netherlands. The merged entity would continue to be challenged by a number of competitors with non-negligible shares of the market in those countries, namely Adama ([40-50]%), UPL ([20-30]%) and BASF ([5-10]%) in Austria, Phyteurop ([30-40]%), Adama ([20-30]%) and BASF ([10-20]%) in France, Adama ([30-40]%), UPL ([30-40]%) and BASF ([5-10]%) in Germany, and Adama ([40-50]%), Bayer ([10-20]%) and BASF ([5-10]%) in the Netherlands.

(1145) [...].

(1146) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not be likely to significantly impede effective competition with respect to post-emergence broadleaf weed herbicides for beet crops in Austria, France, Germany and the Netherlands.

(1147) The Commission also notes that the Parties' combined market share rises to [40-50]% in the Czech Republic. However, the market share increment brought by the Transaction would be limited ([0-5]%). The merged entity would continue to be challenged by a number of competitors with non-negligible shares of the market, including Bayer ([10-20]%), Adama ([20-30]%) and BASF ([5-10]%). [...].

(1148) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not be likely to significantly impede effective competition with respect to post-emergence broadleaf weed herbicides for beet crops in the Czech Republic.

(1149) The Transaction would also result in overlaps in Slovakia ([30-40]%), the United Kingdom ([30-40]%) and Greece ([70-80]%). However, the merged entity would continue to be challenged by a number of competitors in those countries, including

Adama ([20-30]%), Bayer ([10-20]%) and UPL ([10-20]%) in Slovakia, Adama ([20-30]%), UPL ([10-20]%) and Bayer ([5-10]%) in the United Kingdom and Adama ([10-20]%) and UPL ([5-10]%) in Greece.

(1150) Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets (Slovakia, the United Kingdom and Greece), given that the overlaps would in any case be eliminated by the global divestment of both of DuPont's post-emergence broadleaf beets herbicides, lenacil and triflusaluron, proposed by the Parties.

(1151) In addition, the Commission notes that one or both of the Parties are active in a number of other EEA countries. The Parties have submitted that no affected markets arise in those countries due to no overlaps or limited overlaps; however, they have not been able to provide exact market information and therefore the Commission does not make any conclusive findings with regard to those markets. Moreover, there is no need for the Commission to conclude whether the Transaction would significantly impede effective competition with regard to those markets, given that the overlaps would in any case be eliminated by the global divestment of both of DuPont's post-emergence broadleaf beets herbicides, lenacil and triflusaluron.

6.3.10. *Corn herbicides – assessment of non-coordinated effects*

(1152) Sales of corn herbicides amounted to USD [...] globally and USD [...] in the EEA in 2015.⁷²⁹ Corn accounts for approximately [...]% of total EEA herbicides sales, making it the [...] largest market for selective herbicides. [...].⁷³⁰

(1153) Corn crops need sufficient weed control in the early growing stages as they develop slowly and thus face strong competition from surrounding weeds. As a result, corn herbicides are usually applied at the pre-emergence or early post-emergence stage.⁷³¹

6.3.10.1. The relevant products of the Parties

(A) Dow

(1154) Dow has a small corn herbicide portfolio, selling only post-emergence broadleaf corn herbicides. Dow's corn herbicide products are either straight products or mixtures of its AIs florasulam, fluroxypyr and 2,4-D, which it sells in almost all EEA countries. Its share of the corn herbicide market has fallen over recent years since the company lost the Union registration of its cross-spectrum AI acetochlor in 2011.

(B) DuPont

(1155) DuPont sells the graminicides nicosulfuron and rimsulfuron, and the broadleaf herbicides mesotrione and dicamba as straight corn herbicides or mixtures containing those AIs in almost all EEA countries. In addition, DuPont sells small quantities of thifensulfuron, accounting for only [...]% of its total corn herbicide sales in the EEA in 2015.⁷³²

⁷²⁹ Parties' response to the Commission's request for information RFI 29, question 3.1.

⁷³⁰ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 84.

⁷³¹ Form CO, part B.I - Herbicides, section 4, page 1.

⁷³² Form CO, part B.I - Herbicides, section 4, page 4.

6.3.10.2. The Parties' market shares

(1156) The Commission notes that the Transaction would give rise to an affected markets in post-emergence broadleaf herbicides for corn in Austria, with the highest increment coming from DuPont.

Table 15 – Market shares for post-emergence broadleaf selective corn herbicides in the EEA (affected national markets)

	Market size (USD million)	Dow	DuPont	Combined	BASF	Bayer	Syngenta	FMC	Others
EEA	[...]	[5-10]	[0-5]	[5-10]	[5-10]	[30-40]	[30-40]	[0-5]	[40-50]
Austria	[...]	[5-10]	[30-40]	[30-40]	[10-20]	[10-20]	[30-40]	[0-5]	[30-40]

Source: Commission compilation based on Agrowin (2015) and Parties' submission based on Agrowin (2015)

6.3.10.3. Conclusion on the assessment of non-coordinated effects in the markets for corn herbicides

(1157) The Parties are generally weak in the sales of corn herbicides in the EEA. Based on the information available to the Commission, the only market where the Transaction is liable to give rise to an affected market is in Austria.

(1158) In this respect, the Commission notes that the Parties' combined market share rises to [30-40]% in the market for post-emergence broadleaf corn herbicides in Austria. However, the market share increment brought by the Transaction would be limited ([5-10]%). The combined Parties would continue to be challenged by a number of competitors, including Bayer ([10-20]%), BASF ([10-20]%) and Syngenta ([30-40]%). [...].

(1159) Therefore, on balance and in light of the evidence available to it, the Commission concludes that the Transaction would not be likely to significantly impede effective competition with respect to the market for post-emergence broadleaf corn herbicides in Austria.

6.4. Insecticides

6.4.1. Introduction

6.4.1.1. Main markets and crops worldwide and in the EEA

(1160) Globally, insecticide sales amount to about USD [...] worldwide, of which about USD [...] sales are in the EEA.⁷³³ The Member State with the highest insecticide sales in the EEA is Italy (USD [...]), followed by Spain (USD [...]), France (USD [...]), Germany (USD [...]) and Greece (USD [...]). Together, these five countries account for around [70-80]% of sales of insecticides in the EEA.⁷³⁴

(1161) Speciality crops fruits and nuts and vegetables (each with a market size of approximately USD [...]), oilseed rape (USD [...]), cereals (USD [...]) and corn (USD [...]) are the main crops for insecticides in the EEA.

⁷³³ Agrowin.

⁷³⁴ Agrowin.

6.4.1.2. Key insects and insect groups

(1162) There are a multitude of different insects that affect crops in the EEA. These pests can be divided into different insect groups. The main insect groups relevant to the Transaction and the pests within these groups, are set out in Table 16. Each insect group can also be broadly classified as a ‘chewing’ or ‘sucking’ insect group.⁷³⁵

Table 16 – Insect groups

Insect group	Insects
Lepidoptera (chewing)	Tortricids (includes moths such as codling moth, lobesia botrana)
	Plutella
	Lepidoptera leafminers (includes tomato leafminer – tuta absoluta)
	Noctuids
	Stemborers
	Fruit borers
	Cutworms
Coleoptera (chewing)	Chrysomelids
	Grubs
	Weevils
	Wireworms
Diptera (chewing)	Diptera leafminers
	Maggots
	Gall midges
	Fruit flies (includes drosophila suzukii)
Thysanoptera (rasping and sucking)	Thrips (includes Frankliniella occidentalis and Thrips tabaci)
Hemiptera (sucking)	Aphids
	White flies
	Psyllids
	Plant hoppers
	Cicadellidae (leafhoppers)
	Stink bugs
	Coccidae (includes scale insects, mealy bugs)

6.4.1.3. Main chemical classes in insecticides

(1163) Organophosphates first came to the market in 1947 after the introduction of parathion by Bayer. Organophosphate insecticides are used in a broad range of crops, with fruit and vegetables, rice, soybean, cotton, cereals and maize being the most significant. The leading organophosphate product is chlorpyrifos, launched by Dow

⁷³⁵ Form CO, part B.II - Insecticides, pages 7-8.

in 1965 [...], followed by acephate, dimethoate, profenophos, dichlorvos, quinalphos, malathion, triazophos and phoxim.⁷³⁶

- (1164) Pyrethroids were introduced in 1976. The most significant sectors for pyrethroids today are fruit and vegetables, soybeans, maize, cereals, cotton, rice and oilseed rape. The leading pyrethroid is lambda-cyhalothrin, sales of which are [...] by Syngenta, although Adama is also a [...] supplier. Syngenta did not support lambda-cyhalothrin's re-registration in the Union. Other key pyrethroids include, deltamethrin (introduced by Aventis, now Bayer); cypermethrin (now of commodity status); and bifenthrin (by FMC).⁷³⁷
- (1165) Carbamates were first introduced in 1956 and generally provide a broad spectrum of pest control. The most commercially significant carbamate is methomyl. Methomyl was introduced by DuPont in 1966 [...]. The key concern for carbamates today is regulatory acceptance in the EEA.⁷³⁸
- (1166) Oxadiazines have been developed by DuPont and include only the AI indoxacarb, a broad-spectrum lepidopteran insecticide launched in 1999. It controls lepidopteran pests including cydia, helicoverpa, heliothis, lobesia, plutella and spodoptera, with the main crop uses being fruit and vegetables, cotton and vines.⁷³⁹
- (1167) The avermectin chemical class is composed of emmamectin benzoate and abamectin, both marketed by Syngenta. Emmamectin benzoate was introduced in 1998 and targets lepidoptera on vegetables and cotton. Abamectin was introduced in 1985. It is a broad-spectrum AI which is used against pear psylla, mites and certain chewing pests (including lepidoptera).⁷⁴⁰
- (1168) Spinosyns have been developed by Dow and are one of the four most recent chemical classes discovered in insecticides. The chemical class is composed of spinosad and spinetoram, both introduced by Dow. Spinosad was introduced in 1995 and is used to control a wide range of lepidopteran pests, including fruit and vegetables, cotton, tobacco, vine, rice and maize sectors. Spinetoram was introduced in 2007. It is an analogue of spinosad but covers a broader spectrum of pests, with a better control of armyworm and longer control of codling moth.⁷⁴¹
- (1169) Diamides are a chemical class composed of DuPont's chlorantraniliprole (the brand name of the AI is Rynaxypyr), cyantraniliprole (the brand name of the AI is Cyazypyr) and Bayer's flubendiamide. Rynaxypyr was introduced in 2008 and it is used mainly on soybeans followed by fruit and vegetables, with significant sales also achieved on cotton and rice. Flubendiamide, jointly developed by Nihon Nohyaku and Bayer, was first introduced in 2007 and has the same MoA as Rynaxypyr. Today, it is mainly used on soybeans in Brazil.⁷⁴² It is banned from use in the EEA and the US.
- (1170) Neonicotinoids were first introduced in 1991 by Bayer's imidacloprid, [...] products of this chemical class. [...] Syngenta's thiamethoxam, which is used in over

⁷³⁶ Phillips McDougall Leading Crop Protection Companies Report, pages 132-134.

⁷³⁷ Phillips McDougall Leading Crop Protection Companies Report, pages 139-142.

⁷³⁸ Phillips McDougall Leading Crop Protection Companies Report, pages 147-150.

⁷³⁹ Phillips McDougall Leading Crop Protection Companies Report, page 214.

⁷⁴⁰ Phillips McDougall Leading Crop Protection Companies Report, pages 170-171.

⁷⁴¹ Phillips McDougall Leading Crop Protection Companies Report, pages 170-171.

⁷⁴² Phillips McDougall Leading Crop Protection Companies Report, page 214.

115 crops. Other neonicotinoid products include clothianidin, acetamiprid and thiacloprid. Today, neonicotinoids are under severe regulatory pressure in the EEA⁷⁴³ and many neonicotinoids are expected to disappear from the EEA market in the near future.

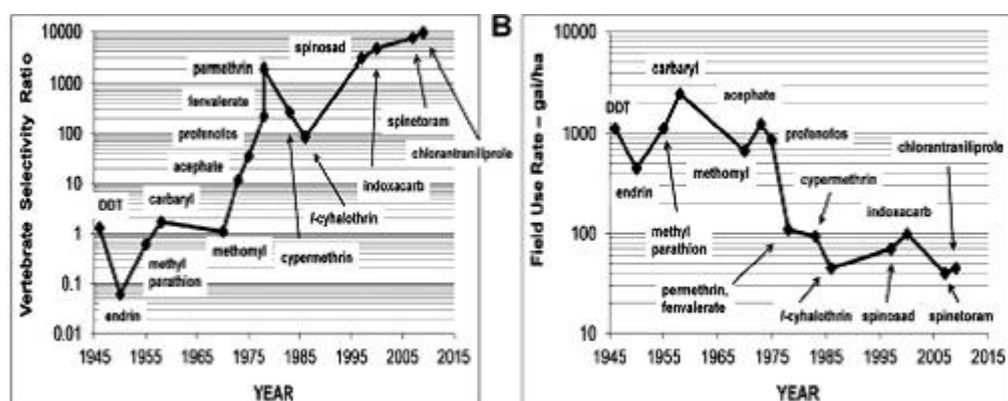
(1171) Sulfoximines are the most recent discoveries in insecticides, introduced by Dow's sulfoxaflor (the brand name of the AI is Isoclast), which was discovered in 2005 and was introduced at a global level in 2012. Isoclast is the most recent important innovation in insecticides.⁷⁴⁴

6.4.1.4. Older generation insecticides under regulatory pressure while newer insecticides gain market share

(1172) Due to increasing regulatory pressure on older insecticides which also target beneficial insects (for instance bees) and the importance of managing resistance to insecticides, there has been a growing demand for the newer generation of insecticides to be more targeted in their approach.⁷⁴⁵ The newer generation of insecticides includes products that are much more selective than those of the previous generation, as illustrated in Figure 43.

(1173) At the same time, the newer insecticides, being more effective, have lower usage rates. This makes the newer generation of insecticides more environmentally-friendly. This is also illustrated in Figure 43.

Figure 43 – Evolution of selectivity of insecticides and usage rates



Source: Sparks (2013), "Insecticide discovery: an evaluation and analysis", *Pesticide Biochemistry and Physiology* 107 (2013) 8-17, page 14

(1174) It is in this context that new insecticides and also those with new or under-utilised MOAs become particularly important. T.C. Sparks, Discovery Research fellow at Dow, notes that due to increasing development costs, environmental regulation and the presence of fewer companies active in insecticide discovery, "the value of any new insecticide is magnified."⁷⁴⁶

⁷⁴³ Phillips McDougall Leading Crop Protection Companies Report, pages 154–158.

⁷⁴⁴ Sparks (2013), "Insecticide discovery: an evaluation and analysis", *Pesticide Biochemistry and Physiology*.

⁷⁴⁵ Sparks (2013), "Insecticide discovery: an evaluation and analysis", *Pesticide Biochemistry and Physiology* 107 (2013) 8-17, pages 11, 13-14.

⁷⁴⁶ Sparks (2013), "Insecticide discovery: an evaluation and analysis", *Pesticide Biochemistry and Physiology* 107 (2013) 8-17, page 15.

(1175) Further, in addition to describing Spinetoram and Spinosad as "lepidopteran" insecticides he highlights that these AIs have gained significant global market share as the share of older AIs declines: "*spinosad, indoxacarb, Spinetoram and chlorantraniliprole all exhibit greatly improved VSRs compared to prior lepidopteran insecticides [...] It is these new chemistries, along with the neonicotinoids (e.g. tetric acid and tetramic acid derivatives) that are increasingly capturing sizable portions of the global insecticide market compared to the organophosphates, carbamates and pyrethroids.*" Older broader spectrum products are being withdrawn from the market.⁷⁴⁷

(1176) [Quote from internal document].⁷⁴⁸

Figure 44 – [Extract from internal document]

[...]

Source: [Internal document] (ID4384-8)

6.4.2. Product portfolios of the Parties

6.4.2.1. Dow

(A) Products currently sold or soon to be marketed in the EEA

(1177) Dow's insecticides portfolio in the EEA currently consists of four products: chlorpyrifos; spinosad; spinetoram; and methoxyfenozide. Chlorpyrifos and spinosad currently account for [90-100]% of Dow's EEA insecticides revenues. Methoxyfenozide accounts for [5-10]% and spinetoram accounts for [0-5]% of revenues currently, [...]. All four AIs target lepidoptera, while spinosad and spinetoram also target thrips. Chlorpyrifos is a broad spectrum AI that targets a number of additional pests (including scales). Isoclast is a sucking insecticide that will soon be marketed in the EEA. Dow's EEA product portfolio is set out in Table 17.

Table 17 - Dow's insecticides portfolio in the EEA⁷⁴⁹

	Chlorpyrifos	Methoxy-fenozide	Spinosad	Spinetoram	Sulfoxaflor
Brand names	Dursban, Reldan	Intrepid, Gladiator, Prodigy	Laser	Delegate, Radiant	Closer
Chemical Class	Organo-phosphate	Diacylhydrax-ines	Spinosyn ⁷⁵⁰	Spinosyn	Sulfoximine
MOA - IRAC Class	1B	18A	5	5	4C

⁷⁴⁷ Competitor's response to the Commission's request for information, "*Answers to RFI - Dow DuPont Merger Control Process_Comments to confidential questionnaire 07102016,*" (ID9663).

⁷⁴⁸ [Internal document] (ID4384-8).

⁷⁴⁹ Table includes all AIs that have received Annex I registration, even if not currently sold in the EEA.

⁷⁵⁰ Spinosad is a "Macrocyclic lactone", a very broad chemical class that encompasses, among others, IRAC MOA Groups 5 (Nicotinic acetylcholine receptor (nAChR) allosteric modulators) and 6 (Chloride channel activators). Within that broad class, the Spinosyns (Spinosad and spinetoram) are nAChR allosteric modulators, comprising Group 5 of the IRAC MOA classification.

	Chlorpyrifos	Methoxy-fenozide	Spinosad	Spinetoram	Sulfoxaflor
Main Crop Uses in Union	Brassicas, tree fruit, fruiting vegetables, corn, citrus	Brassicas, fruiting vegetables, tree fruit	Tree fruit, brassicas, leafy & fruiting vegetables, citrus, strawberries and other berries, table grapes, ornamentals, organic production	[...]	[...]
Pest Spectrum	Aphids, leps, scales, mealy bugs, flies (root flies)	Leps	Leps, thrips, flies (fruit, carrot & root flies)	Thrips, leps, leaf miners, psyllids	Aphids, Trialeurodes sp. (greenhouse white fly), scales, mealy bugs, psyllids, plant hoppers

Source: Form CO

(A.i) *Chlorpyrifos*

(1178) Chlorpyrifos is currently Dow's [...] insecticide product by EEA revenues, with sales of EUR [...]. It was launched in the EEA in 1974 and is off-patent today. It is part of the organophosphates chemical class and there are two different chlorpyrifos molecules: chlorpyrifos-ethyl ("CHP-E") and chlorpyrifos-methyl ("CHP-M"). The Annex I registration will expire in January 2018 [quote from internal evaluation; quote from internal strategy document].⁷⁵¹

(1179) Dow's main chlorpyrifos brands in the EEA are Dursban (CHP-E) and Reldan (CHP-M). Despite the fact that a number of generics also sell chlorpyrifos products, Dow is still targeting sales of [...] of chlorpyrifos-methyl in the Union by [...].⁷⁵²

(A.ii) *Spinosad*

(1180) Spinosad is Dow's [...] insecticide product by EEA revenues, with sales of EUR [...]. It was launched in the EEA in 2002 and lost its patent protection in the EEA at the end of 2016. It is a spinosyn, which is part of the Macrocyclic lactone chemical class. Its Annex I registration will expire in April 2018 [...].⁷⁵³

(1181) Dow is targeting sales of [...] of Spinosad in the Union by [...].⁷⁵⁴ [Quote from internal document].^{755,756} For example, [quote from internal document].⁷⁵⁷

(1182) [Internal assessment].

Figure 45 – [Extract from internal document]

[...]

Source: [Internal document]

⁷⁵¹ [Internal document] (ID3987-132).

⁷⁵² [Internal document] (ID06696-10429), slide 12.

⁷⁵³ [Internal document] (ID1154-7).

⁷⁵⁴ [Internal document] (ID06696-10429), slide 12.

⁷⁵⁵ [Internal document] (ID1154-7).

⁷⁵⁶ Form CO, part B.II, paragraphs 32-35.

⁷⁵⁷ [Internal document] (ID06696-29023).

(A.iii) *Methoxyfenozide*

- (1183) Methoxyfenozide was launched about 15 years ago and today accounts for [... 5-10]% of Dow's EEA insecticide revenues (sales of USD [...] – and projected sales in the EEA of USD [...] by [...]). Its Annex I registration expires in July 2017. [Internal strategy information and internal assessment].⁷⁵⁸ Brand names include Intrepid, Gladiator and Prodigy. [...] Bayer, who sells it under the brand name Runner.

(A.iv) *Spinetoram*

- (1184) Dow is in the process of launching spinetoram in the EEA. This is in the same chemical class as spinosad but has a broader spectrum of activity. Spinetoram is very effective on a wide range of pests such as: lepidopteran pests including peach twig borer, armyworm, cotton bollworm, codling moth, leafrollers, corn borers; grape vine moth; grape berry moth; coleopteran pests including Colorado potato beetle; dipteran pests including drosophila suzukii and also thrips.⁷⁵⁹ [Internal document].

Figure 46 – [Extract from internal document]

[...]

Source: [Internal document] (ID6696-23364)

- (1185) Dow already sells small quantities of spinetoram in the EEA due to an emergency registration for use on pear psylla, drosophila suzukii and thrips on certain crops.⁷⁶⁰ Registrations and product launch in the EEA will take place from Q4 2016 in France [...], in Greece and the United Kingdom from Q1 2017 [...].⁷⁶¹ Dow is targeting sales of [...] of Spinetoram in the EU by [...].⁷⁶²
- (1186) Spinetoram brands include: Radiant ([...] ⁷⁶³); Delegate ([...]); Exalt ([...]) ([...]). Projected worldwide revenue figures until [...] are set out below, with peak global sales expected [...].

Figure 47 – [Extract from internal document]

[...]

Source: [Internal document]

(A.v) *Sulfloxaflor (Isoclast)*

- (1187) Sulfloxaflor (brand name for the AI is Isoclast) belongs to the sulfoximines chemical class and has a new MOA. It mainly targets various hemipteran pests including aphids, scales and whiteflies.⁷⁶⁴ The Isoclast brands include: Transform (which [...]); and Closer ([...]).

⁷⁵⁸ [Internal document], (ID1076).

⁷⁵⁹ Parties' response to the Commission's request for information RFI 44, question 10.

⁷⁶⁰ Dow's response to the Commission's request for information RFI 59, question 11.

⁷⁶¹ Parties' response to the Commission's request for information RFI 55.

⁷⁶² [Internal document] (ID06696-10429), slide 12.

⁷⁶³ [Internal document] (ID06696-27933).

⁷⁶⁴ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

(1188) Dow obtained Annex I registration in 2015 and registration will expire in August 2025. [...].⁷⁶⁵ Isoclast will remain patent protected until August 2025. Dow is projecting USD [...] sales in the EEA by [...].⁷⁶⁶ [...].

Figure 48 – [Extract from internal document]

[...]

Source: [Internal document]

(B) [Pipeline information]

(1189) Dow also has a number of insecticides in its pipeline, [pipeline information].⁷⁶⁷

Table 18 – [Pipeline information]

[...]

Source: [...]

(C) Dow strategy

(1190) By [...], Dow is aiming to achieve insecticide sales of [...] and achieve a market share of [10-20]% in the Union.⁷⁶⁸

(1191) [Internal strategic information].⁷⁶⁹

6.4.2.2. DuPont

(A) Products currently sold or soon to be marketed in the EEA

(1192) DuPont's insecticides portfolio in the EEA currently mainly consists of two products: Rynaxypyr and indoxacarb. These two products currently account for [90-100]% of DuPont's EEA insecticides revenues.⁷⁷⁰ Both of these products target lepidoptera. Cyazypyr will soon be marketed in the EEA. DuPont's insecticides portfolio in the EEA is described in Table 19.

Table 19 – DuPont's insecticides portfolio in the EEA

	Indoxacarb	Methomyl ⁷⁷¹	Chlorantraniliprole (Rynaxypyr)	Cyantraniliprole (Cyazypyr)
Brand names	Steward, Avaunt, Explicit	Lannate	Coragen, Altacor	Exirel
Chemical Class	Oxadiazine	Carbamate	Anthranilic diamide	Anthranilic diamide
MOA - IRAC Class	22A	1A	28	28

⁷⁶⁵ Parties' response to the Commission's request for information RFI 55.

⁷⁶⁶ [Internal document] (ID06696-10429).

⁷⁶⁷ Dow's response to the Commission's request for information RFI 54, question 2 and accompanying documents.

⁷⁶⁸ [Internal document] (ID06696-10429), slide 12.

⁷⁶⁹ [Internal document] (ID7081-2983).

⁷⁷⁰ Form CO, part B.II, paragraph 42.

⁷⁷¹ Methomyl accounts for [0-5]% of DuPont's insecticides sales in the EEA ([...]). The AI registration in Europe expires in 2019 [internal strategic information].

	Indoxacarb	Methomyl ⁷⁷¹	Chlorantraniliprole (Rynaxypyr)	Cyantraniliprole (Cyazypyr)
Main Crop Uses in Union	Cotton, leafy & fruiting vegetables, brassicas, tree fruit, grapes, oilseed rape, tree nut, corn	Fruiting vegetables	Tree fruit, brassicas, leafy & fruiting vegetables, potato, rice (seed treatment), tree nuts, corn, cotton, citrus	Fruiting vegetables, potatoes, onions, tree fruits (pome and stone fruit), citrus, olives
Pest Spectrum	Lepidoptera, leaf hoppers, weevils, pollen beetles	Lepidoptera, aphids	Lepidoptera, Colorado potato beetle, water weevil, leaf miners, flies (carrot)	Hemiptera, Coleoptera, Diptera, Lepidoptera

Source: Form CO

(1193) [Description of internal document].

Table 20 – [...]

[...]

Source: [Internal document] (ID6827-42039)

(A.i) *Rynaxypyr*

(1194) The two Rynaxypyr products currently sold by DuPont in the EEA are: Altacor, which is used on vegetables; and Coragen, which is used on fruit. Rynaxypyr was launched in the EEA in 2009 and its current AI registration expires in April 2024.⁷⁷² Rynaxypyr is patent-protected in the EEA until 2022. It had sales of EUR [...].⁷⁷³ Rynaxypyr is DuPont's blockbuster AI: [...].⁷⁷⁴ DuPont is targeting USD [...] sales of Rynaxypyr in EMEA by [...].⁷⁷⁵ [Internal assessment].

Figure 49 – [Extract from internal document]

[...]

Source: [Internal document] (ID4384-8)

(A.ii) *Indoxacarb*

(1195) The indoxacarb products sold in the EEA are: Steward; Avaunt; and Explicit. These are used on fruit, vegetables, corn and oil seed rape. Indoxacarb was launched in the EEA in 2001 and its current AI registration expires in July 2017.⁷⁷⁶ [...].⁷⁷⁷ Indoxacarb has been off-patent since 2011. It had sales of EUR [...] in [...].⁷⁷⁸ DuPont is targeting USD [...] sales of indoxacarb in EMEA by [...].⁷⁷⁹

⁷⁷² Parties' response to the Commission's request for information RFI 44, question10.

⁷⁷³ Form CO, part B.II, paragraph 42.

⁷⁷⁴ Phillips McDougall Product Section Report, pages 12 and 124.

⁷⁷⁵ [Internal document] (ID4384-14).

⁷⁷⁶ Parties' response to the Commission's request for information RFI 44, question 10.

⁷⁷⁷ [Internal document] (ID6827-20443).

⁷⁷⁸ Form CO, part B.II, paragraph 43.

⁷⁷⁹ [Internal document] (ID4384-14).

(A.iii) *Cyazypyr*

(1196) [Internal document].⁷⁸⁰ DuPont already sells small quantities of Cyazypyr in the EEA due to an emergency registration for *drosophila suzukii* and diamond-back moth (a lepidopteran pest) in various crops.⁷⁸¹ Full launch in the EEA will take place from Q4 2016 and Q1 2017 in Ireland and the United Kingdom for [internal strategic information].⁷⁸² DuPont is targeting USD [...] sales of Cyazypyr in EMEA by [...],⁷⁸³ reaching USD [...] sales per year at maturity.⁷⁸⁴ [Internal document].

Figure 50 – [Extract from internal document]

[...]

Source: [Internal document] (ID4384-8)

(B) [Pipeline information]

(1197) DuPont also has a number of insecticides in its pipeline, [pipeline information].

Table 21 – [Pipeline information]

[...]⁷⁸⁵

Source: [...]

(C) DuPont strategy

(1198) DuPont's target is to be [internal strategy document] and aimed to achieve EEA sales of [...] by [...].⁷⁸⁶ As part of its EMEA insecticide strategy, DuPont planned to target the following crops: [...]; and focus on [...] countries.⁷⁸⁷

6.4.3. *Product portfolio of competitors in the EEA*

6.4.3.1. Syngenta

(1199) Syngenta is currently the largest insecticide supplier in Europe, with an estimated [20-30]% share of sales in the EEA. While Syngenta holds a number of insecticide AIs in its portfolio, only two molecules were introduced within the last five years (emamectin benzoate and also Rynaxypyr, which is sold only in mixtures). The remaining insecticide AIs are older molecules which are facing either growing resistance and/or regulatory pressure.

(1200) These include: lamda-cyhalothrin, which accounts for approximately [30-40]% of all of Syngenta's insecticides in the EEA. This AI belongs to the pyrethroid class and is a broad-spectrum insecticide targeting both sucking and chewing pests for both row crops and some fruit and vegetables.⁷⁸⁸ Annex I re-registration has been granted until March 2023 but it is also a candidate for substitution⁷⁸⁹ and is under regulatory

⁷⁸⁰ [Internal document].

⁷⁸¹ DuPont's response to the Commission's request for information RFI 59, question 11.

⁷⁸² Parties' response to the Commission's request for information RFI 55.

⁷⁸³ [Internal document] (ID4384-14).

⁷⁸⁴ [Internal document] (ID6827-17697), slide 13.

⁷⁸⁵ [Pipeline information].

⁷⁸⁶ [Internal document] (ID6827-42039), slide 2.

⁷⁸⁷ [Internal document] (ID6827-42039), slide 2.

⁷⁸⁸ Form CO, part B.II, Annex B.II.20.

⁷⁸⁹ EU pesticides database.

pressure.⁷⁹⁰ The brand name for the lambda-cyhalothrin straight product is Karate. It is also sold in mixtures with Rynaxypyr under the brand name Ampligo. Syngenta has the rights to sell Rynaxypyr and Cyazypyr in mixtures, due to a co-operation agreement with DuPont.⁷⁹¹

- (1201) Emmamectin benzoate and abamectin are two molecules which are part of the Avermectin class. Emmamectin benzoate is an insecticide which targets lepidoptera on fruit and vegetables and accounts for approximately [10-20]% of Syngenta's EEA insecticide sales. Emmamectin benzoate's Annex I registration expires in April 2024. Brand names include: Affirm; Proclaim; Pursue and Revive. Abamectin is a broad-spectrum AI which is used against pear psylla, mites and certain chewing pests (including lepidoptera) and accounted for approximately [5-10]% of Syngenta sales in 2015. The Annex I registration for Abamectin expires in April 2019.⁷⁹² Brand names include: Agro; Vertimec; Avid.
- (1202) Thiamethoxam accounts for [10-20]% of Syngenta's EEA insecticide sales. It is in the neonicotinoid class of insecticides and targets various sucking pests. Brand names include: Actara and Reason. It is also sold in mixtures with Rynaxypyr under the brands: Luzindo and Voliam. While it is a relatively new product, it comes from the neonicotinoid class which is under regulatory pressure.
- (1203) Tefluthrin accounts for [10-20]% of Syngenta's sales in the EEA and is also a broad-spectrum pyrethroid and targets soil pests only.
- (1204) Further analysis of Syngenta's insecticide portfolio in the EEA is set out at Section V.6.4.5.5.

6.4.3.2. Bayer

- (1205) Bayer is currently the second largest insecticide supplier in Europe with an estimated [10-20]% share of insecticides sales in the EEA. Bayer has an insecticide portfolio that mainly targets sucking pests. Four AIs account for around [80-90]% of Bayer's insecticide sales in the EEA. This includes two neonicotinoids (Thiacloprid and Imidacloprid); a pyrethroid (Deltamethrin) and Spiretetroamat, which is from the keto-enol chemical class. Flubendiamide was another molecule in Bayer's EEA insecticide portfolio, but it is not sold in products in the EEA due to regulatory issues.⁷⁹³
- (1206) Deltamethrin is a broad-spectrum pyrethroid that primarily targets lepidoptera and aphids, used on open-field vegetables.⁷⁹⁴ It accounted for approximately [10-20]% of Bayer's insecticide sales in the EEA and an additional [10-20]% of insecticide sales was derived from the sale of a Deltamethrin/Thiacloprid mixture (brand names include: Ecail and Proteus). Brand names for the straight deltamethrin product include: Decis and Pearl. Annex I registration expires in October 2017. Bayer started the re-approval process in 2014 but the evaluation of the dossier has been delayed.⁷⁹⁵

⁷⁹⁰ [Internal document] (ID6696-17045).

⁷⁹¹ Form CO, part B.II, pages 111–112.

⁷⁹² EU pesticides database.

⁷⁹³ <https://www.epa.gov/ingredients-used-pesticide-products/flubendiamide-notice-intent-cancel-and-other-supporting>.

⁷⁹⁴ Form CO, part B.II, Annex B.II.20.

⁷⁹⁵ Bayer's submission to Commission, email of 17 October 2016 at 12.33 (ID7719).

- (1207) Thiacloprid has full control on coleoptera and partial control on lepidoptera. It is a candidate for substitution and Annex I registration expires in April 2018.⁷⁹⁶ Thiacloprid had been submitted for re-approval in 2014, but due to evaluation delays, the expiry/renewal date was extended by one year to 2018. After re-classification by European Chemicals Agency as R1B (18 March, 2015), Bayer intends to target re-approval for uses under negligible exposure and/or derogation.⁷⁹⁷ Brand names of the straight formulated product include: Alanto and Calypso.
- (1208) Imidacloprid targets mainly aphids, but also other pests such as whitefly, thrips and hoppers in particular crops.⁷⁹⁸ In 2012, its use was restricted in the EEA due to the risk of neonicotinoids to bees. In France, all neonicotinoid products will be banned from 2018 onwards.⁷⁹⁹ The Annex I registration expires in July 2019. Brands include: Confidor; Gaucho; Plural and Stunt.
- (1209) Spiretetroxat was launched in the EEA in 2014 and Annex I registration expires in April 2024. It targets pests such as aphids, white flies, scales and psyllids in certain crops. The brand name of the formulated product is Movento. Further analysis of Bayer's insecticide portfolio in the EEA is set out at Section V.6.4.5.5.

6.4.3.3. BASF

- (1210) BASF has a very limited presence in insecticides and has an estimated [5-10]% share of insecticide sales in the EEA. The majority of these sales are derived from sales of alpha-cypermethrin (a pyrethroid) and pheromones.
- (1211) Further analysis of BASF's insecticide portfolio in the EEA is set out at Section V.6.4.5.5.

6.4.4. *Definition of relevant markets*

6.4.4.1. Past decisional practice

- (1212) In the Commission's decision on the transaction Bayer/Aventis,⁸⁰⁰ the Commission found that the relevant product market for insecticides can be divided by crop and further subdivided into foliar and soil insecticides. Special attention was given to the distinction between chewing and sucking insecticides in the competitive assessment and also to two new (at the time) chemical classes (neonicotinoids and pyrazoles). The reason for this was that these were two chemical classes in which the merging parties were particularly strong and were also the only two chemical classes to achieve significant growth at the time of the merger.

6.4.4.2. The Parties' views

- (1213) The Parties appear to agree that there is a segmentation between foliar and soil insecticides. However, they submit that it is artificial to segment by crop, arguing

⁷⁹⁶ Competitor's response to the Commission's request for information on crop protection products. File name, "Revised excel files in response to request for information - M.7932 - RFI - Annex 1_KIM-2016-09-27_Herbicide_final_non confidential_EEAdat" (ID8153).

⁷⁹⁷ Bayer's submission to Commission, email of 17 October 2016 at 12.33 (ID7719).

⁷⁹⁸ Competitor's response to the Commission's request for information on crop protection products. File name, "Revised excel files in response to request for information - M.7932 - RFI - Annex 1_KIM-2016-09-27_Herbicide_final_non confidential_EEAdat" (ID8153).

⁷⁹⁹ Bayer's submission to Commission, email of 17 October 2016 at 12.33 (ID7719).

⁸⁰⁰ Commission decision in Case M.2547 – Bayer/Aventis Crop Science (2002), recital 61.

that differences by crop use are less pronounced than they are for herbicides and that, furthermore, insecticides are effective, and registered for, a wide range of crops.⁸⁰¹

- (1214) The Parties also argue that the distinction between chewing and sucking insecticides does not correspond directly to different insecticide product markets, because many insecticides are broad-spectrum (that is to say active on both chewing and sucking pests) and that pests such as thrips do not fall within either category (but can be classified as "rasping" pests). For these reasons, the Parties argue that the competitive assessment should not focus on such segmentations but rather focus on the extent to which any two insecticides are substitutable.⁸⁰²
- (1215) In response to the Article 6(1)(c) Decision, the Parties argued that the Commission did not consistently follow its own market definition in the competitive analysis set out in the Article 6(1)(c) Decision. In particular, the Parties argued that the Commission should not have excluded broad spectrum insecticides from its market definition of chewing and sucking insecticides, but at the same time, refer to the Parties' broad spectrum insecticides in the competitive assessment. They argued that there is no meaningful distinction between "broad spectrum" and either chewing, or sucking, insecticides. Therefore, they argued, the Commission should have taken into account broad spectrum insecticides, in its market definition.⁸⁰³

6.4.4.3. The Commission's assessment of the relevant markets

(1216) The general principles to define the relevant product market for crop protection products are described in Section V.4.2. The Commission submits that the same principles should be applied in defining the relevant markets for insecticides, except where stated otherwise below.

(A) Product market

- (1217) The Commission finds that insecticides may be primarily segmented by crop, secondarily segmented according to whether they have foliar or soil application and then further segmented according to the types of pests targeted (for instance codling moth, grape berry moth, drosophila suzukii and so on).
- (1218) First, farmers choose their insecticide products on the basis of their ability to control the targeted pest, on a particular crop. For example, if a farmer needs to fight an infestation of grapholita molesta (a lepidopteran chewing pest), he needs a product that targets that particular pest. The farmer would not be able to substitute that product with another one which targets only, for example, coleoptera, a different category of chewing pests.
- (1219) Second, [internal document].⁸⁰⁴ Similarly, [internal document].⁸⁰⁵
- (1220) Third, a majority of respondents in the market investigation indicated that it was relevant to segment insecticides by crop and, then, by method of application, that is to say whether the insecticide was sprayed on the leaves (foliar) or the soil.⁸⁰⁶

⁸⁰¹ Form CO, part B.II, pages 25-26.

⁸⁰² Form CO, part B.II, page 26.

⁸⁰³ Parties' response to the Article 6(1)(c) Decision, page 34.

⁸⁰⁴ Parties' response to Article 11(3) decision dated [...] [internal document].

⁸⁰⁵ [Internal document] (ID6827-17697).

(1221) A majority of respondents also considered that it was relevant to distinguish according to the types of pest, that is whether it was a chewing or a sucking pest, or more narrowly according to the particular species of pest.⁸⁰⁷ One customer noted, "*[i]t is relevant to distinguish between the different insect species. The more specific the insecticide, the better.*"⁸⁰⁸ The reasons given included:

- (1) the registration/labelling of the product: "*[y]ou only can use an insecticide where it is registered. So registration/pests/targets are important*";⁸⁰⁹
- (2) the need to ensure effectiveness of the product: "*[e]very product has a Optimum against a certain insect, so the main pest is relevant for the purchase of the insecticide;*"⁸¹⁰ "*it is very relevant that the insecticide to be distinguished by species; first of all we buy one that is need in our crop for example thrips) we have seen in the past that a general insecticide not doing such a good job in respect to a dedicated pest;*"⁸¹¹ and "*[i]t is important to distinguish between Lepidoptera, aphids, whiteflies and thrips because they all have different feeding behavior, developmental processes (e.g. molt) and metabolic pathways. Hence, to better optimize the biological potency of an active ingredient the innovation process has to focus on the factors which are common within an insect order, such as Lepidoptera, aphids (Homoptera), whiteflies (Hemiptera), thrips (Thysanoptera).*"⁸¹²
- (3) the selectivity of crop protection products, often a product will only target one pest such as aphids: "*[m]ost plant protection products are very selective. A product) which works against aphids often does not work against other pests. There are now pests for which no effective plant protection product with sufficient effect is authorised. (e.g. Cherry flies, whiteflies, woolly aphid, wireworm in potatoes, thrips in many cultures (crops);*"⁸¹³
- (4) insecticides are targeted according to type of pest in order to protect beneficials: "*[c]hoosing the most effective product to control the specific pest using the most selective material to minimise the effect on non target organisms while having the greatest effect in controlling the target pest*";⁸¹⁴ and

⁸⁰⁶ Questionnaire to Crop Protection Customers (Q1), questions 41 and 42; Questionnaire to Crop Protection Competitors (Q2), questions 97 and 98; Questionnaire to Crop Protection Stakeholders (Q3), question 23.

⁸⁰⁷ Questionnaire to Crop Protection Customers (Q1), question 43; Questionnaire to Crop Protection Competitors (Q2), question 99; Questionnaire to Crop Protection Stakeholders (Q3), question 24.

⁸⁰⁸ Questionnaire to Crop Protection Customers (Q1h), question 43.1 (ID4564). Courtesy translation from Spanish: "*Es relevante distinguir entre las diferentes especies de insectos. Cuanto más específico sea el insecticida, mejor.*"

⁸⁰⁹ Questionnaire to Crop Protection Customers (Q1a), question 43.1 (ID2818).

⁸¹⁰ Questionnaire to Crop Protection Customers (Q1i), question 43.1 (ID2309).

⁸¹¹ Questionnaire to Crop Protection Customers (Q1g), question 43.1 (ID9480).

⁸¹² Questionnaire to Crop Protection Competitors (Q2a), question 99.1 (ID4230).

⁸¹³ Questionnaire to Crop Protection Customers (Q1a), question 43.1 (ID9349). Courtesy translation from German: "*Die meisten Pflanzenschutzmittel sind sehr selektiv. Ein Mittel was gegen Blattläuse funktioniert, funktioniert oft nicht gegen andere Schädlinge. Es gibt inzwischen Schädlinge für die kein Pflanzenschutzmittel mit ausreichender Wirkung mehr zugelassen ist. z.B. Kirschessigfliege, Weiße Fliege, Blutlaus, Drahtwurm in Kartoffeln, Thrips in vielen Kulturen.*"

⁸¹⁴ Questionnaire to Crop Protection Customers (Q1j), question 43.1 (ID9392).

(5) insecticides are targeted according to type of pest in order to manage resistance and for regulatory reasons: *"it's important to distinguish between lepidoptera, aphids and thrips to take to bigger benefit from each product used and to avoid the development of resistances"* and *"it is important to distinguish between species so that you can rightfully target and not create resistance towards other species,"*⁸¹⁵ and *"[w]ith increasing regulatory demands on selectivity against non target insects it is preferable to develop insecticides that only targets a limited number of insect families or classes. Therefore it makes a lot of sense to not only distinguish between sucking and chewing insects but further divide insects into at least their taxonomical order and some down to family."*⁸¹⁶

(1222) Respondents to the market investigation indicated that consideration of the MoA and chemical class of an insecticide was one relevant factor when purchasing or developing an insecticide.⁸¹⁷ However, the Commission notes that a farmer looking to target a particular pest would still be able to choose freely among products targeting those pests with different MoA and chemical classes. Therefore, MoAs and chemical classes will not be assessed as different segments.

(B) Geographic market

(1223) As described in the general market definition principles (Section V.4.2), the relevant geographic market should be considered to be national.

6.4.4.4. Conclusion about the relevant markets

(1224) In conclusion, the Commission considers that the relevant product markets to retain for the competitive analysis include: insecticides segmented per crop, soil or foliar application and per pest (for instance codling moth, grape berry moth, drosophila suzukii and so on). Due to the multitude of markets that result as a consequence of this approach, in its competitive analysis the Commission will examine groupings of crops (for example, solanaceous vegetables rather than tomato, pepper, aubergine) and to groupings of types of pest (for instance lepidoptera, diptera and so on).

6.4.5. *Assessment of non-coordinated effects in insecticides markets across EEA*

(1225) The Parties manage their insecticide portfolios both at the European and country levels. Their AIs are used on common pests across multiple crops in various Member States. On that basis, and to avoid repetition in the competitive assessment at national level, the common arguments that are relevant to multiple insecticide markets across the EEA are set out in Sections V.6.4.5.2 to V.6.4.5.5, followed by a competitive assessment, per crop and pest group in each national market at Section V.6.4.6.

6.4.5.1. Parties' arguments

(1226) The Parties submit that the Transaction would not raise any concerns in chewing insecticides and advance a number of arguments to support this claim. Notably: the EEA insecticide industry is not concentrated and the Parties' overall EEA share is [... 10-20]%; the Parties' portfolio is almost entirely off-patent; the Parties are not

⁸¹⁵ Questionnaire to Crop Protection Customers (Q1g), question 43.1 (ID9358).

⁸¹⁶ Questionnaire to Crop Protection Competitors (Q2a), question 99.1 (ID4230).

⁸¹⁷ Questionnaire to Crop Protection Customers (Q1), questions 44 and 45; Questionnaire to Crop Protection Competitors (Q2), questions 100 and 101; Questionnaire to Crop Protection Stakeholders (Q3), question 20.

close competitors because *inter alia*, their products target different pests and have different MoAs and can be considered rotation partners rather than substitutes; and there are no concerns regarding the Parties' pipeline.

- (1227) Further, the Parties claim that spinosad and spinetoram are broad spectrum insecticides that are positioned as high-value thrip/lepidoptera and thrip treatments. Spinosad is currently sold at a price premium to Rynaxypyr [internal strategic information]. Further, DuPont does not have any products that are effective on thrips.
- (1228) The Parties acknowledge that the main pest overlap for spinosad, spinetoram, Cyazypyr and Rynaxypyr is lepidoptera, in particular for fruit and vegetable crops. However, they argue that the spinosyns are primarily used to control thrips and that there are numerous other products that target lepidoptera and compete more closely than the spinosyns with Rynaxypyr.
- (1229) As regards the interaction between Rynaxypyr and Spinosad, the Parties submit that the only other "by pest" overlap is coleoptera on potatoes. While both products also target a number of other identical pest categories, they are not effective on the same crop.
- (1230) As regards sucking insecticides, the Parties claim that their current market share in the EEA is (... [0-5]%) and [...]. On the basis of the Parties' data, in those countries where the Commission preliminarily identified a significant impediment to effective competition in the Statement of Objections (Italy, Spain and the Czech Republic), [...].
- (1231) The Parties further submit that while they will each introduce new AIs targeting sucking pests, Isoclast and Cyazypyr, these two AIs will not compete closely on the basis that they have different pest spectrums and different target pests. While there is a small overlap in pest spectrum in aphids and whiteflies, Isoclast primarily targets aphids (and has limited control on whiteflies), and Cyazypyr primarily targets whiteflies (and has limited control on aphids). [...].⁸¹⁸ Further, the Parties argue that post-Transaction, they will face strong competition from numerous competing current and forthcoming products.

6.4.5.2. The Transaction would lead to an increase in the Parties' combined market strength in markets across the EEA

- (1232) The Commission considers that market shares provide useful first indications of the market structure and of the competitive importance of the Parties and their competitors. However, it is important to note that the market shares only indicate a snapshot of the market shares at EEA level in 2015 when the data was collected.
- (1233) Furthermore, the Commission finds that in insecticides, there are a number of elements that are likely to significantly underestimate the Parties' share of sales and their competitive strength, and/or overestimate the shares of sales and the competitive strength of the Parties' main competitors, at EEA level and also in the different markets at national level, as discussed in Section V.6.4.6. In particular, the fact that both Dow and DuPont will start to introduce new insecticides throughout the EEA in the coming months is a significant factor to consider, since the sales of such new insecticides are not included in the current market shares that are based on historic data.

⁸¹⁸ Parties' response to the Statement of Objections, paragraph 1107.

- (A) The combined market shares and market position of the Parties are likely to be underestimated because of the forthcoming introduction of important new AIs
- (A.i) *Spinetoram and Isoclast are in the process of being launched by Dow in the EEA*
- (1234) The Commission takes note that, currently, Dow [...] Spinetoram in the EEA due to an emergency registration for use on pear psylla, drosophila suzukii and thrips on certain crops,⁸¹⁹ but sales are expected to grow significantly. The first registrations [...].⁸²⁰ Due to their effectiveness on the following insect groups, the Commission considers that the launch of Spinetoram and Isoclast is likely to significantly increase Dow's market share in the following pest groups: lepidoptera, thrips, diptera, hemiptera and coleoptera.⁸²¹ One market participant also predicted that that Spinetoram will have a significant impact on the market: "*Spinetoram from Dow...quickly gained considerable market share in North America following its market introduction. Spinetoram has received... Annex 1 inclusion and is in the process of receiving the product approvals at the individual Member State level....and the market success can be expected in the same way as in North America.*"⁸²²
- (1235) As previously mentioned, [internal document].⁸²³ Spinosad will continue to be sold in the EEA [internal document].⁸²⁴
- (1236) Accordingly, and also in the context of paragraph 38 of the Horizontal Merger Guidelines, according to which "*a firm with a relatively small market share may nevertheless be an important competitive force if it has promising pipeline products*", the Commission considers that in the markets where Spinetoram and Isoclast will be present, Dow's current market shares significantly underestimate its competitive strength in those markets in the coming years since Dow is likely to take a significant market share from rivals.
- (1237) As explained in Section V.6.1 the Commission considers that the competition exerted by these products should also be seen in light of paragraph 58 et seq. of the Horizontal Merger Guidelines, with the result that the Commission includes in its analysis the potential competition exerted by these products on the products currently available in the market.
- (A.ii) *Cyazypyr is in the process of being launched by DuPont in the EEA*
- (1238) DuPont's Cyazypyr has already received emergency registration for use on drosophila suzukii and diamond-back moth (lepidopteran pest) in various crops.⁸²⁵ Registrations in Ireland and the United Kingdom for use on [...] and further registrations were expected from Q4 2016 and Q1 2017 in Ireland and the United Kingdom for [...].⁸²⁶ Due to its effectiveness, the Commission considers that the

⁸¹⁹ Dow's response to the Commission's request for information RFI 59, question 11.

⁸²⁰ Parties' response to the Commission's request for information RFI 55.

⁸²¹ Parties' response to the Commission's request for information RFI 44, question 10 shows high level of control on numerous insects in the lepidoptera, thrips, hemiptera, diptera and coleoptera pest groups.

⁸²² Agreed non-confidential minutes of a call with a competitor, 12 April 2016 (ID8247).

⁸²³ [Internal document] (ID6696-632).

⁸²⁴ [Internal document] (ID6696-632).

⁸²⁵ DuPont's response to the Commission's request for information RFI 59, question 11.

⁸²⁶ Parties' response to the Commission's request for information RFI 55.

launch of Cyazypyr is likely to increase DuPont's market share in the following pest groups: lepidoptera, thrips, diptera, hemiptera and coleoptera.⁸²⁷

- (1239) Similarly to Dow's products, and with reference to what is laid down in paragraph 38 of the Horizontal Merger Guidelines, the Commission considers that in the markets where Cyazypyr will compete, DuPont's current market shares significantly underestimate its competitive strength for the next years since [...].
- (1240) Moreover, and since DuPont is not active in some of the markets discussed in Section V.6.4.6, the Commission should take into account the competitive pressure exerted by Cyazypyr in the light of paragraph 58 et seq. of the Horizontal Merger Guidelines. In particular, the Commission considers it relevant in this Decision to refer to the conclusions drawn in the said paragraph 58 according to which "*[c]oncentrations where an undertaking already active on a relevant market merges with a potential competitor in this market can have similar anti-competitive effects to mergers between two undertakings already active on the same relevant market and, thus, significantly impede effective competition, in particular through the creation or the strengthening of a dominant position*".
- (1241) Moreover, the Commission considers it relevant, in this Decision, to also refer to paragraph 60 of the Horizontal Merger Guidelines noting that for a merger with a potential competitor to have significant anti-competitive effects, two conditions must be fulfilled: "*[f]irst, the potential competitor must already exert a significant constraining influence or there must be a significant likelihood that it would grow into an effective competitive force. Evidence that a potential competitor has plans to enter a market in a significant way could help the Commission to reach such a conclusion. Second, there must not be a sufficient number of other potential competitors, which could maintain sufficient competitive pressure after the merger.*"
- (1242) Such considerations are applied, where relevant, in the assessment of non-coordinated effects at the specific crop level in national markets at Section V.6.4.6.
- (B) The market shares of Bayer, Syngenta and BASF are likely to be overestimated because some of their products face regulatory pressure and are expected to exit the market in the near future
- (1243) The Commission observes that a number of AIs are expected to be withdrawn from the market due to regulatory reasons, such as AIs from the neonicotinoid and pyrethroid classes. This is likely to have a negative impact on the market share of R&D companies such as Bayer and Syngenta that have a number of older chemistry insecticides in their portfolio. As these older products leave the market, newer chemistry AIs, such as those in the Parties' insecticide portfolios, are likely to gain market share as a result.
- (1244) [Internal document]. The Commission considers it likely that [...] as the Syngenta and Bayer insecticide portfolios come under regulatory pressure and as Dow and DuPont introduce their new insecticides to the market. [...].⁸²⁸

⁸²⁷ Parties' response to the Commission's request for information RFI 44, question 10 shows high level of control on numerous insects in the lepidoptera, thrips, hemiptera, diptera and coleoptera pest groups.

⁸²⁸ [Internal document] (ID6827-30123).

Figure 51 – [Extract from internal document]

[...]

Source: [Internal document] (ID4384-8)

- (1245) The Commission takes note that, [internal document].⁸²⁹
- (1246) One competitor noted: "*[t]he active ingredients which are used in both the chewing and piercing/sucking segments are mainly older, non-selective compounds belonging to the IRAC Groups IA (Carbamates), IB (Organophosphates) and 3A (Pyrethroids). All of these chemistries are losing market share due to evolving regulatory restrictions including label restrictions, reductions in applications and rates, reduced application windows and resistance development and are being replaced by new, more potent and environmentally favorable and sustainable compounds such as DuPont's Rynaxypyr and Dow's Spinosyns.*"⁸³⁰ Another competitor also noted that: "*OP, Neonics & Pyrethroids are either banned or restricted in a number of countries, making diamides even more important.*"⁸³¹
- (1247) In conclusion, the Commission considers that the current market shares of Bayer, BASF and Syngenta are likely to overstate the competitive constraint they would exert on the merged entity, in particular given that some of their products are likely to exit the EEA markets in the near future.
- (C) The category of "other" competitors is fragmented and does not constrain the Parties
- (1248) As noted in Annex 3, the Commission considers that while Agrowin explicitly lists and identifies a large number of competitors, certain companies active in the agrochemical industry are aggregated as 'others'. This includes sales belonging to distributors. The Parties also acknowledge that other than the R&D-integrated players, the remaining market share is fragmented among a large number of competitors.⁸³² The Commission observes that those competitors are typically small and their market strengths limited.
- (D) The Parties' combined share of sales at product level across the EEA is significant
- (1249) The Commission considers that, despite the limitations of the market share data as described at Section V.5.1, the shares of sales (and the market shares provided in the competitive assessment of national markets) of the Parties are nonetheless significant and provide useful first indications of the Parties' competitive importance and of the market power held in numerous markets.
- (1250) While the competitive assessment, with market shares for crop/pest combination at individual country level, is set out at Section V.6.4.6, the Commission notes that even on an EEA-wide basis, it is apparent that the Parties' share of sales is significant across a number of crops and pest groups. These include lepidoptera, thrips, coleoptera and diptera, and in many of these, the merged entity will become the

⁸²⁹ [Internal document] (ID4384-8).

⁸³⁰ Competitor's response to the Commission's request for information, "*Answers to RFI - Dow DuPont Merger Control Process_Comments to confidential questionnaire 07102016,*" (ID9663).

⁸³¹ Questionnaire to Crop Protection Competitors (Q2a), question 99.1 (ID4750).

⁸³² Form CO, part B.II, page 30.

leading player. This is particularly the case for insecticides for speciality crops (fruits and vegetables), which are the largest markets in the EEA for insecticides, accounting for approximately [...] of all insecticides sales (USD [...]).⁸³³

(1251) A selection of the Parties' share of sales across the EEA is set out in Table 22.

Table 22 – Selection of share of sales at EEA level – products

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others	Selected combined shares in important markets
ALL FRUIT									
Lepidoptera/foliar	[...]	[5-10]%	[20-30]%	[30-40]%	[10-20]%	[5-10]%	[10-20]%	[30-40]%	
Lepidoptera/not defined ⁸³⁴	[...]	[10-20]%	[10-20]%	[30-40]%	[10-20]%	[0-5]%	[10-20]%	[40-50]%	
CITRUS FRUIT									
Lepidoptera/not defined	[...]	[20-30]%	[5-10]%	[30-40]%	[10-20]%	[0-5]%	[10-20]%	[40-50]%	[40-50]% Italy
POME FRUIT									
Lepidoptera/foliar	[...]	[5-10]%	[20-30]%	[30-40]%	[10-20]%	[0-5]%	[10-20]%	[30-40]%	[40-50]% Italy
Lepidoptera/not defined	[...]	[10-20]%	[30-40]%	[40-50]%	[10-20]%	[0-5]%	[10-20]%	[30-40]%	[60-70]% Poland
GRAPES									
Lepidoptera/foliar	[...]	[10-20]%	[20-30]%	[30-40]%	[0-5]%	[40-50]%	[20-30]%	[5-10]%	[30-40]% France
Lepidoptera/not defined	[...]	[20-30]%	[10-20]%	[30-40]%	[5-10]%	[0-5]%	[20-30]%	[30-40]%	[50-60]% Greece
ALL VEGETABLES									
Lepidoptera/not defined	[...]	[5-10]%	[30-40]%	[40-50]%	[5-10]%	[0-5]%	[20-30]%	[20-30]%	
Diptera/not defined	[...]	[20-30]%	[5-10]%	[30-40]%	[10-20]%	[0-5]%	[20-30]%	[30-40]%	
Thrips/not defined	[...]	[30-40]%	[5-10]%	[30-40]%	[10-20]%	[0-5]%	[10-20]%	[30-40]%	
Others/not defined ⁸³⁵	[...]	[10-20]%	[5-10]%	[20-30]%	[10-20]%	[0-5]%	[20-30]%	[30-40]%	

⁸³³ Agrowin data.

⁸³⁴ The Agrowin data used by the Commission does not always provide data on the basis of foliar or soil application, and so for a number of crops this is left as "not defined." Where the method of application is not defined, on the basis that the majority of insecticides are foliar insecticides, the Commission considers that "not defined" should be considered as "foliar."

⁸³⁵ The category "others" in Agrowin includes mainly the following pests (those cited most frequently in the survey data): lepidoptera; insects, others; gastropoda.

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others	Selected combined shares in important markets
VEGETABLES – SOLANACEAE									
Lepidoptera/not defined	[...]	[10-20]%	[10-20]%	[20-30]%	[10-20]%	[0-5]%	[20-30]%	[30-40]%	[30-40]% Italy
Thrips/not defined	[...]	[40-50]%	[5-10]%	[50-60]%	[5-10]%	[0-5]%	[10-20]%	[30-40]%	[40-50]% Italy
Diptera/not defined	[...]	[30-40]%	[10-20]%	[40-50]%	[5-10]%	[0-5]%	[10-20]%	[30-40]%	[40-50]% Italy
VEGETABLES – BRASSICAS									
Lepidoptera/not defined	[...]	[20-30]%	[40-50]%	[60-70]%	[5-10]%	[0-5]%	[10-20]%	[5-10]%	[80-90]% Spain
VEGETABLES - LEAFY/LEGUMES									
Lepidoptera/not defined	[...]	[20-30]%	[20-30]%	[40-50]%	[0-5]%	[0-5]%	[20-30]%	[20-30]%	[40-50]% Spain
POTATOTES									
Lepidoptera/not defined	[...]	[10-20]%	[20-30]%	[30-40]%	[10-20]%	[0-5]%	[10-20]%	[30-40]%	[30-40]% Greece
COTTON									
Lepidoptera/not defined	[...]	[0-5]%	[30-40]%	[40-50]%	[10-20]%	[0-5]%	[10-20]%	[30-40]%	[50-60]% Greece
CORN									
Lepidoptera/foiar	[...]	[10-20]%	[40-50]%	[50-60]%	[0-5]%	[0-5]%	[5-10]%	[30-40]%	[80-90]% Czech Republic

(E) Conclusion

(1252) The Parties submit that the market for insecticides is not concentrated. However, in light of the EEA market shares presented in Table 22, the Commission considers that the market is concentrated amongst a small number of players and, further, that the Parties are the leading players in insecticides for lepidoptera across a large number of crops. This makes it likely that the Parties would accrue strength in markets across the EEA by acquiring more than their current combined market share indicates. Further, the Commission considers that the merged entity's position in the insecticides for lepidoptera, thrips, diptera, hemiptera and coleoptera would be significantly strengthened [...], as three new AIs (Isoclast, Spinetoram and Cyazypyr) are fully launched on the European market.

6.4.5.3. The Parties are important and close competitors in markets across the EEA

- (A) The Parties both have a strategic focus on [strategic business information]
- (1253) The Commission takes note that the Parties are [strategic business information].⁸³⁶ The Parties' strength in certain key crops was highlighted by market participants' responses.
- (1254) One competitor noted that they were: *“concerned about the strong position of the combined entity in the segments of insecticides for pome fruits and grapes. [...] The combination of the portfolios of Dow and DuPont would give the combined entity a very strong market share in insecticides. In particular: The combined entity will have a dominant position in the segment of insecticides for pome fruits, with rynaxypyr, spinosad, methoxyfenozide and chlorpyrifos-methyl. The combined entity will be very strong in insecticides for grapes, with spinosad, chlorpyrifos, methoxyfenozide, rynaxypyr, indoxacarb and the future Spinetoram product. This will give them a huge product portfolio. As far as we know Dow has a very strong insecticides pipeline of two to three products.”*⁸³⁷
- (B) The Parties are competing to become leaders in the lepidoptera segment
- (1255) Rynaxypyr is already the best AI for tackling lepidoptera and DuPont's aim is [internal document].^{838,839}
- (C) The Parties' products are currently competing head to head in markets across the EEA
- (1256) The Commission takes note that [discussion of internal strategy document].^{840,841}
- (C.i) *Dow considered [...] to be a threat to its insecticide portfolio*
- (1257) Dow considered that [strategic internal assessment] products for lepidoptera in commodity crops and to the spinosyns and methoxyfenozide in vegetable crops: [internal document].⁸⁴²
- (C.ii) *Chlorpyrifos was directly competing with Rynaxypyr*
- (1258) Chlorpyrifos and Rynaxypyr have good efficacy against a number of common target pests. These include lepidoptera such as codling moth, peach twig borer, oriental fruit moth, plum fruit moths and cutworms.⁸⁴³
- (1259) Rynaxypyr is the top-selling diamide globally and diamides are referenced as [quote from internal document].⁸⁴⁴

⁸³⁶ [Internal document], (ID6827-50827).

⁸³⁷ Agreed non-confidential minutes of a call with a competitor, 31 May 2016 (ID8909). Other examples include: Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248); Agreed non-confidential minutes of a call with a competitor, 8 April 2016 (ID8907); Agreed non-confidential minutes of a call with a customer, 28 October 2016 (ID9551).

⁸³⁸ [Internal document] (ID6827-42039), slide 2.

⁸³⁹ [Internal document] (ID6696-632).

⁸⁴⁰ [Internal document].

⁸⁴¹ [Internal document] (ID1327-6).

⁸⁴² [Internal document] (ID6748-17166), slide 5.

⁸⁴³ These examples and further examples of common target pests can be found in [internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

⁸⁴⁴ [Internal document] (ID3987-132).

- (1260) Further evidence that the two AIs were in direct competition can be found [internal document]. It follows that [quote from internal document].⁸⁴⁵
- (1261) As noted at Section V.6.4.2.1, [...].
- (C.iii) *In certain markets, spinosad was directly competing against Rynaxypyr*
- (1262) The Commission understands that spinosad and Rynaxypyr are highly effective against a number of common target pests. These include lepidoptera such as: tuta absoluta; bollworms; cabbage worm; diamond back moth; peach twig borer; lepidopteran leafrollers and tortricids; European grapevine moth.⁸⁴⁶
- (1263) The Commission considers that evidence that the two products are competing [internal document].⁸⁴⁷
- (1264) Similarly, one competitor observed that: "*Dow's Spinosad is in competition with DuPont's Rynaxypyr. For some critical pests they share a common market e.g. the control of lepidoptera and Colorado beetle. In IPM and resistance management (differing mode of action) practices both active substances have important position on the market. To hold both actives in one portfolio would be a strong position. The broad spectrum of Spinosad and Rynaxypyr. [...] causes a direct competition not only in lead pests, but also in so-called minor pest complexes. Especially recommendations under IPM and Resistance Management aspects make a replacement of one in favor of the other possible. So a head-to-head competition is evident.*"⁸⁴⁸
- (1265) Another competitor also confirms that Spinosad competes with DuPont's products such as indoxacarb and Rynaxypyr: "*Spinosad is a natural product targeting lepidoptera, and is the product which overlaps the most with DuPont products. DuPont has different products (indoxacarb and Rynaxypyr for lepidoptera), which are newer products and are effective on fruits and vegetables (tomatoes), and maize. Overall, Dow's products are more broad-spectrum products, whereas DuPont's products target a specific type of insects. Dow's product based on spinosad (brand Laser) is one of the most important insecticide on the Italian market and has a lot of fields of application, even if the main fields are tomato and other various vegetables; as does one of DuPont's products based on indoxacarb (brand Steward, solid formulation).*"⁸⁴⁹
- (1266) To take the specific example of the grapevine berry moth, a stakeholder in the industry noted that Dow's AIs methoxyfenozide and Spinosad could be used to target this pest, as well as DuPont's AIs Rynaxypyr and indoxacarb. These products could be used interchangeably. He went on to note that, while Spinosad is acknowledged to be priced slightly higher than the other products, this price difference is not deemed to be significant: "*[n]evertheless, spinosad is slightly more expensive (the price*

⁸⁴⁵ [Internal document] (ID6696-3648). [Internal document].

⁸⁴⁶ These examples and further examples of common target pests can be found in [internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

⁸⁴⁷ [Internal document].

⁸⁴⁸ Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

⁸⁴⁹ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

difference does not exceeds 10%) because Dows attaches value to its natural origin."⁸⁵⁰

- (1267) On the other hand, [...] and certain market participants discussed in recitals (1262) to (1266) confirmed that in some crops spinosad and Rynaxypyr do compete directly, one market participant in Italy noted that the two products could be considered as rotation partners. The example given was that for fruit crops in Italy, while Coragen and Laser were both used, they had different time of application; Coragen was used at an earlier stage and Laser was used during the last stage before the fruits were picked.⁸⁵¹
- (1268) In conclusion, the Commission considers that in certain markets, spinosad was directly competing against Rynaxypyr.
- (D) Market participants consider that there is a broad overlap in spectrum of target pests between the two portfolios
- (1269) Market participants consider that there is a broad overlap in the spectrum of the target pests between DuPont's and Dow's portfolios. For instance, a competitor notes: *"There is a broad overlap of spectrum looking at Dow's proprietary solutions (Spinosad, Spinetoram, Chlorpyrifos-ethyl & -methyl) and DuPont's owned solutions (Chlorantranilipole, Indoxacarb, Cyazypyr). This is particularly true for the lead pests in Pome fruit (Cydia Pomonella) and in grapes (Lobesia Botrana). Whereas Dow can count on excellent efficacy of Spinosad + Spinetoram on Cydia in pome fruit, DuPont has very effective solutions such as Chlorantraniliprole, Indoxacarb and Cyazypyr against Cydia e.g. in apples. [...] Beyond these lead or key pests, the overlap is also overwhelming when looking at pest complexes including thrips (Dow: Spinosad, Spinetoram, DuPont: Cyazypyr, Chloran-traniliprole), Leaf roller (Dow: Chlorpyrifos-methyl & ethyl, DuPont: Indoxacarb, Chloran-traniliprole) or Oriental Peach Moth (Cydia molesta, also attacking pome fruit) - Dow: Spinosad, Methoxyfenozide, DuPont: Chlorantraniliprole. In summary we can say that both companies together cover all recommendations according to IPM standards in key crops against all generations of lead pests with various solutions at the same time, so that their absolute dominance becomes evident."*⁸⁵²
- (1270) Another competitor, notes in relation to the Italian market that: *"Dow has chlorpyrifos and spinosad, which are very important products in Southern Europe. Spinosad is a natural product targeting lepidoptera, and is the product which overlaps the most with DuPont products. DuPont has different products (indoxacarb and Rynaxypyr for lepidoptera), which are newer products and are effective on fruits and vegetables (tomatoes), and maize. Overall, Dow's products are more broad-spectrum products, whereas DuPont's products target a specific type of insects. Dow's product based on spinosad (brand Laser) is one of the most important insecticide on the Italian market and has a lot of fields of application, even if the main fields are tomato and other various vegetables; as does one of DuPont's products based on indoxacarb (brand Steward, solid formulation)."*⁸⁵³

⁸⁵⁰ Agreed non-confidential minutes of a call with an institute, 5 October 2016 (ID8147). Vigne et vin. Courtesy translation from French: *"Le spinosad est néanmoins un peu plus cher car Dow valorise son origine naturelle (différence de prix n'exédant pas 10%)."*

⁸⁵¹ Agreed non-confidential minutes of a call with a customer, 26 September 2016 (ID7521).

⁸⁵² Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

⁸⁵³ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

(1271) In conclusion, the Commission considers that market participants perceive there to be a notable overlap in the spectrum of pests targeted by the Parties' respective portfolios.

(E) The Parties' combined product portfolio will be the strongest insecticide portfolio in markets across the EEA, in particular for lepidopteran pests

(1272) The Commission understands that the strength of the Parties' insecticide portfolio, which contains a number of the newest AIs for lepidopteran pests, is clearly perceived by market participants. For example, an Italian customer notes that "*[t]he biggest problem regarding the Dow/DuPont transaction is the combination of two important insecticide portfolios with important molecules. [...] Both companies produce modern insecticides that are very effective and are must-have insecticides*".⁸⁵⁴ In the Italian market, DuPont in particular is considered to be: "*a master in insecticides because it has active ingredients – indoxacarb, Rynaxypyr – with very significant market shares*".⁸⁵⁵

(1273) Another competitor adds: "*[t]here are concerns in combining Dow and DuPont in insecticides, notably in France, Spain, Germany and Italy. In insecticides against chewing insects their joint market position is already now by far the strongest and will significantly increase with Rynaxypyr, Cyazypyr and Spinetoram under their common control and registered in the EU. They will be able to combine products and offer a comprehensive solution to farmers. Due to regulatory requirements, no other AIs are likely to appear in the short-term. The combination of DuPont and Dow would result in a single player having the best and newest chewing AI in the industry and the possibility to create several mixtures based on those. The remaining, older chemical classes on the market would not represent a comparable alternative for control of chewing pests*".⁸⁵⁶

(1274) Another competitor notes: "*Dow has a strong position in insecticides tackling lepidoptera. Its portfolio includes old products like chlorpyrifos, methoxyfenozide and spinosad. DuPont's portfolio tackling lepidoptera includes more recent products like indoxacarb and chlorantraniliprole. There is an overlap in the two portfolios*".⁸⁵⁷

(1275) Competitors also highlight the strength of the Parties in insecticides targeting, *inter alia*, lepidoptera (a chewing pest group): "*[i]n insecticides Dow/DuPont have an outstanding portfolio, a strong market position and a promising pipeline. [...] The combination of DuPont and Dow is expected to create an extremely strong player in the market for chewing insecticides. [...] Dow enjoys a very strong position with its chewing portfolio, particularly due to the Spinosyns (Spinosad + Spinetoram). [...] Upon introduction Spinetoram and combination of the two portfolios, the remaining alternatives in the European market will mainly be older chemical classes or active*

⁸⁵⁴ Agreed non-confidential minutes of a call with a customer, 21 March 2016 (ID8263).

⁸⁵⁵ Agreed non-confidential minutes of a call with a customer, 26 September 2016 (ID7521). Courtesy translation from Italian: "*un master negli insetticidi poiché detiene principi attivi – indoxacarb, Rynaxypyr – con quote di mercato molto rilevanti....*"

⁸⁵⁶ Agreed non-confidential minutes of a call with a competitor, 12 April 2016 (ID8247).

⁸⁵⁷ Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248), also agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

*ingredients with lower efficacy and more limited pest coverage and scope, which will hardly stand the comparison with the two industry best".*⁸⁵⁸

- (1276) Importantly, customers indicate that as a result of the merging of two important insecticide portfolios, there is a risk of a negative impact on prices and competition in particular for insecticides for speciality crops: "*risk of reduction of competition in several segments (top fruits). [...] Top fruits insecticides - full range of products in specific segments (Lepidoptera)*"⁸⁵⁹; "*prices in specialty may go up*"⁸⁶⁰; and "*both firms are aware that they have a very strong position in insecticides and as a consequence certain prices may increase*".⁸⁶¹
- (1277) For instance, an Italian customer clearly states that "*[t]he Parties have a dominant position, due to the fact that for certain insect pests they will be the only two companies with appropriate technical solutions (in insecticides) and it is therefore clear that they will be able to charge high prices since there are no valid alternative products.*"⁸⁶²
- (1278) At the same time, the Commission understands that [...].⁸⁶³
- (1279) In the same vein, as regards sucking insecticides, one Greek competitor notes for example that, "*[i]n the future, sulfoxaflor and cyazypyr will be directly competing on aphid, whitefly and fruit moth control.*"⁸⁶⁴ Customers were for the most part not familiar with the Cyazypyr and Isoclast products, because these products have not yet reached the EEA market. Isoclast has not yet been launched in the EEA (first EEA registrations are expected in [...]) and Cyazypyr only started to be fully launched in Q4 2016.⁸⁶⁵
- (1280) In conclusion, the Commission considers that the Parties' combined insecticide product portfolio would be likely to become the strongest in markets across the EEA, in particular with respect to the lepidopteran pests.

(F) Conclusion

- (1281) In light of the considerations described in Section V.6.4.5.3, the Commission concludes that the Parties are important and close competitors in markets across the EEA.

⁸⁵⁸ Agreed non-confidential minutes of a call with a competitor, 12 April 2016 (ID8247).

⁸⁵⁹ Questionnaire to Crop Protection Customers (Q1), questions 103.1 and 104.1 (ID3766).

⁸⁶⁰ Questionnaire to Crop Protection Customers (Q1), question 103.1 (ID9141). Courtesy translation from the Italian: "*Sono possibili aumenti dei prezzi delle specialità.*"

⁸⁶¹ Questionnaire to Crop Protection Customers (Q1), question 104.1 (ID9141). Courtesy translation from Italian: "*Entrambe sono ditte con una predominanza sul settore degli insetticidi il che può portare ad una consapevolezza di essere forti e predominanti e di conseguenza all'aumento di qualche prezzo.*"

⁸⁶² Questionnaire to Crop Protection Customers (Q1), question 103.1 (ID9597). Courtesy translation from Italian: "*Avendo una posizione dominante, grazie al fatto che per alcune problematiche saranno gli unici a possedere soluzioni tecniche adeguate (parlo sempre degli insetticidi), è chiaro che potranno applicare prezzi alti non essendoci prodotti alternativi validi.*"

⁸⁶³ [Internal document] (ID6827-30566).

⁸⁶⁴ Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

⁸⁶⁵ Parties' response to the Commission's request for information RFI 55.

6.4.5.4. The Parties' position in insecticides markets will be strengthened significantly through the launch of Spinetoram, Cyazypyr and Isoclast on these markets

(A) Spinetoram was to compete directly with Rynaxypyr and indoxacarb

(A.i) *Spinetoram and Rynaxypyr are both very effective on a number of key lepidopteran pests*

(1282) The Commission takes note that Spinetoram is positioned as an insecticide mainly for lepidoptera. The time of application for Spinetoram is similar to Rynaxypyr: it is active on the larvae and also at the adult stage, as described by a Dow information leaflet for the French market.⁸⁶⁶

(1283) Both Spinetoram and Rynaxypyr are very effective on many of the same target pests. These include lepidoptera such as: tuta absoluta (tomato leafminer); bollworms; plutella (diamond back moth); cutworms; codling moth; oriental fruit moth; peach twig borer; plum fruit moth; lepidoptera leafminers; lepidoptera leafrollers; European grapevine moth; bollworms; spodoptera; European corn borer; cutworms; and loopers. They are also both very effective on dipteran pests such as: diptera leafminers; drosophila suzukii; and coleoptera including Colorado potato beetles.⁸⁶⁷

(A.ii) *[Internal documents]*

(1284) The fact that the two AIs compete directly is evidenced [internal documents].^{868,869}

(1285) [Internal documents].⁸⁷⁰

(1286) [Quote from internal document].^{871,872}

(A.iii) *[...]*

(1287) [Content of internal document].

Figure 52 – [Extract from internal document]

[...]

Source: *[Internal document] (ID06696-27933)*

(1288) [Reference to internal strategy document].⁸⁷³

Figure 53 – [Extract from internal document]

[...]

Source: *[Internal document] (ID6696-23364)*

(1289) [Internal strategy document].⁸⁷⁴ The Commission therefore considers that [...] provide an important perspective on the competitive interaction between products on a given market.

⁸⁶⁶ [Internal document] (ID6696-23364).

⁸⁶⁷ These examples and further examples of common target pests can be found in [internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

⁸⁶⁸ [Internal document].

⁸⁶⁹ [Internal document], (ID5475-168).

⁸⁷⁰ [Internal document] (ID7080-1542).

⁸⁷¹ [Internal document] (ID6827-51307), slide 44.

⁸⁷² [Internal document] (ID6696-11502).

⁸⁷³ [Internal document] (ID6696-23364).

- (1290) [Internal strategy document].^{875,876}
- (1291) In conclusion, the Commission considers that Dow was positioning Spinetoram to directly compete with Rynaxypyr and indoxacarb in key European markets.
- (B) Cyazypyr targets Spinetoram and Isoclast
- (B.i) *Cyazypyr and Spinetoram already received temporary authorisation for use on the pest drosophila suzukii and are likely to compete in the future for insect control of this pest*
- (1292) From the market investigation, the Commission understands that one of the insects for which solutions were deemed to be lacking was drosophila suzukii.⁸⁷⁷ Cyazypyr and Spinetoram both received emergency authorisation for this pest; such authorisation is granted where such a measure is needed to control a serious danger that cannot be controlled by any other reasonable means.⁸⁷⁸ On that basis and on the basis of feedback received in the market investigation, the Commission understands that Cyazypyr and Spinetoram are the only, or two of very few, AIs available to tackle this pest and could have been expected to compete in the future. In this respect, the Commission refers to one customer commenting that: *“Cyazypyr has not been registered yet, but benefits from an emergency authorisation for exceptional use on diptera for cherries. Before this emergency authorisation was granted there were no products targeting this diptera pest on cherry trees (drosophila suzukii) since it is a new pest. Cyazypyr at present is very effective on this pest and is currently the only product that can effectively target drosophila suzukii on cherries; and looks set to become another leading insecticide in the fruit segment once it is registered.”*⁸⁷⁹
- (1293) Another customer also refers to the indispensable nature of Cyazypyr, noting: *“Cyazypyr has not been yet fully registered in Italy, but since 2016 it has been provided with an emergency registration for sale in Italy as it is considered indispensable and necessary against Drosophila suzukii (cherry fruit fly). Spinetoram also currently benefits from an emergency registration for sale in certain European countries for drosophila suzukii, but not in Italy.”*⁸⁸⁰
- (1294) In conclusion, the Commission considers that Cyazypyr and spinetoram are likely to compete closely for control of the pest drosophila suzukii.
- (B.ii) *Cyazypyr and Spinetoram are both very effective on a number of key pests*
- (1295) The Commission understands that Cyazypyr and Spinetoram are both effective on a number of key pests. These include lepidoptera such as: tuta absoluta (tomato leafminer); bollworms; armyworms, plutella (diamond back moth); cutworms; codling moth; oriental fruit moth; peach twig borer; lepidoptera leafminers; lepidoptera leafrollers; spodoptera; European corn borer; and loopers.⁸⁸¹ It also

⁸⁷⁴ Dow's response to the Commission's request for information RFI 49, question 3.

⁸⁷⁵ Parties' response to Article 11(3) decision dated [...], document 23, [internal documents] and Parties' response to Article 11(3) decision dated [...], document 35, [internal document].

⁸⁷⁶ Dow's response to the Commission's request for information RFI 38, question 10, page 211.

⁸⁷⁷ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

⁸⁷⁸ Article 53 of Regulation 1107.

⁸⁷⁹ Agreed non-confidential minutes of a call with a customer, 28 October 2016 (ID9551).

⁸⁸⁰ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

⁸⁸¹ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

includes dipteran pests such as: diptera leafminers; drosophila suzukii; coleoptera including Colorado potato beetles; and hemipteran pests including pear, potato and citrus psyllids;⁸⁸² [...].⁸⁸³

(1296) [Internal document].

Figure 54 – [Extract from internal document]

[...]

Source: [Internal document] (ID7830-291)

(1297) [Internal document].⁸⁸⁴

(1298) In conclusion, the Commission considers that Cyazypyr and spinetoram are both very effective on a number of similar key pests.

(B.iii) Cyazypyr and Isoclast are both very effective on a number of key pests

(1299) These pests include: hemipteran pests including aphids, whiteflies, pear and citrus psyllids and thrips.⁸⁸⁵

(1300) Contrary to the Parties' arguments that Cyazypyr has weak control on aphids, [internal document].⁸⁸⁶

(1301) [Internal document].^{887,888} [emphasis added]

(1302) [Internal document].⁸⁸⁹

(1303) [Internal document and strategic plans].^{890,891}

(1304) In conclusion, the Commission considers that Cyazypyr and Isoclast are both very effective on aphids in vegetables and [internal documents].

(C) Conclusion

(1305) In light of the considerations described in Section V.6.4.5.4, the Commission concludes that the Parties' position in those markets will be strengthened significantly with the introduction of Spinetoram, Cyazypyr and Isoclast.

6.4.5.5. Limited competitive constraints imposed by competitors in markets across the EEA

(1306) By way of background, the Commission has already explained at Section V.6.4.3, that Bayer and Syngenta's insecticides are subject to significant regulatory pressure: the Parties are by comparison less affected because they have a portfolio of newer AIs which are either already marketed in products currently sold in the EEA, or are about to be launched in the EEA. The regulatory pressure faced in particular by Bayer and Syngenta is illustrated in Table 23. [Quote from cover email].

⁸⁸² [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

⁸⁸³ [Internal document].

⁸⁸⁴ [Internal document] (ID6748-453).

⁸⁸⁵ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

⁸⁸⁶ [Internal document] (ID7830-291).

⁸⁸⁷ [Internal document] (ID9304-93).

⁸⁸⁸ [Internal document] (ID9304-93).

⁸⁸⁹ [Internal document] (ID6694-6619), slide 6. [Internal document] (ID6748-453).

⁸⁹⁰ [Internal document] (ID3987-81).

⁸⁹¹ Parties' response to the Statement of Objections, paragraph 1083.

Table 23 – [Extract from internal document]

[...]

Source: [...]

- (1307) In the same vein, [internal document].⁸⁹²
- (A) Bayer has very few products targeting lepidoptera and those products are under regulatory pressure
- (1308) The Commission observes that although Bayer is the second largest insecticide supplier in the EEA, it has only very few products in its portfolio that target the same key pests mainly targeted by the Parties' insecticides portfolio, namely lepidoptera.
- (1309) The main two Bayer AIs that target lepidoptera are deltamethrin and (for a limited number of pests) thiacloprid, a neonicotinoid. In an email to the Commission, Bayer admitted that thiacloprid is facing regulatory issues.⁸⁹³ Thiacloprid was [internal strategy document]⁸⁹⁴. Deltamethrin is from the pyrethroid class of insecticides, which is also under regulatory pressure. Flubendiamide, another Bayer AI, is active on lepidoptera but has been withdrawn from the EEA market due to regulatory reasons.⁸⁹⁵
- (1310) The other two principal AIs in Bayer's insecticide portfolio are: imidacloprid; and spirotetramat. Both target sucking pests such as aphids and whitefly. They do not target lepidoptera, which is the main pest group targeted by Dow and DuPont's insecticides portfolio. Furthermore, imidacloprid is a neonicotinoid which is under regulatory pressure: for example, all neonicotinoid products will be banned in France from 2018 onwards.
- (1311) [Internal document].⁸⁹⁶
- (1312) In conclusion, the Commission considers that Bayer's has very few products targeting lepidoptera and those products are under regulatory pressure.
- (B) Syngenta has a number of products targeting lepidoptera but the majority are relatively old and face resistance or regulatory issues
- (1313) Syngenta's insecticide portfolio is mostly old and under regulatory pressure. Lambda-cyhalothrin is its best-selling AI, but this belongs to the pyrethroid class and is a candidate for substitution. [Internal document].⁸⁹⁷ For example, an Italian customer refers to the fact that: "*[f]or this market other products exist, such as pyrethroids but these are older products which also target beneficials and this is a major flaw in these products. The products of Dow and DuPont do not target beneficials.*"⁸⁹⁸

⁸⁹² [Internal document] (ID4384-8).

⁸⁹³ Bayer's submission to the Commission, email of 17 October 2016 at 12.33 (ID7719).

⁸⁹⁴ [Internal document] (ID06696-11502), slide 22.

⁸⁹⁵ <https://www.epa.gov/ingredients-used-pesticide-products/flubendiamide-notice-intent-cancel-and-other-supporting>.

⁸⁹⁶ [Internal document] (ID4384-8).

⁸⁹⁷ [Internal document] (ID6696-17045).

⁸⁹⁸ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

- (1314) Abamectin is another AI which is effective on lepidoptera but is also facing regulatory pressure and the Annex I registration for Abamectin expires in April 2019.⁸⁹⁹
- (1315) Emamectin benzoate is the only other principal AI of Syngenta to target lepidoptera. [Internal document].⁹⁰⁰ During the course of the market investigation, the Commission found references to the limited efficacy of emamectin benzoate. For example, when referring to the plum fruit moth, a market participant noted that "[t]he other possible product is Syngenta's emamectin benzoate but the efficacy of this product is limited (it is only effective for a short period)."⁹⁰¹
- (1316) The other two AIs which account for [30-40]% of Syngenta's insecticide sales in the EEA are thiamethoxam and tefluthrin. Tefluthrin targets soil pests only (wire worm, corn root worm and root flies), and does not therefore target many of the key pests currently targeted by the Parties portfolio. Thiamethoxam targets sucking pests such as aphids and white flies [internal document].⁹⁰² Furthermore, [quote from internal document]⁹⁰³ and as a neonicotinoid it is under regulatory pressure (Annex I registration expires in April 2018).
- (1317) The Commission understands that [internal document].⁹⁰⁴
- (1318) Syngenta also sells Rynaxypyr in mixtures with either the AI lambda-cyhalothrin or the AI thiamethoxam under the brand name Ampligo. [Internal document].⁹⁰⁵ However, the Commission notes that in the largest insecticide markets in the EEA, Ampligo is only registered against a small number of crops.⁹⁰⁶
- (1319) [Internal document].

Figure 55 – [Extract from internal document]

[...]

Source: [Internal document] (ID6827-42039), slide 4

- (1320) In conclusion, the Commission considers that Syngenta has a number of products targeting lepidoptera but the majority are relatively old and face resistance or regulatory issues.
- (C) BASF has a very limited presence in insecticides
- (1321) The Commission also takes note that BASF currently has a very limited insecticide portfolio: [internal document].⁹⁰⁷
- (1322) The majority of its sales in the EEA are currently derived from the sale of products containing: alpha-cypermethrin; and pheromones⁹⁰⁸. Alpha-cypermethrin is a broad-

⁸⁹⁹ EU pesticides database.

⁹⁰⁰ [Internal document] (ID06696-11502), slide 62.

⁹⁰¹ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

⁹⁰² [Internal document] (ID06696-11502), slide 62.

⁹⁰³ [Internal document] (ID06696-11502), slide 62.

⁹⁰⁴ [Internal document].

⁹⁰⁵ [Internal document] (ID6827-42039), slide 4.

⁹⁰⁶ Competitor's response to the Commission's request for information, "Non-confidential versions of RFI - INS M 7932 - RFI - Annex 1 - 07102016 - Non-Confidential," (ID7526). The crops are: France, grapes; Greece, various vegetables and some fruits; Italy, various vegetables and some fruits.

⁹⁰⁷ [Internal document] (ID4384-8).

⁹⁰⁸ Pheromones are used as sex attractants and target tortricids (moths), used in traps.

spectrum pyrethroid used on chewing and sucking pests. However, this is coming under regulatory and resistance pressure, as described by BASF: "*BASF's own insecticides portfolio in the EEA is mostly based on the active ingredient alpha-cypermethrin, a Pyrethroid belonging to IRAC Group 3. Similarly to older chemical classes such as organophosphates and carbamates, Pyrethroids are broader spectrum compounds, which were initially used for control of both chewing and piercing/sucking insect. Nevertheless, development of widespread resistance (e.g. in the case of pollen beetle on oilseed rape) has greatly narrowed its field of application. Additionally, all Pyrethroids are currently under regulatory review in EU28 and significant restriction in use and scope are expected at the end of review (expected 2017/2018).*"⁹⁰⁹

(1323) In conclusion, the Commission considers that the competitive constraint imposed by BASF's insecticide portfolio in markets across the EEA is likely to be limited.

(D) No new chewing insecticide AIs to be launched in Europe within the next 5–6 years

(D.i) *No new challenger diamides to be introduced in Europe for at least the next 5–6 years*

(1324) The Parties submit that there are a number of AIs that compete more closely with Rynaxypyr than Dow's AIs. They also argue that a number of diamides are already, or will soon be launched, in the EEA.⁹¹⁰

(1325) However, the Commission notes that [internal document].⁹¹¹

(1326) Further, while the Commission observes [internal document].⁹¹²

Figure 56 – [Extract from internal document]

[...]

Source: [Internal document] (ID06827-18248)

(1327) [Internal document].

(1328) The Annex I registration application for cyclaniliprole was withdrawn on 3 October 2016.⁹¹³ As a result of this withdrawal there are either two options: the molecule is re-registered at some stage in the future, or it is withdrawn permanently. Even if the molecule was re-registered, due to the length of the registration process at European and national level, the Commission considers that cyclaniliprole is unlikely to reach the EEA market before 2021, if at all.

(1329) Bayer has confirmed that it does not intend to register tetraniliprole in Europe.⁹¹⁴

(1330) [Internal document].

⁹⁰⁹ Competitor's response to the Commission's request for information, "*Answers to RFI - Dow DuPont Merger Control Process_Comments to confidential questionnaire 07102016,*" (ID9663).

⁹¹⁰ Form CO, part D, pages 10-12.

⁹¹¹ [Internal document] (ID6827-42039), slide 4.

⁹¹² [Internal document] (ID6827-18248).

⁹¹³ EU Pesticides database.

⁹¹⁴ Bayer states that: "*A submission in the EU-28 is not planned*". Bayer's submission to the Commission, email of 17 October 2016 at 12.33 (ID7719).

- (1331) [Internal document]. As regards broflanilide, the Commission notes that the Annex I registration process has not started yet. In particular, BASF notes: "*Broflanilide is not registered yet and no registration submission has occurred to date in any country in the world. It is unclear whether and when registration submission in Europe will be made. In any event, approval cannot be expected earlier than 3-5 years following registration submission. If registration submission occurs in the EU, given the high regulatory hurdles of the EU system, in particular in the area insecticides, it is unclear if the compound would receive approval and with what restrictions.*"⁹¹⁵
- (1332) As regards the Nissan molecule, [internal document].⁹¹⁶ The Commission understands that the Annex I registration is not currently pending and therefore considers that, as per the broflanilide and cyclaniliprole molecules, that even if the molecule is registered, this AI will not be launched on the European market before 2021-2, if at all.
- (1333) In conclusion, the Commission considers that Rynaxypyr will continue to be the leading diamide in Europe for the next 5–6 years as no new diamides are likely to be introduced to Europe in that time.
- (D.ii) DuPont patent restrictions may hamper entry of new diamide insecticides*
- (1334) Further, the Commission notes that due to DuPont's extensive patent portfolio in the diamide chemical class, other competitors trying to develop insecticides based on this chemical class are likely to overlap with DuPont's patent portfolio and therefore face significant hurdles for the development of new insecticides.
- (1335) [Internal document]. The Commission therefore considers that the extent of DuPont's patent portfolio on the diamide chemical class is likely to limit entry of competitors in that specific chemical class.

Figure 57 – [Extract from internal document]

[...]

Source: [Internal document] (ID6825-53)

(D.iii) [Quote from internal document]

- (1336) The Commission also notes that, [internal document].⁹¹⁷
- (1337) [Internal document].⁹¹⁸ [...], as noted in the preceding two sections, the Commission finds that no new diamides are expected to enter Europe in the near future [internal document].
- (1338) Further, [internal document].

Figure 58 – [Extract from internal document]

[...]

Source: [Internal document]

⁹¹⁵ BASF's submission to the Commission, email of 20 October 2016 at 8.39 (ID7832).

⁹¹⁶ [Internal document] (ID7973-22).

⁹¹⁷ [Internal document] (ID6696-10420).

⁹¹⁸ [Internal document] (ID6696-10420).

- (E) Only one new third party AI will be launched in sucking insecticides in the next five years and current offering is also under severe regulatory pressure
- (1339) The Commission notes that in the EEA Bayer will launch, from 2017 onwards, its products containing its AI Flupyradifurone, an insecticide from the butenolide chemical class which targets sucking pests including aphids, whiteflies, hoppers, scales and also thrips. It will be registered for use on mainly fruits and vegetables under the brand name Sivanto.⁹¹⁹ [Internal document].⁹²⁰
- (1340) [Internal document]⁹²¹ and the Commission's investigation has not revealed any other major new entrants targeting sucking insects within the next five years in the EEA. At the same time, a number of the leading sucking insecticides (from the neonicotinoid chemical class) are likely to exit the market for regulatory reasons.
- (1341) In conclusion, the Commission considers that only one new third party AI will be launched in sucking insecticides in the next five years and current offering is also under severe regulatory pressure.
- (F) Generics exercise only weak competitive constraints on R&D-integrated players
- (1342) The Commission refers to the arguments advanced at Section V.6.2.1 that are also valid for insecticides; in summary, that generics exercise only a limited competitive constraint on R&D-integrated players. The Commission also summarises three arguments that are particularly relevant to insecticides and these are set out in recitals (1343) to (1345).
- (1343) First, older AIs have come under resistance and regulatory pressure and are losing market share, at the expense of new, more effective and targeted AIs, such as a number of AIs in the Parties' portfolios. It is only the older AIs that are genericised and these are precisely the AIs that are facing resistance and regulatory issues.
- (1344) Second, the Parties argue that their current portfolio is almost entirely off-patent.⁹²² However as can be seen from the description of DuPont's portfolio at Section V.6.4.2.1 [...] of DuPont's EEA insecticide sales can be attributed to Rynaxypyr, which is patent-protected until 2022. While [...] of Dow's EEA insecticide sales are attributed to Spinosad, which lost its patent protection in the EEA at the end of 2016, [internal document].⁹²³ Spinetoram remains patent-protected until 2024.
- (1345) Third, due to the multitude of different markets in insecticides (each of which may have a relatively low market size), the registration costs may be considered too high for certain generics to enter. One generic company decided against entering with one particular off-patent AI insecticide, precisely for this reason: “[CONFIDENTIAL] is an example of an AI for which an internal analysis was conducted in order to determine whether to enter and, following this assessment, the company decided against entry. In this case, it was felt that the potential costs of registration were too high and too complex in comparison to the size of the market opportunity.

⁹¹⁹ Bayer's response to the Commission's request for information request for information on crop protection products.

⁹²⁰ [Internal document] (ID6748-453).

⁹²¹ [Internal document] (ID6696-10420). [...].

⁹²² Parties' response to the Article 6(1)(c) Decision, paragraph 101.

⁹²³ [Internal document] (ID1154-7).

*Insecticides are predominantly used in Southern Europe on perennial crops [CONFIDENTIAL] and this requires multiple registrations, which involves expensive and complex registrations and for which there are relatively limited sales compared to other crops.*⁹²⁴

(1346) [Internal document].⁹²⁵

(1347) In conclusion, the Commission considers that generics only exercise weak competitive constraints on R&D-integrated players as regards the markets for insecticides.

6.4.5.6. Conclusion on the assessment of non-coordinated effects in insecticides markets across the EEA

(1348) In light of the considerations described in Sections V.6.4.5.2 to V.6.4.5.5, the Commission concludes that Dow and DuPont are important and close competitors in insecticides in markets throughout the EEA and will face very limited competitive constraints from competitors in both chewing and sucking insecticides.

6.4.6. *Assessment of non-coordinated effects at the specific crop level in national markets*

6.4.6.1. Horizontal overlaps in insecticides for pome fruit

(1349) The term "pome fruit" refers to apples and pears. Apples are the most produced fruit in the Union in terms of quantity. The top three producers are Poland (with 25.0% of total Union harvested production); Italy (19.2%) and France (15.5%).⁹²⁶

(1350) Currently, the main problematic lepidopteran pest for pome fruit in Europe is the codling moth. The Parties' AIs that are used to target this pest are: chlorpyrifos; spinosad; indoxacarb and Rynaxypyr. Spinetoram and Cyazypyr are in the process of being launched in the EEA and are also used to target codling moth.

(A) Analysis of the relative market shares of the Parties

Table 24 – Market shares: insecticides for pome fruit⁹²⁷

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combine d	Bayer	BASF	Syngent a	Others
Austria	Others/not defined ⁹²⁸	[...]	[5-10]%	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[5-10]%	[50-60]%
Belgium	Others/not defined	[...]	[5-10]%	[30-40]%	[30-40]%	[5-10]%	[5-10]%	[50-60]%	[0-5]%
Bulgaria	Lepidoptera/ not defined	[...]	[5-10]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[5-10]%	[20-30]%

⁹²⁴ Agreed non-confidential minutes of a call with a competitor, 9 September 2016 (ID7972).

⁹²⁵ [Internal document] (ID6827-020443).

⁹²⁶ Eurostat press release, 126/2016, 22 June 2016.

⁹²⁷ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

⁹²⁸ The category "others" in Agrowin includes mainly the following pests (those cited most frequently in the survey data): lepidoptera; insects, others; gastropoda.

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Cyprus ⁹²⁹	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[30-40]%	*[40-50]%	*[...]	*[...]	*[...]	*[...]
Czech Republic	Lepidoptera/ not defined	[...]	[20-30]%	[0-5]%	[20-30]%	[50-60]%	[0-5]%	[0-5]%	[10-20]%
Estonia ⁹³⁰	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[40-50]%	*[50-60]%	*[0-5]%	*[0-5]%	*[10-20]%	*[20-30]%
Finland ⁹³¹	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[40-50]%	*[50-60]%	*[0-5]%	*[0-5]%	*[10-20]%	*[20-30]%
Germany	Lepidoptera/ foliar	[...]	[0-5]%	[50-60]%	[50-60]%	[0-5]%	[10-20]%	[0-5]%	[20-30]%
Greece	Lepidoptera/ not defined	[...]	[5-10]%	[30-40]%	[40-50]%	[10-20]%	[10-20]%	[5-10]%	[20-30]%
Hungary	Lepidoptera/ foliar	[...]	[5-10]%	[10-20]%	[20-30]%	[30-40]%	[0-5]%	[20-30]%	[20-30]%
Italy	Lepidoptera/ not defined	[...]	[10-20]%	[30-40]%	[40-50]%	[5-10]%	[0-5]%	[10-20]%	[40-50]%
Luxembourg ⁹³²	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[50-60]%	*[60-70]%	*[0-5]%	*[0-5]%	*[5-10]%	*[50-60]%

⁹²⁹ No reliable market data was available for this market in Cyprus. Market shares for Cyprus are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20. Data provided for combined pome/stone segment only.

⁹³⁰ No reliable market data was available for this market in Estonia. Market shares for Estonia are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20. Data provided for combined pome/stone segment only.

⁹³¹ No reliable market data was available for this market in Finland. Market shares for Finland are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20. Data provided for combined pome/stone segment only.

⁹³² No reliable market data was available for this market in Luxembourg. Market shares for Luxembourg are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20 and RFI 29 question 3.1. Data provided for combined pome/stone segment only.

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Malta ⁹³³	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[30-40]%	*[40-50]%	*[0-5]%	*[0-5]%	*[10-20]%	*[20-30]%
Poland	Lepidoptera/ foliar	[...]	[10-20]%	[40-50]%	[60-70]%	[10-20]%	[0-5]%	[5-10]%	[10-20]%
Slovakia	Lepidoptera/not defined	[...]	[30-40]%	[10-20]%	[40-50]%	[30-40]%	[0-5]%	[0-5]%	[10-20]%
Slovenia ⁹³⁴	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[50-60]%	*[60-70]%	*[0-5]%	*[5-10]%	*[5-10]%	*[80-90]%
Spain	Lepidoptera / not defined	[...]	[30-40]%	[0-5]%	[40-50]%	[0-5]%	[0-5]%	[10-20]%	[40-50]%
UK	Lepidoptera/not defined	[...]	[30-40]%	[50-60]%	[80-90]%	[5-10]%	[0-5]%	[0-5]%	[5-10]%

Source: Commission compilation based on Agrowin (2015) and Parties' response to Commission's request for information 38 Question 20

Note: * [...]

(1351) Table 24 includes the market share data that the Commission relies upon to make the following findings. The Parties have large market shares in many national markets. The combined entity would become a market leader for instance in Germany, Greece, Italy, Poland, Slovakia, Spain and the United Kingdom with a market share significantly larger than those of the other R&D-integrated players. As acknowledged by the Parties, other than the R&D-integrated players, the market share held by "other" players is fragmented among a number of competitors.⁹³⁵ In Germany, Greece, Italy, Poland, Slovakia, Spain and the United Kingdom, only a very small number of competitors have market shares [... 5-10]%. These are: Adama in Italy ([5-10]%) and Greece ([5-10]%), Nippon Soda in Poland ([10-20]%), FMC in Spain ([10-20]%), and Platform Specialty in Slovakia ([10-20]%).

(1352) Further, Dow and DuPont will each launch new products. [...], Spinetoram will for instance soon be launched [...] with the first registrations taking place in Q4 2016.⁹³⁶

⁹³³ No reliable market data was available for this market in Malta. Market shares for Malta are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20. Data provided for combined pome/stone segment only.

⁹³⁴ No reliable market data was available for this market in Slovenia. Market shares for Slovenia are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20 and RFI 29 question 3.1. Data provided for combined pome/stone segment only.

⁹³⁵ Form CO, part B.II, page 30.

⁹³⁶ Dow's response to the Commission's request for information RFI 55, question 3.

[...] Cyazypyr will for instance also be launched [...] with the first registrations taking place in Q4 2016.⁹³⁷ The introduction of these new products will likely further increase the Parties' market shares in these markets.

(B) The Parties are important and close competitors

(1353) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera. Furthermore, the Parties together currently have a market leading position in insecticides for lepidoptera on pome fruit in Germany, Greece, Italy, Poland, Slovakia, Spain and the United Kingdom and [internal document]. For example, for spinetoram [...], Dow is targeting a [20-30]% share of sales for [...].⁹³⁸

(1354) In particular, as regards the codling moth, which is an important pest on pome fruit, the Parties each have AIs which effectively target the pest: chlorpyrifos and spinetoram for Dow; and Rynaxypyr and Cyazypyr for DuPont.⁹³⁹ This is confirmed also by one competitor, who noted that: *"there is a broad overlap of spectrum looking at Dow's proprietary solutions (Spinosad, Spinetoram, Chlorpyrifos-ethyl & -methyl) and DuPont's owned solutions (Chlorantranilipole, Indoxacarb, Cyazypyr). This is particularly true for the lead pests in Pome fruit (Cydia Pomonella).....Whereas Dow can count on excellent efficacy of Spinosad + Spinetoram on Cydia in pome fruit, DuPont has very effective solutions such as Chlorantraniliprole, Indoxacarb and Cyazypyr against Cydia e.g. in apples."*⁹⁴⁰

(1355) [Internal document].

Figure 59 – [Extract from internal document]

[...]

Source: Parties' response to Article 11(3) decision dated [...], document 23, [internal document]

(1356) [Internal document].

Figure 60 – [Extract from internal document]

[...]

Source: [Internal document]

(1357) The Commission notes that as regards pome fruit in Italy, one customer stated that Coragen was the only real effective product: there was no competition. However, that same customer added that he *"eagerly anticipates the registration of Spinetoram in Italy (expected from 2017 onwards) as this new molecule will be another new and effective tool available to farmers and is expected to be very effective in targeting problematic pests such as the codling moth on apples/pears and psylla."*⁹⁴¹ While this customer thought that the two AIs could be potential rotation partners, the Commission notes [internal documents].^{942,943}

⁹³⁷ DuPont's response to the Commission's request for information RFI 55, question 4.

⁹³⁸ Parties' response to the Article 11(3) decision dated [...], document 23, [internal document].

⁹³⁹ Parties' response to the Commission's request for information RFI 44, question 10.

⁹⁴⁰ Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

⁹⁴¹ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

⁹⁴² [Internal document] (ID6827-38513), slide 44.

⁹⁴³ Parties' response to Article 11(3) decision dated [...], document 23, [internal document]

(1358) [Internal document].⁹⁴⁴

(1359) Other than Spinetoram, Dow's Dursban (chlorpyrifos) is used by Italian farmers on pome fruit, as well as DuPont's Coragen (Rynaxypyr), and these were among two of the three products at the "top of their minds," [internal document]. In particular, for pear, Dursban and Coragen were the two most popular products. While the Commission understands that Dursban may be regulated out of the market in the near future, [internal strategic information].⁹⁴⁵

Figure 61 – [Extract from internal document]

[...]

Source: [Internal document] (ID6696-10369)

(1360) As also noted by one customer in Italy: "*Dow and DuPont are the leaders in the fruit segment (for example, pome fruit, peach etc.), more precisely for the insecticides targeting lepidoptera (such as the codling moth for pome fruit). [...] Both companies have important and market-leading products. DuPont has mainly two products Coragen (chlorantraniliprole, rynaxypyr) and Steward (indoxacarb). Dow too has in its portfolio two products, Durban (chlorpyrifos) and Laser (spinosad). These products are all a farmer needs for a complete pest control strategy for the fruit segment; no other products are needed.*"⁹⁴⁶

(1361) Concerns were expressed by market participants about the Parties' strong position in insecticides for pome fruit: "*[r]egarding the transaction between Dow and DuPont, [COMPETITOR] is concerned about the strong position of the combined entity in the segments of insecticides for pome fruits. [...] The combination of the portfolios of Dow and DuPont would give the combined entity a very strong market share in insecticides. In particular: The combined entity will have a dominant position in the segment of insecticides for pome fruits, with rynaxypyr, spinosad, methoxyfenozide and chlorpyrifos-methyl.*"⁹⁴⁷

(1362) In Greece, one competitor also highlighted the importance of the competition between the Parties' current and future portfolio targeting lepidoptera in pome fruit: "*Spinosad and rynaxypyr are directly competitive on a number of crops and mainly on stone / pome fruit against moths (i.e. anarsia, carpocapsa).*"⁹⁴⁸

(1363) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for pome fruit.

(C) Competitive constraints imposed by competitors are limited

(1364) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.

⁹⁴⁴ [Internal document] (ID6827-38513).

⁹⁴⁵ Section V.6.4.2.1.

⁹⁴⁶ Agreed non-confidential minutes of a call with a customer, 28 October 2016 (ID9551).

⁹⁴⁷ Agreed non-confidential minutes of a call with a competitor, 31 May 2016 (ID8909).

⁹⁴⁸ Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

- (1365) Further, as regards the important codling moth pest, one customer in Italy noted that Coragen was the only effective insecticide for tackling codling moth: "*Coragen is indispensable in fighting the codling moth pest (carpocapsa) in apple and pear. Up to now, no alternatives to Coragen exist on the market.*" Syngenta's Affirm (emamectin benzoate) was deemed to be less effective, but was nonetheless used due to the need to rotate products.⁹⁴⁹
- (1366) A competitor also submitted that Affirm tended to be used in later stages of the growing cycle and could not be considered to compete with Coragen: "*[w]hile the Dow and DuPont products constitute a complete pest control strategy, there are other products such as Syngenta's Affirm (emamectin). This product is however usually applied during the last growing cycles and cannot therefore be considered to be a competitor of Coragen; rather it is in competition with Laser.*"⁹⁵⁰
- (1367) Out of the markets discussed at recitals (1351) and (1352), namely Germany, Greece, Italy, Poland, Slovakia, Spain and the United Kingdom, the only competitor to have a significant market share in these markets is Bayer, in Slovakia. However, the Commission understands that Bayer's share relates to sales of Calypso (thiacloprid)⁹⁵¹ which is a neonicotinoid under regulatory pressure, whose Annex I registration expires in April 2018. The Commission therefore considers that although this product may provide a degree of competitive constraint currently, this is unlikely to continue in the near future.
- (1368) As regards generics, one competitor in Greece also referred to the growing resistance of old chemistries and reiterated the need for new chemistry in insecticides: "*[i]n addition to these new chemistries, older products like, in particular, neonicotinoids (still the largest selling group) and pyrethroids are also sold on the Greek market. However they face growing resistance (pyrethroids in particular) which explains the development of and the need to have new chemistry.*"⁹⁵² [Internal document].⁹⁵³
- (1369) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for pome fruit are limited.
- (D) Conclusion on horizontal overlaps in insecticides for pome fruit
- (1370) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1371) and (1372).
- (1371) As regards lepidoptera, the Commission considers that the Transaction would be likely to significantly impede effective competition in Italy, Greece, Poland, Germany, Spain, Slovakia and in the United Kingdom in insecticides for lepidoptera control in pome fruit. In the United Kingdom, the Parties' combined market share would be [80-90]% in insecticides for lepidoptera control in pome fruit and the

⁹⁴⁹ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

⁹⁵⁰ Agreed non-confidential minutes of a call with a customer, 28 October 2016 (ID9551).

⁹⁵¹ <http://www.bayercropscience.sk/produkty-a-riesenia/ochrana-rastlin/insekticidy/calypso-480-sc.aspx>.

⁹⁵² Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

⁹⁵³ [Internal document].

Commission concludes that the Transaction would thus be likely to lead to the creation of a dominant position and significantly impede effective competition.

(1372) Also as regards insecticides for lepidoptera control, the Commission considers that the Transaction would result in an overlap in Bulgaria, the Czech Republic and Hungary. Regarding the control of "other" pests (largely lepidoptera) on pome fruit, the Transaction would also result in overlaps in Austria and Belgium. In addition, in insecticides on pome/stone fruit⁹⁵⁴, the Transaction would result in an overlap in chewing insect control (including lepidoptera) in Cyprus, Estonia, Finland, Luxembourg, Malta and Slovenia. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to these markets, given that the overlap is in any case eliminated by the Final Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.

6.4.6.2. Horizontal overlaps in insecticides for stone fruit

(1373) The term "stone fruit" refers to soft fruits with a large "stone" in the centre such as peaches, nectarines, plums and cherries. The main pests for stone fruit in Europe include: the lepidopteran pests peach twig borer (*anarsia lineatella*), the oriental fruit moth (*cydia* or *grapholita molesta*) and the plum fruit moth (*grapholita funebrana*); dipteran pests, fruit flies (including *drosophila suzukii*); thrips; and the hemipteran pests, aphids. The Parties' AIs that are mainly used to target the lepidopteran pests are: chlorpyrifos; Spinosad; indoxacarb; and Rynaxypyr. Spinetoram and Cyazypyr are in the process of being launched in the EEA and target the lepidopteran pests, *drosophila suzukii* and also thrips.

(A) Analysis of the relative market shares of the Parties

Table 25 – Market shares: insecticides for stone fruit⁹⁵⁵

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combine d	Bayer	BASF	Syngenta	Others
Germany	Lepidoptera / foliar	[...]	[0-5]%	[20-30]%	[20-30]%	[10-20]%	[0-5]%	[40-50]%	[10-20]%
Greece	Lepidoptera / not defined	[...]	[5-10]%	[20-30]%	[30-40]%	[5-10]%	[5-10]%	[20-30]%	[30-40]%
Italy	Lepidoptera / not defined	[...]	[10-20]%	[0-5]%	[10-20]%	[5-10]%	[0-5]%	[20-30]%	[40-50]%

⁹⁵⁴ In Cyprus, Estonia, Finland, Luxembourg, Malta, Slovenia and Hungary the Parties were only able to provide data for pome and stone fruit insecticides combined due to the low value of these segments.

⁹⁵⁵ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Poland	Lepidoptera / foliar	[...]	[10-20]%	[5-10]%	[20-30]%	[20-30]%	[0-5]%	[5-10]%	[40-50]%
Spain	Thrips	[...]	[80-90]%	[0-5]%	[80-90]%	[10-20]%	[0-5]%	[0-5]%	[5-10]%
UK	Lepidoptera / not defined	[...]	[30-40]%	[40-50]%	[80-90]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%

Source: Commission compilation based on Agrowin (2015)

(1374) Table 25 includes the market share data that the Commission relies upon to make the following findings. In Greece for instance, the merged entity would become the market leader with a market share in insecticides for lepidoptera control on stone fruit of [30-40]%. The only other main competitor in that market would be Syngenta, with a market share of [20-30]%. The remainder of the competition is very fragmented. Other than Bayer and BASF, the only other competitors with a market share above 5% are: Adama ([10-20]%), and Mitsui ([5-10]%).

(1375) In Italy, the Commission considers that while the Parties' combined share is currently [10-20]% (and further, the Commission considers that these figures may underestimate DuPont's competitive impact on the market⁹⁵⁶), this market share is [...] in the near future [...].^{957,958}

(1376) While in Spain, DuPont does not currently have any market share in insecticides for thrips in stone fruit, the Commission notes [...]. Dow is currently the dominant player with an [80-90]% market share.

(B) The Parties are important and close competitors

(1377) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera. Furthermore, the Parties' position will be [...].

(1378) In particular, as regards the key lepidopteran pests on stone fruit, such as anarsia lineatella, cydia molesta and grapholita funebrana, each of the Parties' main AIs effectively target these pests.⁹⁵⁹ A competitor also noted that "*the overlap is also overwhelming when looking at pest complexes including [...] Oriental Peach Moth (Cydia molesta, also attacking pome fruit) - Dow: Spinosad, Methoxyfenozide, DuPont: Chlorantraniliprole.*"⁹⁶⁰

(1379) As regards Greece, [internal document]⁹⁶¹ show that it is targeting a [5-10]% market share in [...], [... 5-10]% from [...] onwards.⁹⁶²

⁹⁵⁶ This is on the basis of comments from market participants highlighted later in this section below.

⁹⁵⁷ Dow's response to the Commission's request for information RFI 55, question 3.

⁹⁵⁸ DuPont's response to the Commission's request for information RFI 55, question 4.

⁹⁵⁹ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

⁹⁶⁰ Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

⁹⁶¹ [Internal document].

⁹⁶² [Internal document].

- (1380) A Greek competitor also noted that Spinosad and Rynaxypyr were "*directly competitive [...] mainly on stone / pome fruit against moths (i.e. anarsia, carpocapsa).*" Further, the same competitor also noted that, "*[i]n the future, sulfoxaflor and cyazypyr will be directly competing on aphid, whitefly and fruit moth control.*"⁹⁶³
- (1381) In Italy, a customer noted that Coragen was "indispensable" for the treatment of grapholita funebrana and was also effective on the other main stone fruit pest, grapholita molesta: "*Coragen is used on peach trees to treat the second generation of grapholita molesta (oriental fruit moth that is a lepidoptera). [...] On plum trees, it is used against the first of grapholita funebrana (plum fruit moth that is a lepidoptera). While other products can be used to treat those pests, Coragen is an indispensable product, especially for plum trees, as this is the only product that effectively controls the pest. For instance, for the plum fruit moth there are other products such as Phosmet of Sipcam-Oxon or Gowan and Affirm of Syngenta, but they do not have the same efficacy as Coragen and do not entirely kill the pest.*"⁹⁶⁴
- (1382) In a scenario where there are currently no AIs other than Rynaxypyr and Cyazypyr which effectively target this pest, [internal document].

Figure 62 – [Extract from internal document]

[...]

Source: [Internal document] (ID7079-1136)

- (1383) Thrips is the most significant pest in Spain in terms of insecticide control, [internal document].

Figure 63 – [Extract from internal document]

[...]

Source: [Internal document], response to RFI 49 question 4, slide 11

- (1384) Dow has a [...] market share ([80-90]%) in insecticides controlling thrips in Spain which tends to indicate that it has the only really effective product(s) to target this pest. This was confirmed by a customer in Spain, who noted that: "*[a]gainst Frankliniella Occidentalis: Dow's Spinosad. It is the only effective product against this pest and it does not have any competitors.*"⁹⁶⁵

- (1385) [Internal document]⁹⁶⁶.

Figure 64 – [Extract from internal document]

[...]

Source: [Internal document]

⁹⁶³ Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

⁹⁶⁴ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

⁹⁶⁵ Agreed non-confidential minutes of a call with a customer, 18 October 2016 (ID8639). Courtesy translation from Spanish. "*Contra la Frankliniella Occidentalis: Spinosad de Dow. Es el único producto eficaz para esta plaga y no tiene competidores.*"

⁹⁶⁶ [Internal document], (ID7079-1136), slide 23. [...].

(1386) Dow's own internal estimates of market share in thrips in stone fruit in Spain [internal document] has a [50-60]% market share by value, [...] has a [10-20]% share and Dow is projecting a [20-30]% share for [...].

Figure 65 – [Extract from internal document]

[...]

Source: Parties' response to Article 11(3) decision dated [...], document 30, [internal document]

(1387) The Commission accordingly finds that in a scenario where there are currently no AIs other than the spinosyns which effectively target *Frankliniella Occidentalis* in Spain, [...].⁹⁶⁷

(1388) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for stone fruit.

(C) Competitive constraints imposed by competitors are limited

(1389) The Commission refers to the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them.

(1390) As regards insecticides targeting lepidoptera in stone fruit, Syngenta has the only main competing product, with its Affirm product. However, the Commission finds that the competitive constraint exercised by the Parties on each other, particularly once Spinetoram is introduced to these markets, would be stronger than the constraint exercised by Affirm. First, as noted in recital (1381) by an Italian customer, Affirm is less effective than the products of the Parties, for example in *grapholita funebrana* in plum.⁹⁶⁸ [Internal document].

(1391) As regards insecticides targeting thrips in stone fruit, Dow is the only main supplier in Spain. There is one other AI (Acrinathrin) which is also sold against thrips, but this has a low market share and is less effective than either spinosad or spinetoram and further, a Spanish customer considered that there were "no competitors" to Dow.⁹⁶⁹ [Internal document].⁹⁷⁰

(1392) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for stone fruit are limited.

(D) Conclusion on horizontal overlaps in insecticides for stone fruit

(1393) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1394) to (1396).

⁹⁶⁷ DuPont's response to the Commission's request for information RFI 43, question 11: [internal document].

⁹⁶⁸ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

⁹⁶⁹ Agreed non-confidential minutes of a call with a customer, 18 October 2016 (ID8639).

⁹⁷⁰ [Internal document], Dow's response to the Commission's request for information to RFI 49, question 4.

- (1394) As regards lepidoptera, the Commission concludes that the Transaction would be likely to significantly impede effective competition in Greece and Italy in insecticides for lepidoptera control in stone fruit.
- (1395) As regards thrips, in Spain, while there is currently no overlap between the Parties in thrips in stone fruit, this is currently a market where Dow's products are considered to be the only real effective choice for targeting *Frankliniella Occidentalis*. Cyazypyr is also effective on the pest [strategic information]. In this respect, the Commission considers that the Transaction would be likely to result in [...]. Therefore, the Commission concludes that the Transaction would be likely to cause a significant impediment to effective competition in Spain in insecticides for thrips control in stone fruit.
- (1396) In addition, the Transaction would result in an overlap in insecticides for lepidoptera control on stone fruit in Poland, the United Kingdom and Germany. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to these markets, given that the overlap is in any case eliminated by the Final Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.

6.4.6.3. Horizontal overlaps in insecticides for citrus fruit

- (1397) The main problematic pests for citrus fruit in Europe include: the hemipteran pests citrus mealybug (*Planococcus citri*), red scale, woolly whitefly (*Aleurothrixus floccosus*aphids) and orange spiny whitefly (*Aleurocanthus spineiferus*); the lepidopteran pests, citrus leafminer (*Phyllocnistis citrella*); and the dipteran pest, the Mediterranean fruitfly (*Ceratitis capitata*). Citrus psyllid (*Diaphorina citri*) is another very problematic pest at global level but this pest is not currently present in Europe.

(A) Analysis of the relative market shares of the Parties

Table 26 – Market shares: insecticides for citrus⁹⁷¹

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Cyprus ⁹⁷²	Chewing (includes lepidoptera)	*[...]	*[50-60]%	*[20-30]%	*[80-90]%	*[...]	*[...]	*[...]	*[...]
Italy	Lepidoptera/not defined	[...]	[30-40]%	[10-20]%	[40-50]%	[5-10]%	[0-5]%	[5-10]%	[40-50]%
Italy	Hemiptera/not defined	[...]	[5-10]%	[0-5]%	[5-10]%	[20-30]%	[0-5]%	[10-20]%	[50-60]%
Spain	Diptera/not defined	[...]	[60-70]%	[0-5]%	[60-70]%	[0-5]%	[0-5]%	[20-30]%	[40-50]%
Spain	Hemiptera / not defined	[...]	[5-10]%	[0-5]%	[5-10]%	[20-30]%	[5-10]%	[0-5]%	[50-60]%

Source: Commission compilation based on Agrowin (2015) and Parties' response to Commission's request for information 38 Question 20

Note: *[...]

(1398) Table 26 includes the market share data that the Commission relies upon to make the following findings. In Italy, the merged entity would become the market leader in insecticides for lepidoptera control in citrus fruit and is [...] the next closest competitor. The remaining competition, including the R&D-integrated players, is extremely fragmented. Sumitomo is the only other player with a market share [... 5-10]%.

(1399) [Strategic business information].⁹⁷³ The remaining competition is fragmented. Other than the R&D-integrated players whose shares are set out in Table 26, the remaining market share is fragmented among a number of competitors - with only three competitors identified with a market share [... 5-10]%, Adama (... 5-10)%, Sumitomo ([... 5-10]%) and Sipcarn Oxon ([... 5-10]%).

(1400) [Strategic business information].⁹⁷⁴ In Spain, in insecticides for diptera control, Dow is currently the dominant player with a [60-70]% market share. The introduction of new products in Spain and Italy will further increase Dow's market shares in these markets.

(B) The Parties are important and close competitors

(1401) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera.

⁹⁷¹ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

⁹⁷² No reliable market data was available for this market in Cyprus. Market shares for Cyprus are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

⁹⁷³ DuPont's response to the Commission's request for information RFI 55, question 4.

⁹⁷⁴ Dow's response to the Commission's request for information RFI 55, questions 2 and 3.

- (1402) In Italy, the Transaction brings together the two leading suppliers of insecticides for lepidoptera control in citrus. Further, [...].
- (1403) As regards the markets for hemiptera control in Spain and Italy, Dow is currently active with its products Reldan and Dursban. The Commission further notes that the market shares in Table 26 may underestimate the current competitive importance of Dow, [internal estimates].⁹⁷⁵ The Commission notes however that Dow's existing market share [internal document].⁹⁷⁶
- (1404) [Internal document].^{977,978}
- (1405) [...].⁹⁷⁹ [...].⁹⁸⁰ The Parties argue that [...].⁹⁸¹ However, the Commission notes that these claims have not been substantiated, for example, through the submission of internal documents discussing pricing. Further, as noted in recital (1404), [internal document]. Further, as will be noted in recitals (1409) to (1416), these products are likely to be [...], meaning that these products will be important products in these markets.
- (1406) As regards the market for diptera control in citrus in Spain, Dow is currently the dominant market player, with a [60-70]% market share. [Internal document]⁹⁸².
- (1407) [Internal document].⁹⁸³
- (1408) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for citrus fruit.
- (C) Competitive constraints imposed by competitors are limited
- (1409) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.
- (1410) As regards Syngenta, the Commission notes that it is currently the only main competitor to Dow in diptera control, but the Commission understands that this market share is attributable to sale of its product based on lamda-cyhalothrin, which is under severe regulatory pressure. [Internal document].⁹⁸⁴
- (1411) As regards hemiptera control (which includes aphids), Bayer is the only other main competitor with its product Movento (AI spirotetromat), although some Spanish customers contacted in the market investigation did not mention that the product

⁹⁷⁵ Parties' response to the Article 11(3) Decision, document 39.

⁹⁷⁶ [Internal document], (ID1328-219).

⁹⁷⁷ [Internal document].

⁹⁷⁸ [Internal document] (ID6827-50827).

⁹⁷⁹ Agreed non-confidential minutes of a call with a customer, 20 January 2017 (ID10727); Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10733).

⁹⁸⁰ Agreed non-confidential minutes of a call with a customer, 20 January 2017 (ID10727); Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10733).

⁹⁸¹ Parties' response to the first Letter of Facts.

⁹⁸² [Internal document].

⁹⁸³ [Internal document].

⁹⁸⁴ [Internal document] (ID6696-17045).

would be used by them for aphid control.⁹⁸⁵ From 2017, Bayer will launch a new insecticide targeting hemipteran pests, Sivanto.⁹⁸⁶ As noted at Section V.6.4.5.5, the Commission's investigation has not identified any other major new entrants targeting sucking insecticides in the EEA in the next five years.

- (1412) Flonicamid (sold under the brand name Teppeki by Belchim) is sold in both Italy and Spain. However, one Spanish customer did not recognise this product for use on citrus and did not consider this to be a competitor product to Dow's Reldan product (CHP-M). The reasons for this were: the product has to be used 70 days before the picking of the fruit; it can only be used once per year; and it is slow-acting.⁹⁸⁷
- (1413) Another Spanish customer stated that the products currently available for aphids were not very effective and had a detrimental impact on beneficial fauna. Aphids are considered to be a pest that was very difficult to control.⁹⁸⁸ While he did not consider these products to be very effective, this customer used (in rotation) Gazel (acetamiprid) from BASF and Dafene (dimethoate) from Bayer. Both products are used before the flowering of the fruit. The Commission notes however that acetamiprid is a neonicotinoid that accounts for just [0-5]% of BASF's already limited insecticide sales in the EEA and whose EEA registration expires in April 2018.⁹⁸⁹ Dimethoate is a candidate for substitute under regulatory pressure: its EEA approval expires in July 2018.⁹⁹⁰
- (1414) An Italian customer referred to a greater number of products that he used in rotation to treat citrus, but a number of these products were deemed to be ineffective by the Spanish customers.⁹⁹¹ Further, the customer noted that a greater number of products had to be used in rotation in Sicily, due to the temperate climate which means that insects reproduce at a faster rate. Similar to one of the Spanish customer, the Italian customer also noted that Belchim's Teppeki product could only be used 60 days before picking of the fruit. Further, the neonicotinoid product from Bayer, Confidor (imidacloprid) had certain restrictions in application due to its detrimental impact on beneficials.⁹⁹² As noted at Section V.6.4.5.5, this is a product that is under severe regulatory pressure and expected to exit the market in the near future. Syngenta is also present in Italy, but has a relatively low market share and furthermore, Syngenta's portfolio of sucking insecticides is under severe regulatory pressure.
- (1415) In one submission, the Parties refer to pyriproxyfen has having [10-20]% and [20-30]% market share in insecticides for hemiptera control for citrus in Spain and Italy respectively.⁹⁹³ However, the Commission notes that this product was not mentioned by customers in the market investigation as a competing product⁹⁹⁴ and

⁹⁸⁵ Agreed non-confidential minutes of a call with a customer, 20 January 2017 (ID10727); Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10733).

⁹⁸⁶ Bayer's response to the Commission's request for information request for information on crop protection products.

⁹⁸⁷ Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10733).

⁹⁸⁸ Agreed non-confidential minutes of a call with a customer, 20 January 2017 (ID10727).

⁹⁸⁹ EU pesticides database.

⁹⁹⁰ EU pesticides database.

⁹⁹¹ Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10748).

⁹⁹² Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10748).

⁹⁹³ Parties' response to the second Letter of Facts.

⁹⁹⁴ See for example, agreed non-confidential minutes of a call with a customer, 20 January 2017 (ID10727); Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10748); Agreed non-confidential minutes of a call with a customer, 23 January 2017 (ID10733).

moreover, the Parties have not provided further evidence substantiating their claim that this is a competitor product to Cyazypyr and Isoclast in their areas of overlapping pest spectrum.

(1416) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for citrus fruits are limited.

(D) Conclusion on horizontal overlaps in insecticides for citrus fruits

(1417) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1418) to (1421).

(1418) As regards lepidoptera, the Commission concludes that the Transaction would be likely to significantly impede effective competition in Italy in insecticides for lepidoptera control in citrus fruit.

(1419) Also regarding lepidoptera, the Commission considers that the Transaction would result in an overlap in Cyprus in insecticides for chewing (including lepidoptera) control in citrus fruit. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to this market, given that the overlap is in any case eliminated by the Final Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.

(1420) In Spain and Italy regarding hemipteran control, while there is currently no overlap between the Parties, this is currently a market where Bayer is the only other main competitor. [...]. The Commission considers that the Transaction would be likely to result in [...]. In this respect, the Commission concludes that the Transaction would be likely to cause a significant impediment to effective competition in Spain and Italy in insecticides for hemiptera control in citrus fruit.

(1421) As regards diptera control in Spain, the Commission finds that the only other main competitor is likely to exit the market. [...]. The Commission considers that the Transaction would be likely to result in [...]. In this respect, the Commission concludes that the Transaction would be likely to cause a significant impediment to effective competition in Spain in insecticides for diptera control in citrus fruit.

6.4.6.4. Horizontal overlaps in insecticides for grapes

(1422) The main problematic pests for grapes in Europe include the lepidopteran pests grapevine berry moth (*lobesia botrana*) and the grape berry moth (*Eupoecilia ambiguella* or *Clysia ambiguella*);⁹⁹⁵ and the homipteran pest, vine leafhopper (*cicadella*). The Parties' products that are used to target the lepidopteran pests are: indoxacarb, Rynaxypyr, spinosad and methoxyfenozide.⁹⁹⁶ Spinetoram will also be used to target these pests and will be registered for use on grapes/vines in the EEA

⁹⁹⁵ French common name is *Cochlylis*, Italian common name is *Tignola della vite*.

⁹⁹⁶ Agreed non-confidential minutes of a call with an institute, 5 October 2015 (ID8147).

from Q4 2016 onwards.⁹⁹⁷ The Parties' products that target cicadella are: chlorpyrifos and indoxacarb.⁹⁹⁸

(A) Analysis of the relative market shares of the Parties

Table 27 – Market shares: insecticides for grapes⁹⁹⁹

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combine d	Bayer	BASF	Syngenta	Others
Austria	Lepidoptera / foliar	[...]	[30-40]%	[40-50]%	[70-80]%	[0-5]%	[0-5]%	[5-10]%	[20-30]%
Cyprus ¹⁰⁰⁰	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[10-20]%	*[20-30]%	*[...]	*[...]	*[...]	*[...]
Czech Republic	Lepidoptera / not defined	[...]	[30-40]%	[60-70]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
France	Lepidoptera / foliar	[...]	[10-20]%	[20-30]%	[30-40]%	[0-5]%	[30-40]%	[20-30]%	[5-10]%
Germany	Lepidoptera / foliar	[...]	[5-10]%	[5-10]%	[10-20]%	[0-5]%	[80-90]%	[0-5]%	[0-5]%
Greece	Lepidoptera / not defined	[...]	[20-30]%	[20-30]%	[50-60]%	[10-20]%	[0-5]%	[10-20]%	[10-20]%
Hungary	Lepidoptera / not defined	[...]	[30-40]%	[20-30]%	[50-60]%	[5-10]%	[0-5]%	[30-40]%	[0-5]%
Italy	Lepidoptera / not defined	[...]	[20-30]%	[5-10]%	[20-30]%	[0-5]%	[0-5]%	[20-30]%	[40-50]%
Luxembourg ¹⁰⁰¹	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[10-20]%	*[20-30]%	*[...]	*[...]	*[...]	*[...]

⁹⁹⁷ [Internal document] (ID6696-23364).

⁹⁹⁸ Parties' response to the Commission's request for information RFI 44, question 10.

⁹⁹⁹ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹⁰⁰⁰ No reliable market data was available for this market in Cyprus. Market shares for Cyprus are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

¹⁰⁰¹ No reliable market data was available for this market in Luxembourg. Market shares for Luxembourg are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Malta ¹⁰⁰²	Chewing	*[...]	*[10-20]%	*[10-20]%	*[20-30]%	*[30-40]%	*[0-5]%	*[30-40]%	*[10-20]%
Slovakia	Lepidoptera / not defined	[...]	[60-70]%	[20-30]%	[90-100]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%
Spain	Lepidoptera / foliar	[...]	[10-20]%	[5-10]%	[20-30]%	[5-10]%	[0-5]%	[5-10]%	[60-70]%

Source: Commission compilation based on Agrowin (2015) and Parties' response to Commission's request for information 38 Question 20

Note: * [...]

(1423) Table 27 includes the market share data that the Commission relies upon to make the following findings. As regards insecticides for lepidoptera for grapes, the merged entity would have very high market shares for instance in the Czech Republic ([90-100]%), Austria ([70-80]%), Hungary ([50-60]%) and Greece ([50-60]%). Moreover, the merged entity would achieve joint number 1 position with BASF in France and Syngenta in Italy. In Spain, the merged entity would achieve a market leading position with a market share of [20-30]% ([...] as high as the next largest competitor Syngenta) and in Germany, a number 2 position with a market share of [10-20]%, with the only other main competitor being BASF. Other than the R&D-integrated players whose shares are set out in Table 27, in these markets, the remaining market share is fragmented among a number of competitors with only two competitors identified with a market share [... 5-10]%, Adama (Italy [5-10]%) and Spain [5-10]%) and FMC (Spain [5-10]%).

(1424) Further, in France, Italy, Greece, Poland, Germany and Spain, the Commission notes that Dow and DuPont are expected to launch new products. On the basis of [...], Spinetoram will soon be launched [...] with the first registrations taking place in Q4 2016.¹⁰⁰³ [...] ¹⁰⁰⁴ On the basis of [...], Cyazypyr will also be launched for use on grapes [...] with the first registrations taking place in Q4 2016.¹⁰⁰⁵ [...].

Figure 66 – [Extract from internal document]

[...]

Source: [Internal document], response to RFI 49 Q.4

(1425) The Commission considers that the market shares referenced in Table 27 provide a likely indication that the merged entity would exercise market power in a number of markets, for instance: Czech Republic (lepidoptera/not defined, [90-100]%), Austria (lepidoptera/not defined, [70-80]%), Hungary (lepidoptera/not defined, [50-60]%), and Greece (lepidoptera/not defined [50-60]%). As regards Germany, Italy and

¹⁰⁰² No reliable market data was available for this market in Malta. Market shares for Malta are based on available data for the region and/or proxy countries as submitted by the Parties. Parties' response to the Commission's request for information RFI 38, question 20.

¹⁰⁰³ Dow's response to the Commission's request for information RFI 55, question 3.

¹⁰⁰⁴ Dow's response to the Commission's request for information RFI 55, question 2.

¹⁰⁰⁵ DuPont's response to the Commission's request for information RFI 55, question 4.

Spain, the merged entity would face only one other major competitor. Further, in France, Italy, Greece, Poland, Germany and Spain, the Parties are expecting to significantly increase their market share, as a result of the introduction of new products.

(B) The Parties are important and close competitors

(1426) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera. Furthermore, [...].

(1427) Market participants confirm that the Parties both had an important portfolio of products for insecticides on grapes.¹⁰⁰⁶ For example: "*Dow and DuPont are active in the insecticide market for vines. Both companies' portfolios are fairly large and the merger will have the greatest impact on insecticides.*"¹⁰⁰⁷ Further, market participants noted that Dow and DuPont directly competed on this market: "*[t]he Dow and DuPont products compete fully, as farmers can apply them alternatively, in particular to use different modes of action.*"¹⁰⁰⁸

(1428) In particular, both have products effective on the grape berry moth (*lobesia botrana*): "*[t]he same is true for Lobesia Botrana in grapes. Dow offers Chlorpyrifos-methyl, Spinosad and the 3rd party product Methoxyfenozide in this segment, DuPont has excellent solutions against this key pest such as Chlorantraniliprole, Indoxacarb.*"¹⁰⁰⁹ Further, [...].

(1429) [Internal document].¹⁰¹⁰

Figure 67 – [Extract from internal document]

[...]

Source: [Internal document] (ID06696-27933)

(1430) The way in which [internal document].

Figure 68 – [Extract from internal document]

[...]

Source: [Internal document] (ID06696-27933)

(1431) [Internal document].¹⁰¹¹

(1432) [Internal document].

¹⁰⁰⁶ See for example agreed non-confidential minutes of a call with an institute, 5 October 2015 (ID8147); and agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734).

¹⁰⁰⁷ Agreed non-confidential minutes of a call with an institute, 5 October 2015 (ID8147). Courtesy translation from French: "*Dow et DuPont sont présentes dans le marché des insecticides sur les vignes. Le portefeuille des deux entreprises est assez large et c'est en matière d'insecticides que la concentration aura l'impact le plus fort.*"

¹⁰⁰⁸ Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734) and agreed non-confidential minutes of a call with an institute, 5 October 2015 (ID8147). Courtesy translation from French: "*Les produits de Dow et DuPont sont pleinement concurrents, puisque les agriculteurs peuvent les utiliser de manière alternative, notamment en vue d'utiliser des modes d'action différents.*"

¹⁰⁰⁹ Agreed non-confidential minutes of a call with a competitor, 14 July 2016 (ID5734). See also agreed non-confidential minutes of a call with an institute, 5 October 2015 (ID8147).

¹⁰¹⁰ [Internal document] (ID06696-27933).

¹⁰¹¹ [Internal document] (ID06696-27933).

Figure 69 – [Extract from internal document]

[...]

Source: Parties' response to Article 11(3) decision dated [...], document 35, [internal document]

(1433) [Internal document].¹⁰¹²

(1434) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for grapes.

(C) Competitive constraints imposed by competitors are limited

(1435) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.

(1436) In addition, [internal document], the Commission considers that the competitive constraint exercised by the Parties on each other, is stronger than the constraint exercised by Affirm on the Parties. This is because, first, the Commission notes that Affirm appears to be less effective than the products of the Parties.¹⁰¹³ Second, [internal document]. Syngenta's Affirm is priced [internal document].¹⁰¹⁴

(1437) As regards BASF, it has [...] in insecticides for lepidoptera control in grapes in France ([30-40]%) and a very high share in Germany ([80-90]%). The Commission [internal document]. Further, and as noted at Section V.6.4.5.5, the AI is also under severe regulatory pressure. The Commission therefore considers that BASF's market share in both France and Germany overstates its competitive importance.

Figure 70 – [Extract from internal document]

[...]

Source: [Internal document] (ID06696-27933), slide 7

(1438) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for grapes are limited.

(D) Conclusion on horizontal overlaps in insecticides for grapes

(1439) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1440) to (1442).

(1440) The Commission concludes that the Transaction would be likely to significantly impede effective competition in Hungary, Greece, France, Italy and Spain in insecticides for lepidoptera control in grapes. In Germany, the Commission concludes that the Transaction would be likely to significantly impede effective

¹⁰¹² [Internal document] (ID1332-619).

¹⁰¹³ [Internal document] (ID6696-10258).

¹⁰¹⁴ Parties' response to Article 11(3) Decision dated [...], document 35, [internal document].

competition on the basis that the merger combines the only two competitors to the only other main supplier on the market whose products face resistance/regulatory issues (BASF) [...].

- (1441) Also as regards lepidoptera, in Austria, the Parties' combined market share would be [70-80]% in insecticides for lepidoptera control in grapes and in this respect the Commission concludes that this would lead to the creation of a dominant position significantly impeding competition. In the Czech Republic, the Commission finds that DuPont is already dominant with a [60-70]% share in insecticides for lepidoptera control in grapes and that the Transaction would result in the addition of Dow's [30-40]% market share which would further strengthen the Parties' dominant position with a combined share of [90-100]%.
- (1442) Finally, the Commission finds that the Transaction would also result in an overlap in insecticides for lepidoptera control on grapes in Slovakia and for chewing (including lepidoptera) insect control in Cyprus, Malta and Luxembourg. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to these markets, given that the overlap is in any case eliminated by the Final Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.

6.4.6.5. Horizontal overlaps in insecticides for vegetables (solanacea)

- (1443) The term solanaceous vegetables refers to vegetables such as tomatoes, aubergines and peppers. In Europe, the tomato is the most produced vegetable in terms of quantity and together, Italy and Spain supply nearly two thirds of all tomatoes produced in the Union.¹⁰¹⁵
- (1444) The main pests for solanaceous vegetables include: the lepidopteran pests tomato leafminer (*tuta absoluta*), cotton bollworm (*helicoverpa armigera*) cotton leafworm (*Spodoptera littoralis*); thrips (*Frankliniella occidentalis* and *Thrips tabaci*); aphids; and whiteflies (*Trialeurodes vaporariorum*, *Bemisia tabaci*). The Parties AIs that are mainly used to target the lepidopteran pests are: chlorpyrifos; spinosad; methoxyfenozide; indoxacarb and Rynaxypyr. Spinetoram and Cyazypyr are in the process of being launched in the EEA and target lepidopteran pests, and also thrips. Cyazypyr and Isoclast, which will also soon be launched, are effective on aphids and whiteflies.¹⁰¹⁶

¹⁰¹⁵ Eurostat press release, 126/2016, 22 June 2016.

¹⁰¹⁶ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

(A) Analysis of the relative market shares of the Parties

Table 28 – Market shares: insecticides for vegetables (solanacea)¹⁰¹⁷

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Italy	Lepidoptera/not defined	[...]	[10-20]%	[20-30]%	[30-40]%	[0-5]%	[0-5]%	[40-50]%	[10-20]%
Italy	Diptera/not defined	[...]	[30-40]%	[10-20]%	[40-50]%	[5-10]%	[0-5]%	[10-20]%	[30-40]%
Italy	Hemiptera/not defined	[...]	[20-30]%	[5-10]%, [...] ¹⁰¹⁸	[30-40]%	[20-30]%	[0-5]%	[10-20]%	[20-30]%
Italy	Thrips/not defined	[...]	[30-40]%	[10-20]%	[40-50]%	[10-20]%	[0-5]%	[10-20]%	[30-40]%
Spain	Lepidoptera/not defined	[...]	[5-10]%	[10-20]%	[20-30]%	[10-20]%	[0-5]%	[10-20]%	[40-50]%
Spain	Thrips/ not defined	[...]	[80-90]%	[0-5]%	[80-90]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%

Source: Commission compilation based on Agrowin (2015)

(1445) Table 28 includes the market share data that the Commission relies upon to make the following findings. In Italy, the merged entity would have significant market shares in insecticides in solanaceous vegetables targeting three different pest groups: lepidoptera; diptera; and thrips. In two of the three, it would become the market leader, and in lepidoptera, it would achieve a joint number 1 position with Syngenta. In hemiptera, on the basis of the Parties' data, it would be the number 3 player on the basis of Dow's sales alone.

(1446) [...].^{1019,1020,1021} The Commission accordingly finds that [...] market shares in these markets. In particular, in Spain, [...] its share of [...] by [...]:

Figure 71 – [Extract from internal document]

[...]

Source: [Internal document], response to RFI 49 question 4

(1447) The Commission considers that competition in the Italian markets is very fragmented and notes that BASF is barely present. In insecticides targeting diptera, the merged entity would be [...] the next competitor, Syngenta ([10-20]%). Bayer has a [5-10]% share and there are only a small number of other competitors with a market share above 5%: Adama ([5-10]%), ISK ([5-10]%), Sipcam ([5-10]%). In lepidoptera, the only notable competitor to the merged entity is Syngenta; all other companies have a market share [0-5]%.
 [...]

¹⁰¹⁷ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹⁰¹⁸ [...].

¹⁰¹⁹ Dow's response to the Commission's request for information RFI 55, question 3.

¹⁰²⁰ Dow's response to the Commission's request for information RFI 55, question 2.

¹⁰²¹ DuPont's response to the Commission's request for information RFI 55, question 4.

- (1448) In hemiptera, it is only the R&D-integrated players that have a market share [... 5-10]%. Further, [...]. In thrips, the merged entity would be [...] than the next largest competitor, Syngenta ([10-20]%). A small number of competitors have a market share above 5%: Adama ([5-10]%); UPL ([5-10]%); ISK ([5-10]%).
- (1449) In Spain, post-Transaction the Parties would achieve a market leading position in lepidoptera, slightly ahead of Bayer and Syngenta, who would be in second and third place respectively. [Internal document], the Parties' combined market share is however expected to increase substantially with the introduction of spinetoram to the Spanish market. As regards other competitors: Nufarm has a market share of [10-20]%; and Sipcam has a share of [20-30]%. However, as discussed further at recitals (1465) to (1471), these market shares can be attributed to AIs which are under regulatory pressure.
- (1450) While DuPont does not currently have any market share in insecticides for thrips in solanaceous vegetables in Spain, the Commission notes that [...]. Dow is currently the dominant player with a [80-90]% market share. In terms of other competitors, Sipcam has a [10-20]% market share.
- (B) The Parties are important and close competitors
- (1451) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera. Furthermore, the Parties currently together have a market leading position in all but one of the markets listed in Table 28 (in insecticides for lepidoptera in Italy it would be joint number 1 with Syngenta). The Commission considers that this position will be [...].
- (1452) [Internal document].¹⁰²²
- (1453) As regards the main lepidopteran pests for tomato, for example tomato leafminer (*tuta absoluta*); cotton bollworm (*helicoverpa armigera*); cotton leafworm (*Spodoptera littoralis*), the Parties each have products that effectively target these pests, in particular, Spinosad, indoxacarb, Rynaxypyr and, soon, Spinetoram. This is reflected in the replies of market participants. For example, an Italian customer noted that "*Dow and DuPont's insecticides i.e. Laser, Coragen and soon also Spinetoram – are also very important for use on vegetables such as tomatoes, potatoes and brassicas. Indeed, those products target heliopsis and spodoptera respectively. Currently Coragen and Laser are the most important products against those pests, and with the introduction of Spinetoram, this will strengthen the position of Dow and DuPont even further*"¹⁰²³
- (1454) An Italian competitor also noted, in relation to both fruit and also tomatoes, that: "*Dow and DuPont are the leaders in the fruit segment (for example, pome fruit, peach etc.), more precisely for the insecticides targeting lepidoptera (such as the codling moth for pome fruit). [...] Thus, the two companies – for the fruit segment – can be considered as competitors. Both companies have important and market-leading products. [...] These products are all a farmer needs for a complete pest control strategy for the fruit segment; no other products are needed. [...] The above comments are also valid for tomatoes; Dow and DuPont are the market leaders in this segment. The relevant products are Altacor (Rynaxypyr) and Spinosad. With regard to the treatment for tomatoes, the farmer will first us Coragen and*

¹⁰²² [Internal document...] (ID7081-2983). [Internal document], (ID5475-168), slide 6.

¹⁰²³ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

subsequently, at a later stage in the cycle, will use Laser. While the Dow and DuPont products constitute a complete pest control strategy, there are other products such as Syngenta's Affirm (emamectin). This product is however usually applied during the last growing cycles and cannot therefore be considered to be a competitor of Coragen; rather it is in competition with Laser."¹⁰²⁴ [emphasis added]

- (1455) A customer in Spain referred to the importance of Rynaxypyr when tackling pests in tomatoes for industrial use: "Rynaxypir is a "must-have product" due to its greater effectiveness."¹⁰²⁵ The same customer noted however that Dow's Spinosad, although effective on the key pest tuta absoluta, was too expensive to be used on tomatoes for industrial use. The Commission however notes that [internal document].¹⁰²⁶
- (1456) As regards diptera and hemiptera in Italy, the Commission notes that the Parties both have products (Spinosad, Spinetoram, Rynaxypyr, indoxacarb, Cyazypyr) that effectively target the diptera leafminer, which is another target pest for tomato.
- (1457) As regards hemiptera, the Commission understands that the Parties' market share mainly consists of [...], DuPont currently has [...] in the sucking insecticide segment in Italy, contrary to the Agrowin data.¹⁰²⁷ However, a competitor noted that "[f]or sucking pests, there would be a strong concentration in tomatoes in Spain and Italy."¹⁰²⁸
- (1458) [Internal document]

Figure 72 – [Extract from internal document]

[...]

Source: [Internal document] (ID9304-92)

- (1459) Further, the Commission notes that [internal document]^{1029,1030,1031}, the Commission expects that [market share information] and, further, as anticipated by [internal document], as explained in recitals (1460) and (1461).
- (1460) Whiteflies are also an important hemipteran pest affecting solanaceous vegetables. [Internal document]¹⁰³², Dow's Isoclast EU website makes it clear that Isoclast is targeting the whitefly space, for example it notes that Isoclast "protects against difficult to control species which have developed resistance to many other insecticides like *Myzus persicae*, aphids *gossypypi* or *bemisia tabaci*" [emphasis added].¹⁰³³ As regards *bemisia tabaci* in particular, the Commission understands that

¹⁰²⁴ Agreed non-confidential minutes of a call with a customer, 28 October 2016 (ID9551). Emphasis added by the Commission.

¹⁰²⁵ Agreed non-confidential minutes of a call with a customer, 18 October 2016 (ID8600. Courtesy translation from Spanish: "Rynaxypir es un "must-have product" por su mayor efectividad."

¹⁰²⁶ [Internal document] (ID6696-632).

¹⁰²⁷ Parties' response to Statement of Objections, paragraph 1097.

¹⁰²⁸ Agreed non-confidential minutes of a call with a competitor, 8 April 2016 (ID8907).

¹⁰²⁹ [Internal document] (ID7830-291).

¹⁰³⁰ As noted in Section V.8.8.2, both Dow and DuPont focus their sucking insecticide discovery in particular on aphids, whiteflies and hoppers.

¹⁰³¹ [Internal document], (ID1328-219).

¹⁰³² [Internal document] (ID7830-291).

¹⁰³³ <http://isoclast.eu/faqs>.

this can be amongst the most damaging pests for, for example, tomatoes.¹⁰³⁴ [Internal document].

- (1461) Further, the Commission notes that in a [internal document].¹⁰³⁵ In addition, Dow's Isoclast website suggests that there are very few insecticides which effectively control this pest, due to resistance issues. This means that new AIs that can effectively control the pest, such as Isoclast and Cyazypyr, will be particularly important in this market.
- (1462) The Parties submit that Cyazypyr will be a significantly more expensive product than Isoclast and that this supports the argument that the two AIs are not close competitors.¹⁰³⁶ However, the Commission notes that these claims have not been substantiated, for example, through the submission of internal documents discussing pricing.
- (1463) As regards thrips, the main tomato pests are *Frankliniella occidentalis* and *Thrips tabaci*. In a scenario where there appears to be only one other company in this segment in Spain (Sipcam) and [internal document].^{1037,1038} In Italy, the merging entity would already have market power in thrips and [...].
- (1464) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for vegetables (solanacea).

(C) Competitive constraints imposed by competitors are limited

- (1465) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.
- (1466) As regards vegetables, an Italian customer noted the flaws in competitor products, such as pyrethroids and also Syngenta's Affirm product (emamectin benzoate): "*[f]or this market other products exist, such as pyrethroids but these are older products which also target beneficials and this is a major flaw in these products. The products of Dow and DuPont do not target beneficials. The other possible product is Syngenta's emamectin benzoate but the efficacy of this product is limited (it is only effective for a short period).*"¹⁰³⁹ As regards Syngenta, [internal document].¹⁰⁴⁰
- (1467) As regards insecticides for lepidoptera in Spain, the Commission notes that Nufarm has a market share of [10-20]%; and Sipcam has a share of [20-30]%. However, the Commission understands that the Nufarm products are either based on imidacloprid or lambda-cyhalothrin, which are both under regulatory pressure and expected to exit the market soon, as discussed further in Section V.6.4.5.5. The Commission further understands that the Sipcam's sales also relate to sales of lambda-cyhalothrin-based

¹⁰³⁴ Bayer Italia, "Soluzioni per la difesa, Pomodoro", page 2 available at <http://www.cropscience.bayer.it/it-IT/Colture/Orticole.aspx>.

¹⁰³⁵ [Internal document], (ID1327-115).

¹⁰³⁶ Parties' response to the first Letter of Facts.

¹⁰³⁷ [Internal document] (ID7081-295).

¹⁰³⁸ [Internal document].

¹⁰³⁹ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

¹⁰⁴⁰ [Internal document] (ID6827-20443).

products. The Commission considers therefore that these competitors are likely to suffer a significant decline in sales in the near future.

- (1468) In Italy, the Transaction brings together the only two main competitors to Syngenta, for insecticides for lepidoptera. In insecticides for diptera in Italy, the competition is very fragmented with the generic suppliers also supplying products which are based on old chemistries and coming under regulatory pressure. In insecticides for thrips in Italy, the competition is again very fragmented.
- (1469) As regards aphids, [internal document], the main competing AIs (other than Cyazypyr) are imidacloprid, thiametoxam, flupyradifurone and flonicamid. The first two are neonicotinoids that are under severe regulatory pressure and are likely to exit the market (see Section V.6.4.5.5). Flonicamid is an ISK molecule that is distributed by Belchim in Italy, under the brand name "Teppeki" for control of aphids and whiteflies on solanaceous vegetables, amongst other crops.¹⁰⁴¹ The Commission notes that Annex I approval of the AI was granted in September 2010 and expires in August 2020.¹⁰⁴² On the basis of the market share data¹⁰⁴³, the Commission concludes that the commercial impact of this molecule has been limited as regards solanaceous vegetables. While the Parties submit that the flonicamid is the number 1 product for whitefly control in Italy¹⁰⁴⁴ this claim has not been substantiated by the Parties.
- (1470) The only main competitor remaining on aphids is Bayer's flupyradifurone, which will be launched in Italy in 2017 and is effective on aphids.¹⁰⁴⁵ However, the Transaction would bring together two main R&D-integrated players, with only one main R&D competitor (Bayer) remaining. As noted at Section V.6.4.5.5, the Commission's investigation has not revealed any other major new entrants targeting sucking insecticides in the EEA in the next five years.
- (1471) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for vegetables (solanacea) are limited.
- (D) Conclusion on horizontal overlaps in insecticides for vegetables (solanacea)
- (1472) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1473) and (1474).
- (1473) The Commission concludes that the Transaction would be likely to significantly impede effective competition in Spain and Italy in insecticides for lepidoptera control in solanaceous vegetables and in Italy for diptera, hemiptera and thrips control. [...].

¹⁰⁴¹ <http://www.belchim.it/index.php/teppeki>.

¹⁰⁴² EU Pesticides database.

¹⁰⁴³ Source: Agrowin. The Commission further notes that the market share data provided by the Parties for chewing insecticides in Italy for tomatoes (Response to RFI 4 question 12) does not appear to attribute any significant share to ISK.

¹⁰⁴⁴ Parties' response to the first Letter of Facts, paragraph 23.

¹⁰⁴⁵ Competitor's response to the Commission's request for information. File name, "*Revised excel files in response to request for information - M.7932 - RFI - Annex 1_KIM-2016-09-27_Herbicide_final_non confidential_EEAdata*" (ID8153).

(1474) In Spain, while there is currently no overlap between the Parties in insecticides for thrips control in solanaceous vegetables, this is currently a market where Dow's products appear to be the only real effective choice for targeting thrips. Cyazypyr is also effective on the pest [...]. The Commission considers that the Transaction would be likely to [...]. On the basis of [...], the Commission concludes that the Transaction would be likely to cause a significant impediment to effective competition in Spain in insecticides for thrips control.

6.4.6.6. Horizontal overlaps in insecticides for vegetables (leafy/legumes)

(1475) The classification "leafy/legumes" vegetables includes vegetables such as artichokes, beans, celery, chicory, herbs, lettuce, peas and spinach.

(1476) The main pests that attack vegetables are lepidoptera (Heliothis, Spodoptera, Chrysodeixis, Plutella, Pieris, Mamestra, Tuta), diptera (Liriomyza species), Thysanoptera (thrips), and hemiptera (Aphids, Whitefly, Mealy bugs – sucking pests).¹⁰⁴⁶ The Parties AIs that are mainly used to target the lepidopteran pests are: Chlorpyrifos; Spinosad; methoxyfenozide; indoxacarb and Rynaxpyr. Spinetoram and Cyazypyr are in the process of being launched in the EEA and target lepidopteran pests, and also thrips. [...].¹⁰⁴⁷

(A) Analysis of the relative market shares of the Parties

Table 29 – Market shares: insecticides for vegetables (leafy/legumes)¹⁰⁴⁸

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combine d	Bayer	BASF	Syngent a	Others
Spain	Lepidoptera/ not defined	[...]	[20-30]%	[20-30]%	[40-50]%	[0-5]%	[0-5]%	[20-30]%	[20-30]%
Spain	Thrips/ not defined	[...]	[80-90]%	[0-5]%	[80-90]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%

Source: Commission compilation based on Agrowin (2015)

(1477) Table 29 includes the market share data that the Commission relies upon to make the following findings. In Spain, the merged entity would become the market leader in lepidoptera, [...] as the next closest competitor, Syngenta. Bayer and BASF are either not present, or barely present. As for the other competitors, other than Syngenta, only one other company has a market share of 5% or above (Sipcam, [5-10]%). [Internal document].^{1049,1050}

(1478) While DuPont does not currently have any market share in insecticides for thrips in leafy/legumes vegetables in Spain, the Commission notes that Cyazypyr is effective on thrips [...]. Dow is currently the dominant player with a [80-90]% market share. In terms of other competitors, Sipcam has a [10-20]% market share.

¹⁰⁴⁶ Form CO, part B.II - Insecticides, page 91.

¹⁰⁴⁷ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

¹⁰⁴⁸ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹⁰⁴⁹ Dow's response to the Commission's request for information RFI 55, question 3.

¹⁰⁵⁰ DuPont's response to the Commission's request for information RFI 55, question 4.

(B) The Parties are important and close competitors

(1479) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera. Furthermore, the Parties currently together have a market leading position in insecticides for lepidoptera on leafy/legumes vegetables in the markets listed above and this position [...].

(1480) [Internal document].¹⁰⁵¹

(1481) In conclusion, the Commission considers that the Parties are important and competitors in insecticides for vegetables (leafy/legumes).

(C) Competitive constraints imposed by competitors are limited

(1482) The Commission refers to the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.

(1483) As regards Syngenta, [internal document].¹⁰⁵²

(1484) As regards thrips, the main pest is [internal document] *Frankliniella occidentalis*. In a scenario where there appears only to be one other company in this segment in Spain (Sipcam) [internal documents].^{1053,1054}

(1485) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for vegetables (leafy/legumes) are limited.

(D) Conclusion on horizontal overlaps in insecticides for vegetables (leafy/legumes)

(1486) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1487) and (1488).

(1487) The Commission concludes that the Transaction would be likely to cause a significant impediment to effective competition in Spain in insecticides for lepidoptera control in leafy/legumes vegetables.

(1488) In Spain, while there is currently no overlap between the Parties in thrips in leafy/legumes vegetables, this is currently a market where Dow's products appear to be the only real effective choice for targeting thrips. Cyazypyr is also effective on the pest [...]. The Commission considers that the Transaction would be likely to result [...]. Therefore, the Commission concludes that the Transaction would be likely to significantly impede effective competition in Spain in insecticides for thrips control.

¹⁰⁵¹ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

¹⁰⁵² [Internal document] (ID6827-20443).

¹⁰⁵³ [Internal document] (ID7081-295).

¹⁰⁵⁴ DuPont's response to the Commission's request for information RFI 43, question 11: [...].

6.4.6.7. Horizontal overlaps in insecticides for vegetables (brassicas)

(1489) The classification "vegetables (brassicas)" includes vegetables such as: broccoli; cabbage; cauliflower; and turnips.

(1490) The main pests that attack vegetables are lepidoptera (Heliothis, Spodoptera, Chrysodeixis, Plutella, Pieris, Mamestra, Tuta), Diptera (Liriomyza species), Thysanoptera (thrips), and Hemiptera (Aphids, Whitefly, Mealy bugs – sucking pests).¹⁰⁵⁵ The Parties AIs that are mainly used to target the lepidopteran pests are: Chlorpyrifos; Spinosad; methoxyfenozide; indoxacarb and Rynaxpyr. Spinetoram and Cyazypyr are in the process of being launched in the EEA and target lepidopteran pests, and also thrips. Cyazypyr and Isoclast, which will also soon be launched, are effective on aphids and whiteflies.

(A) Analysis of the relative market shares of the Parties

Table 30 – Market shares: insecticides for vegetables (brassicas)¹⁰⁵⁶

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combine d	Bayer	BASF	Syngenta	Others
Spain	Lepidoptera /not defined	[...]	[30-40]%	[40-50]%	[80-90]%	[0-5]%	[0-5]%	[20-30]%	[0-5]%
France	Others/not defined ¹⁰⁵⁷	[...]	[10-20]%	[10-20]%	[30-40]%	[10-20]%	[0-5]%	[40-50]%	[10-20]%

Source: Commission compilation based on Agrowin (2015)

(1491) Table 30 includes the market share data that the Commission relies upon to make the following findings. In Spain, the merged entity would have a market leading position in insecticides targeting lepidoptera in brassicas. The only competitor would be Syngenta, with a [20-30]% share. In France, the merged entity would be in a number 2 position, behind Syngenta. However, the Transaction would combine the second and third largest players in the segment and, [...].

(1492) [...].^{1058,1059}

(B) The Parties are important and close competitors

(1493) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera. Furthermore, the Parties would, on the basis of their combined current market share, have a dominant position in insecticides for lepidoptera on brassicas in Spain. In France, the merged entity would bring together the [...]. In both markets, the Parties' position will likely [...].

¹⁰⁵⁵ Form CO, part B.II - Insecticides, page 91.

¹⁰⁵⁶ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹⁰⁵⁷ The category "others" in Agrowin includes mainly the following pests (those cited most frequently in the survey data): lepidoptera; insects, others; gastropoda.

¹⁰⁵⁸ Dow's response to the Commission's request for information RFI 55, question 3.

¹⁰⁵⁹ DuPont's response to the Commission's request for information RFI 55, question 4.

- (1494) As noted above in the competitive assessment for leafy/legumes vegetables¹⁰⁶⁰, [...].^{1061,1062}
- (1495) In the market investigation, the effectiveness and importance of the Parties' products for lepidopteran pests in brassicas was referred to by a customer: "*Dow and DuPont's insecticides i.e. Laser, Coragen and soon also Spinetoram – are also very important for use on vegetables such as tomatoes, potatoes and brassicas. Indeed, those products target heliopsis and spodoptera respectively. Currently Coragen and Laser are the most important products against those pests, and with the introduction of Spinetoram, this will strengthen the position of Dow and DuPont even further*".¹⁰⁶³
- (1496) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for vegetables (brassicas).
- (C) Competitive constraints imposed by competitors are limited
- (1497) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.
- (1498) As regards Syngenta in particular, [internal document].¹⁰⁶⁴
- (1499) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for vegetables (brassicas) are limited.
- (D) Conclusion on horizontal overlaps in insecticides for vegetables (brassicas)
- (1500) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recital (1501).
- (1501) The Commission concludes that the Transaction would be likely to significantly impede effective competition in France in insecticides for "other" pest (including lepidoptera) control in brassicas due to the removal of an important competitive force, and in Spain in insecticides for lepidoptera control due to the creation of a dominant market position.

¹⁰⁶⁰ Recitals (1479) to (1481) of Decision.

¹⁰⁶¹ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

¹⁰⁶² [Parties' submission].

¹⁰⁶³ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

¹⁰⁶⁴ [Internal document] (ID6827-20443).

6.4.6.8. Horizontal overlaps in insecticides for vegetables ("others"), vegetables (cucurbits) and vegetables (all segments – for certain smaller markets only)¹⁰⁶⁵

(1502) The classification "vegetables (other)" includes: flowers, leeks, balsam-apple, ornamentals, and other vegetables that have not been attributed to another category.

(1503) The main pests that attack vegetables are lepidoptera (Heliothis, Spodoptera, Chrysodeixis, Plutella, Pieris, Mamestra, Tuta), Diptera (Liriomyza species), Thysanoptera (thrips), and Hemiptera (Aphids, Whitefly, Mealy bugs – sucking pests).¹⁰⁶⁶ The Parties' AIs that are mainly used to target the lepidopteran pests are: chlorpyrifos; spinosad; methoxyfenozide; indoxacarb and Rynaxypyr. Spinetoram and Cyazypyr are in the process of being launched in the EEA and target lepidopteran pests, and also thrips. Cyazypyr and Isoclast, which will also soon be launched, are effective on aphids and whiteflies.

(A) Analysis of the relative market shares of the Parties

Table 31 – Market shares: insecticides for vegetables (others), vegetables (cucurbits) and vegetables (all segments – for certain smaller markets only)¹⁰⁶⁷

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Cyprus (all veg segments) ¹⁰⁶⁸	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[30-40]%	*[40-50]%	*[...]	*[...]	*[...]	*[...]
Czech Republic (other veg)	Hemiptera/not defined	[...]	[5-10]%	[30-40]%, [...] ¹⁰⁶⁹	[40-50]%	[0-5]%	[5-10]%	[10-20]%	[30-40]%
Czech Republic (other veg)	Others/not defined ¹⁰⁷⁰	[...]	[10-20]%	[40-50]%	[50-60]%	[0-5]%	[5-10]%	[5-10]%	[30-40]%
Estonia (all veg segments) ¹⁰⁷¹	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[30-40]%	*[40-50]%	*[5-10]%	*[0-5]%	*[20-30]%	*[20-30]%

¹⁰⁶⁵ Agrowin does not provide data for a number of Member States, including Estonia, Finland, Cyprus, Malta. For these markets, the Parties were also not able to provide reliable data and were only able to provide data on the basis of "all vegetables" rather than by specific groups of crops.

¹⁰⁶⁶ Form CO, part B.II - Insecticides, page 91.

¹⁰⁶⁷ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹⁰⁶⁸ No reliable market data was available for this market in Cyprus. Market shares for Cyprus are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

¹⁰⁶⁹ [Confidential observation] (see response to Statement of Objections, paragraph 1097).

¹⁰⁷⁰ The category "others" in Agrowin includes mainly the following pests (those cited most frequently in the survey data): lepidoptera; insects, others; gastropoda.

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Finland (all veg segments) ¹⁰⁷²	Chewing (includes lepidoptera)	*[...]	*[10-20]%	*[30-40]%	*[40-50]%	*[5-10]%	*[0-5]%	*[20-30]%	*[20-30]%
Greece (other veg)	Lepidoptera / not defined	[...]	[0-5]%	[40-50]%	[40-50]%	[10-20]%	[5-10]%	[30-40]%	[0-5]%
Greece (other veg)	Others / soil	[...]	[30-40]%	[10-20]%	[40-50]%	[5-10]%	[10-20]%	[0-5]%	[20-30]%
Greece (other veg)	Others/not defined	[...]	[10-20]%	[5-10]%	[20-30]%	[20-30]%	[0-5]%	[10-20]%	[30-40]%
Italy (other veg)	Hemiptera/ not defined	[...]	[10-20]%	[5-10]%, [...] ¹⁰⁷³	[20-30]%	[20-30]%	[0-5]%	[10-20]%	[30-40]%
Italy (veg – cucurbits)	Hemiptera/ not defined	[...]	[10-20]%	[10-20]%	[20-30]%	[30-40]%	[0-5]%	[5-10]%	[30-40]%
Italy (veg-cucurbits)	Others	[...]	[10-20]%	[10-20]%	[20-30]%	[10-20]%	[0-5]%	[10-20]%	[40-50]%
Italy (other veg)	Others/not defined	[...]	[30-40]%	[5-10]	[30-40]	[0-5]	[0-5]	[40-50]	[10-20]
Luxembourg (all veg segments) ¹⁰⁷⁴	Chewing (includes lepidoptera)	*[...]	*[20-30]%	*[5-10]	*[20-30]	*[0-5]	*[0-5]	*[0-5]	*[70-80]
Malta (all veg segments) ¹⁰⁷⁵	Chewing (includes lepidoptera)	*[...]	*[10-20]	*[30-40]	*[40-50]	*[5-10]	*[0-5]	*[20-30]	*[20-30]

¹⁰⁷¹ No reliable market data was available for this market in Estonia. Market shares for Estonia are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

¹⁰⁷² No reliable market data was available for this market in Cyprus. Market shares for Cyprus are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

¹⁰⁷³ [Confidential observation] (see response to Statement of Objections, paragraph 1097).

¹⁰⁷⁴ No reliable market data was available for this market in Luxembourg. Market shares for Luxembourg are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Netherlands (other veg)	Others/not defined	[...]	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[0-5]%	[30-40]%	[20-30]%
Slovenia (all veg segments) ¹⁰⁷⁶	Chewing (includes lepidoptera)	*[...]	*[20-30]%	*[5-10]%	*[20-30]%	*[5-10]%	*[0-5]%	*[40-50]%	*[10-20]%
Spain (other veg)	Others/ soil	[...]	[10-20]%	[0-5]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[70-80]%

Source: Commission compilation based on Agrowin (2015) and Parties' response to Commission's request for information 38 Question 20

Note: * [...]

- (1504) Table 31 includes the market share data that the Commission relies upon to make the following findings. As regards insecticides for hemipteran control the merged entity would reach a number 2 position in Italy with a market share of [10-20]% (on the basis of the Parties' sales data). Bayer has a [20-30]% share and Syngenta a [10-20]% share. Other than these two companies, the remaining market share is fragmented among a number of competitors. Only a very small number of these competitors have market shares above 5%. These are: FMC ([5-10]%) and Sipcam Oxon ([5-10]%).
- (1505) As regards insecticides for lepidoptera control, the merged entity would achieve a market leading position in Greece with a market share of [40-50]% (the next competitor being Syngenta with [30-40]%).
- (1506) As regards insecticides for "other" pests, the merged entity would achieve a market leading position in Greece (in insecticides with soil application) with a market share of [40-50]%, Spain with a market share of [20-30]% and in the Czech Republic with a market share of [50-60]%. In these countries, the Parties' market shares are [...] the next largest competitor. Moreover, the merged entity would achieve a number 2 position in Italy with a market share of [30-40]%. In Greece for insecticides for which the application is not defined, the Transaction would remove one main R&D competitor, leaving the merged entity, Bayer and Syngenta with [...] shares. A similar picture emerges in the Netherlands for insecticides for which the application is not defined, albeit that Syngenta would be the number 1 player, with the merged entity and Bayer would have [...] shares, in number 2 position. Other than the R&D-integrated players in the markets for insecticides for "other" pests in Greece, Spain and the Czech Republic, the remaining market share is fragmented among a number

¹⁰⁷⁵ No reliable market data was available for this market in Malta. Market shares for Malta are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

¹⁰⁷⁶ No reliable market data was available for this market in Slovenia. Market shares for Slovenia are based on available data for the region and/or proxy countries as submitted by the Parties. Response to the Commission's request for information RFI 38, question 20.

of competitors. Only a very small number of these competitors have market shares above 5%. These are: FMC (Czech Republic [10-20]%), Platform Speciality (Czech Republic [20-30]%), Adama (Greece [5-10]%, Italy [5-10]%), ISK (Greece [5-10]%) and Nippon soda (Czech Republic [5-10]%).

(1507) Further, in Italy, Spain, Greece and the Netherlands, [...]. On the basis of [...].^{1077,1078,1079}

(B) The Parties are important and close competitors

(1508) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera.

(1509) In the market investigation, a customer referred to the strong combined market position of the Parties in Greece in vegetables: "*Dow and DuPont are present in the Greek market by offering the two most successful products, namely Dow's Spinosad and DuPont's Rynaxypyr. Moreover, in their pipelines they have two up-coming products; Dow's sulfoxaflor and DuPont's Cyazypyr. Syngenta has some insecticides in its pipeline too, but as of today they have not been marketed yet. They are dominant in some segments, notably vegetables.*"¹⁰⁸⁰

(1510) As noted above in the competitive assessment for leafy/legumes vegetables,¹⁰⁸¹ the Parties each have products which are very effective on lepidopteran pests such as *helicoverpa armiguera* and *spodoptera*. [...].¹⁰⁸²

(1511) As regards hemiptera in Italy, the Commission understands that the Parties' market share mainly consists of [...]. Dow and DuPont [...]. In a [internal document].¹⁰⁸³ The Commission refers also to evidence cited at recitals (1454) to (1457) regarding [...], which it considers to apply equally to the competitive assessment for hemipteran pests on "other" vegetables in Italy.

(1512) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for vegetables ("others"), vegetables (cucurbits) and vegetables (all segments – for certain smaller markets only).

(C) Competitive constraints imposed by competitors are limited

(1513) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.

(1514) As regards Syngenta, which is the main other competitor in the lepidoptera and "other" pest markets, [internal document].¹⁰⁸⁴

¹⁰⁷⁷ Dow's response to the Commission's request for information RFI 55, question 3.

¹⁰⁷⁸ Dow's response to the Commission's request for information RFI 55, question 2.

¹⁰⁷⁹ DuPont's response to the Commission's request for information RFI 55, question 4.

¹⁰⁸⁰ Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

¹⁰⁸¹ Recitals (1479) to (1481) of Decision.

¹⁰⁸² [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

¹⁰⁸³ [Internal document] (ID9304-93).

¹⁰⁸⁴ [Internal document] (ID6827-20443).

- (1515) As regards insecticides for hemiptera in Italy, Bayer is the only other main player. Syngenta has a low market share in insecticides for hemiptera in Italy and in any event, its portfolio of sucking insecticides is under severe regulatory pressure.¹⁰⁸⁵ The main other competitors in this market are generics, which, as noted at Section V.6.4.5.5, are likely also to face significant regulatory pressure. As noted at Section V.6.4.5.5, the Commission's investigation has not revealed any other major new entrants targeting sucking insecticides in the EEA in the next five years.
- (1516) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for vegetables ("others"), vegetables (cucurbits) and vegetables (all segments – for certain smaller markets only) are limited.
- (D) Conclusion on horizontal overlaps in insecticides for vegetables (others)
- (1517) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1518) to (1521).
- (1518) As regards "other" (mainly lepidopteran) pests, the Commission concludes that the Transaction would be likely to significantly impede effective competition in Italy, Spain, Greece (both markets), the Netherlands and the Czech Republic in insecticides for control of "other" (mainly lepidopteran) pests in "other" vegetables. Similarly, the Commission concludes that the Transaction would be likely to significantly impede effective competition in Italy in insecticides for control of hemipteran pests, on the basis that the Transaction would bring together two out of three main R&D-integrated players and thus removes an important competitive force.
- (1519) In Greece, while there is currently no overlap between the Parties in lepidoptera, this is currently a market where DuPont's products are the main effective choice for targeting lepidoptera. [...]. The Commission considers that the Transaction would be likely to result in [...]. Therefore, the Commission concludes that the Transaction would be likely to significantly impede to effective competition in Greece in insecticides for lepidoptera control.
- (1520) Furthermore, the Transaction would result in an overlap in insecticides for hemiptera control in vegetables (cucurbits) in Italy, hemiptera control in vegetables (other) in the Czech Republic¹⁰⁸⁶ and for control of "other" (largely lepidoptera) pests in vegetables (cucurbits) in Italy. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to these markets, given that the overlap is in any case eliminated by the Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.
- (1521) In addition, the Transaction would result in an overlap in insecticides for chewing (including lepidoptera) control in vegetables (all vegetable segments) in Cyprus, Estonia, Finland, Luxembourg, Malta and Slovenia. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to these markets, given that the overlap is

¹⁰⁸⁵ Section V.6.4.5.5(A).

¹⁰⁸⁶ [Content of the Parties' submission], Parties' response to Statement of Objections, paragraph 1097.

in any case eliminated by the Final Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.

6.4.6.9. Horizontal overlaps in insecticides for potatoes

(1522) In Europe, key pests targeting potatoes are the coleopteran pests, wireworms and Colorado potato beetles.¹⁰⁸⁷

(1523) The Parties' products used mainly to target wireworms and Colorado potato beetles are: chlorpyrifos; spinosad; and Rynaxypyr. [...].

(A) Analysis of the relative market shares of the Parties

Table 32 – Market shares: insecticides for potatoes¹⁰⁸⁸

Country	Pest groupings	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Bulgaria	Coleoptera/soil	[...]	[0-5]%	[90-100]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Greece	Lepidoptera/not defined	[...]	[10-20]%	[20-30]%	[30-40]%	[10-20]%	[0-5]%	[10-20]%	[30-40]%
Hungary	Lepidoptera/ foliar	[...]	[5-10]%	[20-30]%	[30-40]%	[50-60]%	[0-5]%	[0-5]%	[10-20]%
Spain	Coleoptera/soil	[...]	[5-10]%	[10-20]%	[10-20]%	[10-20]%	[5-10]%	[10-20]%	[30-40]%
UK	Others ¹⁰⁸⁹ /soil	[...]	[0-5]%	[60-70]%	[60-70]%	[0-5]%	[0-5]%	[20-30]%	[10-20]%
UK	Others/foliar	[...]	[0-5]%	[20-30]%	[20-30]%	[10-20]%	[0-5]%	[5-10]%	[50-60]%

Source: Commission compilation based on Agrowin (2015)

(1524) Table 32 includes the market share data that the Commission relies upon to make the following findings. As regards insecticides for potatoes, the merged entity would have market leading shares in Bulgaria, Greece and the UK (soil insecticides) and in Spain (coleoptera), it would have a joint number one position with Bayer and Syngenta.

(1525) [...].^{1090,1091}

(B) The Parties are important and close competitors

(1526) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera and other chewing insects.

¹⁰⁸⁷ [Internal document] (ID6827-17697).

¹⁰⁸⁸ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹⁰⁸⁹ The category "others" in Agrowin includes mainly the following pests (those cited most frequently in the survey data): lepidoptera; insects, others; gastropoda.

¹⁰⁹⁰ Dow's response to the Commission's request for information RFI 55, question 3.

¹⁰⁹¹ DuPont's response to the Commission's request for information RFI 55, question 4.

- (1527) The Commission notes that, as regards the Colorado potato beetle, both Spinetoram and Rynaxypyr and Cyazypyr are very effective on this pest.¹⁰⁹² Further, the Parties state that the only other "by pest" overlap between Spinosad and Rynaxypyr is on coleopteran on potatoes.¹⁰⁹³ The Commission further notes that the wireworm was one particular pest which was deemed by market participants to have no, or only a few, effective crop protection products available.¹⁰⁹⁴
- (1528) The Commission's findings are also supported by market participants. For instance, an Italian customer noted that "*Dow and DuPont's insecticides i.e. Laser, Coragen and soon also Spinetoram – are also very important for use on vegetables such as tomatoes, potatoes and brassicas. Indeed, those products target heliopsis and spodoptera respectively. Currently Coragen and Laser are the most important products against those pests, and with the introduction of Spinetoram, this will strengthen the position of Dow and DuPont even further*".¹⁰⁹⁵ Similarly, a competitor noted that the merged entity would: "*have a similarly strong position in insecticides for [...] potatoes.*"¹⁰⁹⁶
- (1529) [Internal document].¹⁰⁹⁷
- (1530) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for potatoes.
- (C) Competitive constraint imposed by competitors is limited
- (1531) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.
- (1532) The Commission in this respect notes that, as regards the Colorado potato beetle, while both Spinetoram and Rynaxypyr and Cyazypyr are very effective on this pest, the other main group of products that appear to be effective on this pest are the neonicotinoids.¹⁰⁹⁸ As noted at Section V.6.4.5.5, this chemical class is under severe regulatory pressure and these products are likely to exit the market in the near future. [Internal document].

Figure 73 – [Extract from internal document]¹⁰⁹⁹

[...]

- (1533) [Internal document].¹¹⁰⁰

¹⁰⁹² [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

¹⁰⁹³ Parties' response to the Article 6(1)(c), paragraph 122.

¹⁰⁹⁴ Questionnaire to Crop Protection Customers (Q1), question 17.

¹⁰⁹⁵ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

¹⁰⁹⁶ Agreed non-confidential minutes of a call with a competitor, 7 April 2016 (ID8260).

¹⁰⁹⁷ [Internal document] (ID6827-17697).

¹⁰⁹⁸ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

¹⁰⁹⁹ [Internal document] (ID6827-17697).

¹¹⁰⁰ [Internal document] (ID6827-17697).

(1534) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for potatoes are limited.

(D) Conclusion on horizontal overlaps in insecticides for potatoes

(1535) Therefore, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1536) to (1540).

(1536) In particular, the Commission concludes that the Transaction would be likely to significantly impede effective competition in Greece in insecticides for lepidoptera control for potatoes.

(1537) Also as regards lepidoptera, the Transaction would result in an overlap in Hungary in insecticides for lepidoptera control in potatoes. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to this market, given that the overlap is in any case eliminated by the Final Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.

(1538) As regards the control of "other" (mainly lepidopteran) pests on potatoes (both soil and foliar applications), in the United Kingdom where there is currently no overlap between the Parties, [...]. The Commission considers that the Transaction would be likely to result in [...]. Therefore the Commission concludes that the Transaction would be likely to significantly impede effective competition in the United Kingdom markets for control of "other" insects on potatoes (both soil and foliar applications),

(1539) As regards coleoptera, in Bulgaria, in insecticides for coleoptera control on potatoes, there is currently no overlap but DuPont [...] market share [...]. The Commission considers that the Transaction would be likely to result in [...]. Therefore, the Commission concludes that the Transaction would be likely to give rise to a significant impediment to effective competition in Bulgaria.

(1540) In Spain, in insecticides for coleoptera control on potatoes, [...]. The Commission considers that the Transaction would be likely to result in [...]. At the same time, the existing competitors are losing market share due to regulatory pressure on their products. Therefore, the Commission concludes that the Transaction would be likely to give rise to a significant impediment to effective competition in Spain.

6.4.6.10. Horizontal overlaps in insecticides for corn

(1541) The main pests in corn include lepidoptera (*Ostrinia nubilalis*, a corn borer) and coleoptera (*Diabrotica virgifera virgifera*, the Western corn rootworm, and *Agriotes*, a wireworm).¹¹⁰¹

(1542) The Parties' products mainly used to treat these pests are methoxyfenozide, indoxacarb and Rynaxypyr.

¹¹⁰¹ Form CO, part B.II - Insecticides, page 55.

(A) Analysis of the relative market shares of the Parties

Table 33 – Market shares: insecticides for corn¹¹⁰²

Country	Pest grouping	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Austria	Lepidoptera/ foliar	[...]	[20-30]%	[70-80]%	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Czech Republic	Lepidoptera/ foliar	[...]	[50-60]%	[20-30]%	[80-90]%	[0-5]%	[0-5]%	[5-10]%	[10-20]%
Czech Republic	Coleoptera/ foliar	[...]	[20-30]%	[20-30]%	[50-60]%	[0-5]%	[0-5]%	[40-50]%	[0-5]%
Germany	Lepidoptera/ foliar	[...]	[0-5]%	[20-30]%	[20-30]%	[0-5]%	[0-5]%	[0-5]%	[70-80]%
Hungary	Others ¹¹⁰³ / foliar	[...]	[5-10]%	[40-50]%	[40-50]%	[10-20]%	[0-5]%	[10-20]%	[10-20]%
Slovakia	Lepidoptera/ foliar	[...]	[20-30]%	[30-40]%	[50-60]%	[0-5]%	[5-10]%	[10-20]%	[20-30]%

Source: Commission compilation based on Agrowin (2015)

(1543) Table 33 includes the market share data that the Commission relies upon to make the following findings. As can be seen from the market shares in Table 33, the merged entity would have very high combined market shares and able to exercise market power for instance in Austria, the Czech Republic and Hungary. The remaining competition is fragmented (and in Austria, appears non-existent).

(B) The Parties are important and close competitors

(1544) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera. Furthermore, the Parties currently together have a market leading position in insecticides for lepidoptera for instance in Austria, the Czech Republic and Hungary.

(1545) [Strategic targets; internal documents].^{1104,1105,1106}

(1546) In addition, while the Commission understands that the Parties [...] in the markets for insecticides for corn ([...]), the Commission notes that [product information]. The Commission further notes that the Form CO states that [...], which suggests that [...].¹¹⁰⁷

(1547) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for corn.

¹¹⁰² This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹¹⁰³ The category "others" in Agrowin includes mainly the following pests (those cited most frequently in the survey data): lepidoptera; insects, others; gastropoda.

¹¹⁰⁴ [Internal document] (ID6826-740).

¹¹⁰⁵ [Internal document] (ID1332-618).

¹¹⁰⁶ [Internal document] (ID6696-14832).

¹¹⁰⁷ Form CO, part B.II - Insecticides, page 35.

(C) Competitive constraints imposed by competitors are limited

- (1548) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is also reflected in the low and fragmented market shares of these players.
- (1549) Further, while in Austria the Agrowin indicates that there are no competitors to the Parties, the Parties refer to the fact that Kwizida Agro has sales of chewing insecticides on corn in Austria.¹¹⁰⁸ However, the Commission notes that these sales relate only to 2014 and not 2015. Further, these sales are of CHP-E, which is under regulatory pressure [...].
- (1550) In conclusion, the Commission considers that constraints imposed by competitors in insecticides for corn are limited.

(D) Conclusion on horizontal overlaps in insecticides for corn

- (1551) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in a number of EEA countries as specified in recitals (1552) to (1553).
- (1552) As regards lepidoptera, the Commission concludes that the Transaction would be likely to significantly impede effective competition in Hungary in insecticides for other insect/lepidoptera control in corn. In the Czech Republic and Austria, the Parties' combined market share would be [80-90]% and [90-100]% in insecticides for lepidoptera control in corn and the Commission concludes that this would lead to the strengthening of a dominant position.
- (1553) Also as regards lepidoptera, the Transaction would result in an overlap in insecticides for lepidoptera control on corn in Germany and Slovakia and for coleoptera control on corn in the Czech Republic. Nonetheless, there is no need for the Commission to conclude whether the Transaction would be likely to significantly impede effective competition with regard to these markets, given that the overlap is in any case eliminated by the Final Commitments proposed by the Parties, in particular, the global divestment of DuPont's AIs Rynaxypyr, Cyazypyr and indoxacarb.

6.4.6.11. Horizontal overlaps in insecticides for oilseed rape

- (1554) The main problematic pest for oilseed rape in Europe is the pollen beetle (a coleopteran pest). Pyrethroids are the main type of insecticides currently used to tackle this pest.

¹¹⁰⁸ Form CO, part B.II - Insecticides, Annex B.II.12, page 1.

(A) Analysis of the relative market shares of the Parties

Table 34 – Market shares: insecticides for oilseed rape¹¹⁰⁹

Country	Pest groupings	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Czech Republic	Coleoptera/ not defined	[...]	[50-60]%	[0-5]%	[50-60]%	[20-30]%	[0-5]%	[0-5]%	[10-20]%
Slovakia	Coleoptera/ foliar	[...]	[30-40]%	[0-5]%	[40-50]%	[20-30]%	[0-5]%	[10-20]%	[10-20]%

Source: Commission compilation based on Agrowin (2015)

(1555) As can be seen from the market shares in Table 34, the merged entity would have [...] shares in the Czech Republic, although the increment brought about by the merger would be limited ([0-5]%). Bayer is Dow's main competitor with a market share of [20-30]%. The next largest competitors are Nufarm ([5-10]%) and Platform Specialty ([0-5]%). The Parties [...].¹¹¹⁰

(B) Conclusion on horizontal overlaps in insecticides for oilseed rape

(1556) As regards insecticides for the control of coleopteran pests in oilseed rape, the Commission notes that the Parties' combined market share rises to [50-60]% in the Czech Republic and [40-50]% in Slovakia. However, the market share increment brought by the Transaction would be limited ([0-5]% points in the Czech Republic and [0-5]% points in Slovakia). The merged entity would continue to be challenged by a number of competitors in the Czech Republic, including Bayer ([20-30]%), Nufarm ([5-10]%) and Platform Specialty ([0-5]%). In Slovakia, the merged entity would also continue to be challenged by a number of competitors, including Bayer ([20-30]%), Nippon Soda ([10-20]%) and Syngenta ([10-20]%). The Parties [...] would significantly change the competitive landscape in favour of the Parties absent the Transaction.

(1557) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not significantly impede effective competition with respect to insecticides for control of coleopteran pests in oilseed rape in the Czech Republic and Slovakia.

6.4.6.12. Horizontal overlaps in insecticides for cotton

(1558) *Helicoverpa armigera* (cotton bollworm) is one of the main pests to attack cotton and it is a lepidopteran pest. Currently, DuPont's AIs Rynaxypyr and indoxacarb are used to control this pest. None of Dow's current products are used to target pests in cotton, [...].^{1111,1112}

¹¹⁰⁹ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹¹¹⁰ Parties' response to the Commission's request for information RFI 55.

¹¹¹¹ Dow's response to the Commission's request for information RFI 55, question 3.

¹¹¹² DuPont's response to the Commission's request for information RFI 55, question 4.

(A) Analysis of the relative market shares of the Parties

Table 35 – Market shares: insecticides for cotton¹¹¹³

Country	Pest groupings	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
Greece	Lepidoptera/ not defined	[...]	[0-5]% [...] ¹¹¹⁴	[50-60]%	[50-60]%	[10-20]%	[0-5]%	[5-10]%	[30-40]%

Source: Commission compilation based on Agrowin (2015)

(1559) Table 35 includes the market share data that the Commission relies upon to make the following findings. DuPont currently has a very high share in insecticides for lepidoptera control on cotton in Greece and the Commission finds that it exercises market power. It is [...] its next largest competitor. The competition is very fragmented, including among the R&D-integrated players, who are [...] present in this market. The only other competitors with a market share above 5% are: Adama ([10-20]%) and Platform Speciality Products ([5-10]%). As noted in recital (1558), Dow is not currently active in this market [...].

(B) The Parties are important and close competitors

(1560) As noted in Section V.6.4.5.3, the Commission finds that the Parties are important and close competitors, particularly in insecticides for lepidoptera.

(1561) DuPont is currently the market leader in lepidoptera control. [Internal document].^{1115,1116}

(1562) In conclusion, the Commission considers that the Parties are important and close competitors in insecticides for cotton.

(C) Competitive constraints imposed by competitors are limited

(1563) The Commission recalls the arguments set out in Section V.6.4.5.5 regarding the comparatively weak position of the other R&D-integrated players, and also generics, in insecticides and in particular, insecticides targeting lepidoptera to support its finding that the Parties' competitors impose limited constraints on them. The Commission considers that the weak competitive constraint exercised by competitors is corroborated by the low and fragmented market shares of these players.

(1564) The Commission however notes that DuPont, [internal document]¹¹¹⁷ The Commission is unable to comment on such information since it is not aware [...].¹¹¹⁸ Further, the Commission refers to [internal document].¹¹¹⁹

¹¹¹³ This table contains market shares for all affected markets and markets that may not be currently affected markets [pipeline information].

¹¹¹⁴ [...] (see Parties' response to the Commission's request for information 38, question 20.

¹¹¹⁵ [Internal document] (ID6696-10258) and the Parties' response to the Commission's request for information RFI 44, question 10.

¹¹¹⁶ [Internal document]" (ID6827-38513).

¹¹¹⁷ [Internal document] (ID6827-38513).

¹¹¹⁸ Competitor's response to the Commission's request for information, "Non confidential versions of RFI - INS M 7932 - RFI - Annex 1 - 07102016 - Non-Confidential," (ID7526).

(1565) In conclusion, the Commission considers that the competitive constraints imposed by competitors in insecticides for cotton are limited.

(D) Conclusion on horizontal overlaps in insecticides for cotton

(1566) To sum up, considering all evidence available to it and also in light of the common arguments relevant to multiple insecticide markets across the EEA set out at Section V.6.4.5 and the general characteristics of the crop protection market as described in Sections V.6.2, the Commission concludes that, absent adequate remedies, the Transaction would be likely to significantly impede effective competition in Greece as specified in recitals (1567) and (1567).

(1567) In particular, while there is [...] overlap between the Parties in insecticides for control of lepidoptera in cotton, [...]. The Commission considers that the Transaction would be likely to [...].

(1568) Therefore, the Commission concludes that the Transaction would be likely to give rise to a significant impediment to effective competition for insecticides for lepidoptera control in Greece.

6.5. Nematicides

6.5.1. Introduction¹¹²⁰

6.5.1.1. Nematodes are an increasingly important group of agricultural pests

(1569) Nematicides are agrochemicals that control nematodes. Nematodes are microscopic roundworms that live in many habitats, and are the second most abundant species on Earth. Their numerical dominance, often exceeding a million individuals per square metre and accounting for about 80% of all individual animals on Earth, their diversity of life cycles, and their presence at various trophic levels point to an important role in many ecosystems. They are often found as parasites in plants, animals, insects and birds or any living organism from which they can derive nutrition. They are found in nearly all climates and soil types.

(1570) At least 2 500 species of plant-parasitic nematodes have been described. Plant-parasitic nematodes are of great economic importance, "*with an estimated impact of ~\$100 Bn in crop losses*".¹¹²¹ Nematodes secure themselves to the plant tissue and suck nutrition from the plant. This adversely affects plant yield. In a tuber or root-based crop like potatoes or carrots, nematode activity can be fatal for the plant, and consumption of the produce infected by nematodes can cause health problems in humans. Crops or fruits infected by nematodes, if consumed by humans, can lead to severe gastrointestinal problems and aches as well as diarrhoea, abdominal aches and severe dysentery. Nematodes are not easily visible and thus are easily transmitted.

(1571) Because most of them live in the soil, they represent one of the most difficult pest problems to identify, demonstrate and control. It has been estimated that some 10%

¹¹¹⁹ [Internal document] (ID6696-17045).

¹¹²⁰ Information on nematodes and nematode control in this introduction draws on a number of publicly available sources: <http://www.fao.org/docrep/006/y4011e/y4011e0p.htm>, <http://www.apsnet.org/edcenter/intropp/PathogenGroups/Pages/IntroNematodes.aspx>, <https://en.wikipedia.org/wiki/Nematode>, <https://en.wikipedia.org/wiki/Nematicide>, https://en.wikipedia.org/wiki/Potato_cyst_nematode, https://en.wikipedia.org/wiki/Root-knot_nematode, <http://www.gardenguides.com/124007-nematodes.html>.

¹¹²¹ Parties' submission of [date] on development molecules, [internal document] (ID8604), page 3.

of world crop production is lost as a result of plant nematode damage. Because nematodes have the ability to shut down all their metabolic activities, they are tough pests to handle if they infect a crop. They can remain indefinitely dormant and will not succumb to normal pest control measures.

- (1572) The most relevant groups of nematodes in the EEA are cyst nematodes (mainly *Globodera*, potato cyst nematodes, but also cyst nematodes of the *Heterodora* group), *Pratylenchus* (lesion nematodes) and, the most pervasive, *Meloidogyne* (root-knot nematodes).¹¹²²
- (1573) **Potato root nematodes or potato cyst nematodes (PCN)** are 1-mm long roundworms, which live on the roots of plants of the *Solanaceae* family such as potatoes and tomatoes. PCN cause growth retardation and, at very high population densities, damage to the roots and early senescence of plants. Fields are free from PCN until an introduction occurs, after which the typical patches, or hotspots, occur on the farmland. These patches can become full field infestations when unchecked. Yield reductions can average up to 60% at high population densities. Pesticides can be used, but they will not get a field free of nematodes. They will increase yields and are only profitable at high population densities, when the financial profit of the extra yield will surpass the cost of the pesticide application. Cyst nematodes (PCNs but also cyst nematodes of the *Heterodora* group) typically affect root plants like potatoes and carrots only.¹¹²³
- (1574) **Lesion nematodes** are parasitic on plants and are responsible for root lesion disease on a great variety of host plants in temperate regions around the world. *Pratylenchus penetrans* alone has over 350 host plants. They include agricultural crops such as soybeans, potatoes, corn, bananas and wheat. The genus is found most often in corn. Signs of disease are similar in most plants and generally include necrotic lesions of the roots. The lesions can also be entrances for pathogenic bacteria and fungi, which produce secondary infections. Above ground the plant becomes stunted, chlorotic, and wilted, and it often dies. A crop field may be patchy as plants wither and die. Root lesion nematodes can cause significant yield losses.
- (1575) **Root-knot nematodes (RKN)** are plant-parasitic nematodes, which exist in soil in areas with hot climates or short winters. About [...] plants worldwide are susceptible to infection by root-knot nematodes and they cause approximately [5-10]% of global crop loss. For tomatoes in Spain, they cause an estimated [10-20]% loss.¹¹²⁴ Root-knot nematode larvae infect plant roots, causing the development of root-knot galls that drain the plant's photosynthate and nutrients. Infection of young plants may be lethal, while infection of mature plants causes decreased yield. Vegetable crops grown in warm climates can experience severe losses from root-knot nematodes and are often routinely treated with a chemical nematicide.
- (1576) The main crops affected by nematodes in the EEA currently are potatoes and fruits and vegetables (tomatoes, carrots, peppers, strawberries, etc.), as well as flowers and tobacco.¹¹²⁵ These high value crops are strategic for European agriculture, which

¹¹²² Parties' response to the Commission's request for information RFI 59 (ID8827), Figure 1.

¹¹²³ Parties' response to the Commission's request for information RFI 59 (ID8827), Figure 1.

¹¹²⁴ DuPont's response to the Commission's request for information RFI 49, Annex 1.4 (ID9304-000100), Kline report for Spain, page 32.

¹¹²⁵ Agreed non-confidential minutes of a call with a customer, 28 September 2016 (ID8049); agreed non-confidential minutes of a call with a customer, 3 October 2016 (ID7528); agreed non-confidential

explains why farmers use – and will increase the use of – chemical methods of control in spite of their elevated cost.¹¹²⁶ Nematicide sales in the EEA currently amount to approximately USD [...].¹¹²⁷ Cereals are also a target for nematodes globally and may accordingly grow in the future as a target for nematode control in the EEA.

- (1577) The main geographic markets for nematicides in the EEA are Spain (USD [...]), Italy (USD [...]) and the United Kingdom (USD [...]).¹¹²⁸
- (1578) Nematode control in the EEA is currently forecast [...].¹¹²⁹ This appears to be in part because farmers are not as aware of nematodes and their impact on crop yield as for other pests, and partly because few effective products are available.¹¹³⁰ For instance, nematode control in specialty crops in France is forecast to grow from USD [...] in 2014 to USD [...] in 2024, including from EUR [...] in 2014 to EUR [...] in 2019 [...] potatoes.¹¹³¹
- (1579) Indeed, in spite of such current lack of awareness, nematode control appears to be, in the words of the Parties, [internal document].¹¹³² In fact, nematode control is [internal document].^{1133,1134} As the relative importance of this segment in the crop protection market will likely increase, [...].
- (1580) Globally, total nematicide sales amount to approximately USD [...]. The Parties [...] estimate the current global nematicide market at USD [...].¹¹³⁵ The US, Japan and Brazil together represent almost [70-80]% of the market.¹¹³⁶

6.5.1.2. Control of nematodes: few chemical options are available to meet farmer needs

(A) Tools for the control of nematodes

- (1581) There are a number of techniques to control nematodes. Some are agronomic practices, like the selection of resistant crop varieties¹¹³⁷ or solarisation (warming the

minutes of a call with a customer, 29 September 2016 (ID7521); agreed non-confidential minutes of a call with an institute, 20 September 2016 (ID7350); agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312). See also [internal document] (ID6150-20876), slide 32.

¹¹²⁶ Agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521).

¹¹²⁷ Parties' response to the Commission's request for information RFI 44, Annex 14 (ID7280). See also the Parties' response to the Commission's request for information RFI 8 and follow-up request; DuPont's internal document [internal document] (ID1332-1052). [Internal documents] (ID7837-158), page 3).

¹¹²⁸ See the Parties' response to the Commission's request for information RFI 8 and follow-up request; [internal document] (ID1332-1052); Parties' submission of [date] on development molecules, [internal document] (ID8604), page 3; see also agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹²⁹ See the Parties' response to the Commission's request for information RFI 8 and follow-up request; [internal document] (ID1332-1052); [...] response to the Commission's request for information RFI 49, Annex RFI 49 1.2 (ID9304-000098), Kline nematicide market France 2014, pages 26-34.

¹¹³⁰ Parties' submission of [date] on development molecules, [internal document] (ID8604), slides 2-3.

¹¹³¹ [Parties' submission] (ID9304-000097), Kline global nematicide market 2014.

¹¹³² [Internal document] (ID6150-20876), slide 31.

¹¹³³ [Internal document] (ID3665-00023), page 4.

¹¹³⁴ [Internal document] (ID6150-20876), slide 31.

¹¹³⁵ [Parties' submission], [internal document] (ID8604), slides 2-3 and 9.

¹¹³⁶ DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.1 (ID9304-000097), Kline global nematicide market 2014, page 28 and DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.2 (ID9304-000098), Kline nematicide market France 2014, page 47.

¹¹³⁷ Agreed non-confidential minutes of a call with an institute, 20 September 2016 (ID7350).

soil for an extended period of time to sterilise it before planting the crop). Others are chemicals, like soil fumigants and non-fumigant chemical nematicides.

(1582) Stakeholders such as technical experts recommend using several of these options in combination to obtain the requisite level of control.¹¹³⁸ Non-chemical solutions are often preferred to avoid the associated cost and restrictions (residue limits). However, nematodes currently cause severe damage to some crops in a number of countries, and chemical solutions cannot always be avoided. There are two main types of chemicals for nematode control: soil fumigants and non-fumigant chemical nematicides. Biological products are also present on the market but do not constitute reliable alternatives to chemical products and remain a niche segment.

(B) Chemicals for the control of nematodes: fumigants and non-fumigant chemical nematicides

(1583) **Fumigants** are soil sterilisers, which kill diseases, other insects and weeds in addition to nematodes. Because they also kill crops, they are applied before planting. Because they are unusual chemicals, they are typically applied by specialists. They are more effective, but also more expensive than other chemicals and accordingly usually used for high-value crops (for example greenhouse vegetables) where the level of nematode infestation will require the most effective products. Moreover, because of their large spectrum, farmers sometimes use fumigants to also deal with other pest issues like weeds, diseases and insects, not just nematodes.¹¹³⁹

(1584) Since the ban of methyl bromide a few years ago, 1,3-dichloropropene, produced by several companies including Dow and Certis/Agro-Kanesho, is the most prominent fumigant in the EEA. Dow sells it under the Telone, Dorlone, Condor and Condorsis brands in Europe, also as Telopic in mixture with chloropicrin. Other fumigants include the recently launched dimethyl disulfide (DMDS), as well as dazomet and chloropicrin.¹¹⁴⁰

(1585) **Non-fumigant chemical nematicides** usually only target nematodes, can be applied on the crop and are less effective and costly than fumigants. They are typically used where the level of infestation is lower or where crops do not carry enough value to use fumigants.¹¹⁴¹

(1586) Chemicals which do not kill nematodes but merely paralyse them – thus preventing them from targeting crops – are often called "nematostatics" or "nematostats". Nematicides (often nematostats) currently on the market sometimes also target some insects or diseases because they were originally developed as insecticides or fungicides. Pure nematicides currently in the Parties' and competitors' pipelines are focused on nematodes.

¹¹³⁸ See for instance <http://www.fao.org/docrep/006/y4011e/y4011e0p.htm>.

¹¹³⁹ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹⁴⁰ Parties' response to the Article 6(1)(c) Decision, paragraph 154. See also DuPont's response to the Commission's request for information, RFI 49, Annex RFI 49 1.3 (ID9304-000099), Kline nematicide market Italy 2014. Chloropicrin appears to be a fungicide used in combination with fumigants rather than a fumigant fully effective on nematodes on its own (see Dow's response to the Commission's request for information, RFI 27, Annex RFI 27 Dow 3.64 (ID5776-64), page 9; also agreed non-confidential minutes of a call with a customer, 3 October 2016 (ID7528)). See also agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹⁴¹ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

(1587) Examples of non-fumigant chemical nematicides include DuPont's oxamyl (Vydate) and Syngenta's fosthiazate (Nemathorin) and iprodione, as well as ethoprophos and fenamiphos.¹¹⁴²

(C) A limited number of chemical solutions

(1588) Overall, only few AIs are available for nematode control in the EEA.¹¹⁴³ A distributor explains that "**products available on the market for the control of nematodes are few and essential.*"¹¹⁴⁴ Even currently available products like nematistats appear to usually be only partly effective, likely because they were originally not developed to target nematodes specifically.

(1589) Moreover, a large number of AIs – including the Parties' current AIs – are under regulatory pressure (for instance as candidates for substitution): many of them will likely be taken off the market or have their uses restricted in the coming years.¹¹⁴⁵ Specifically, 3 of the 5 non-fumigant chemical nematicides currently approved in the EEA are candidates for substitution, including DuPont's oxamyl.¹¹⁴⁶

(1590) DuPont documents [internal documents].¹¹⁴⁷

(1591) For fenamiphos, Adama submits that it "*faces significant regulatory challenge in the EU and is no longer sold in France and Germany*".¹¹⁴⁸

(1592) Regarding 1,3-dichloropropene, [information about product approval].¹¹⁴⁹ It submitted the application for approval of the AI (Annex I) in March 2015, [information about product registration plans].¹¹⁵⁰

(1593) Similarly, [...].

6.5.2. *Relevant products of the Parties and their competitors*¹¹⁵¹

6.5.2.1. [...]

(1594) Dow and DuPont each have an AI for nematode control.

¹¹⁴² Form CO, Annex B.II.07 and Parties' response to the Article 6(1)(c) Decision, paragraph 155. The Parties also mention Bayer's fluopyram, but it appears to currently be fully registered in the EEA as a fungicide, not a nematicide. Similarly, Syngenta's abamectin is registered only as an insecticide and acaricide across the EEA, and only in Italy on certain crops as a nematicide. See also agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹⁴³ Parties' response to the Commission's request for information RFI 44 (ID6843), question 14 and RFI 54, Annex RFI54 6.03 (ID7837-159), pages 13 and 15; agreed non-confidential minutes of a call with a farmers' association, 18 March 2016 (ID8254).

¹¹⁴⁴ Agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521). Courtesy translation from Italian: "*[i] prodotti presenti nel mercato per il trattamento dei nematodi sono pochi ed essenziali*".

¹¹⁴⁵ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312); [internal document] (ID6827-17700), slide 9.

¹¹⁴⁶ Oxamyl, ethoprophos and fenamiphos. Also, fosthiazate, ethoprophos and fenamiphos are organophosphates, an old class of chemicals.

¹¹⁴⁷ Parties' submission of [date] on development molecules, [internal document] (ID8604), pages 2 and 9.

¹¹⁴⁸ Adama's response to the Commission's request for information to competitors on fungicides and nematicides (ID9262). The product was sold to Amvac.

¹¹⁴⁹ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹⁵⁰ Parties' response to the Commission's request for information RFI 59 (ID8827), question 5.

¹¹⁵¹ Form CO, Annex B.II.07; [internal document] (ID1329-1201), pages 1 and 8. See also agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

- (1595) **Dow** sells the soil fumigant AI 1,3-dichloropropene, mainly under the Telone brand. It is used on soil before crop seeds are planted – as it would otherwise also harm or kill the crop – to control nematodes and other pests (weeds, diseases, insects). It has long been off-patent and is also manufactured by other companies such as Agro-Kanesho and Sipcam.¹¹⁵² As a somewhat atypical crop protection product – a fumigant – it is applied by specialists and, because it is expensive, is usually used only for high-value crops. Actual sales of 1,3-dichloropropene provided by Dow for Italy, Greece, France, Spain and Belgium in 2014 amounted to EUR [...], including more than EUR [...] in Spain and more than EUR [...] in Italy – the total for Belgium, France and Greece thus amounting to approximately EUR [...].¹¹⁵³ 1,3-dichloropropene is no longer approved in the EEA. However, it receives Emergency Use Permits (EUPs) regularly in relevant EEA countries like Belgium, France, Spain and Italy.¹¹⁵⁴
- (1596) **DuPont** sells the non-fumigant chemical nematicide AI oxamyl, under the Vydate brand. Oxamyl was originally developed to control true insects. However, its main usage now is to control nematodes (with some control of insects). This is done through absorption into plant tissue, which prevents nematodes from feeding on crop roots. Oxamyl is sometimes called a "nematostat" because it does not kill nematodes but merely paralyses them – thus preventing them from targeting crops. It is less effective than fumigants, but also less expensive. Oxamyl is sold both in granules (Vydate 10G, essentially for root vegetables against all three main groups of EEA nematodes) and in liquid formulation (Vydate 10L, essentially for RKNs in fruiting vegetables).¹¹⁵⁵ Oxamyl sales in the Union amounted to USD [...] in 2014 according to DuPont internal figures.¹¹⁵⁶

6.5.2.2. [...]

(1597) [...].

(1598) [...],¹¹⁵⁷ [...].¹¹⁵⁸

(1599) [...].¹¹⁵⁹

¹¹⁵² See Dow's response to the Commission's request for information RFI 27 (ID5765), question 3.

¹¹⁵³ Parties' response to the Commission's request for information RFI 59, [internal document] (ID8833-000084). [Content of internal documents] estimates by the Parties based on third-party data: EUR [...] in 2015 (Parties response to the Commission's request for information RFI 59, Annex RFI 59 6.1 (ID8833-000139)). Kline provides a figure of USD [...] in 2014 for Europe (DuPont's response to the Commission's request for information, RFI 49, Annex RFI 49 1.1 (ID9304-000097), table 6.).

¹¹⁵⁴ Dow's response to the Commission's request for information, RFI 27, Annexes RFI 27 Dow 3.13-3.14 (ID5776-13-ID5776-14), as well as Dow's response to the Commission's request for information, RFI 27, Annex RFI 27 Dow 3.61 (ID5776-61). See also agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹⁵⁵ Parties' response to the Commission's request for information, RFI 59 (ID8827), Figure 1.

¹¹⁵⁶ DuPont's response to the Commission's request for information, RFI 54, Annex RFI 54 6.02 (ID7837-158), page 6. [Content of internal documents] estimates by the Parties likely based on third-party data: USD [...] in 2015 (Form CO, Annex B.II.07, paragraph 1.1, and Parties response to the Commission's request for information RFI 59, Annex RFI 59 6.1 (ID8833-000139)). Kline provides a figure of USD [...] in 2014 for Europe (DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.1 (ID9304-000097), table 6.).

¹¹⁵⁷ See the Parties' response to the Commission's request for information RFI 27 (ID5765), question 3.

¹¹⁵⁸ [Internal document] (ID1329-1260), page 6.

¹¹⁵⁹ Form CO, part D.

6.5.2.3. Competing products

- (1600) In the EEA, the Parties' AIs face several competing AIs for nematode control.¹¹⁶⁰
- (1601) According to the Parties, other soil fumigants¹¹⁶¹ include: generic versions of **1,3-dichloropropene**, such as those manufactured by Agro-Kanesho (previously by BASF), with EEA sales of USD [...]; as well as other AIs such as **dazomet** (Certis, Agro-Kanesho, UCB and others) with combined EEA sales of USD [...]; **metam-sodium** (Agro-Kanesho, Taminco, Nufarm, Adama and Amvac) with combined EEA sales of USD [...]; **DMDS** (Certis/Arkema); **chloropicrin** (Mitsui, Arysta LifeSciences and Nippon Kayaku); **metam-potassium** with EEA sales of USD [...]; and new active ingredients such as **iodomethane**.¹¹⁶²
- (1602) According to the Parties, other non-fumigant chemical nematicides¹¹⁶³ include: Amvac's **ethoprophos** (originally a Bayer AI; now Certis Europe is the exclusive distributor in the United Kingdom, Ireland, France, the Netherlands, Belgium, Spain, Portugal and Italy) with EEA sales of USD [...]; Amvac's **fenamiphos** (originally a Bayer AI; Adama is acting as a distributor in Greece, Italy, Portugal and Spain) with EEA sales of USD [...]; Syngenta's **fosthiazate** (manufactured by Ishihara (ISK); Syngenta has distribution rights in the United Kingdom, Hungary, France, Italy and the Netherlands) with EEA sales of USD [...]; Syngenta's **abamectin** with EEA sales of USD [...];¹¹⁶⁴ Syngenta's **iprodione** (Cheminova - now FMC - distributes it as Devguard in Greece, Italy, Spain and Portugal for use on greenhouse vegetables),¹¹⁶⁵ and Bayer's **fluopyram**.¹¹⁶⁶

6.5.3. Market definition

6.5.3.1. Past decisional practice

- (1603) In previous merger decisions, the Commission did not assess the market definition in relation to nematicides. However, in previous decisions, the Commission analysed whether fumigants were part of the insecticide market. For instance, in *Bayer/Aventis*,¹¹⁶⁷ the Commission found that the relevant product market for

¹¹⁶⁰ For a brief description of a number of molecules used for nematode control in the EEA, see DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.4 (ID9304-000100), Kline nematicide market Spain 2014, pages 20-22.

¹¹⁶¹ Agreed non-confidential minutes of a call with a customer, 3 October (ID7528); agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹⁶² Parties' response to the Article 6(1)(c) Decision, paragraph 154. Sales are drawn from Kline (DuPont's response to the Commission's request for information, RFI 49, Annex RFI 49 1.1 (ID9304-000097), table 6.). Iodomethane did not have sales in the EEA in recent years, nor is it approved in the EEA.

¹¹⁶³ Agreed non-confidential minutes of a call with a customer, 3 October (ID7528); agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹¹⁶⁴ Abamectin is registered only in Italy and only for the following vegetable crops: tomato, squash and eggplant (Syngenta's response to the Commission's request for information to competitors on fungicides and nematicides (ID8809)).

¹¹⁶⁵ Iprodione, originally a fungicide, did not have significant sales in the EEA in recent years (Syngenta's response to the Commission's request for information to competitors on fungicides and nematicides (ID8809); see also the Parties' response to the Commission's request for information RFI 44, Annex RFI 44 Q14 (ID7280)). Kline provides [...] (DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.3 (ID9304-000099), tables 13 and 19).

¹¹⁶⁶ Parties' response to the Article 6(1)(c) Decision, paragraph 155. Sales are drawn from DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.1 (ID9304-000097), table 6.

¹¹⁶⁷ See Commission Decision in Case M.2547 - Bayer/Aventis Crop Science (2002), recital 61.

insecticides is defined by crop and subdivided into foliar and soil insecticides. In *BASF/American Cyanamid*,¹¹⁶⁸ the Commission found that soil fumigants were not pure insecticides and constituted a separate relevant product market. This was on the basis that soil fumigants were products used to prepare and clean up soil by sterilising it to remove all remaining insects, weeds and diseases.

6.5.3.2. The Parties' views

- (1604) The Parties argue that their products do not constrain each other and are in fact not in the same product market because of their differences in terms of chemical composition, mode of action, efficacy, spectrum, timing of application, method of application and cost. They argue that these differences mean that the two products cannot be used alternatively to satisfy grower needs. They also argue that this is confirmed by precedents, which would have concluded that soil fumigants, such as 1,3-dichloropropene, constitute a distinct product market.¹¹⁶⁹
- (1605) The Parties provide detailed explanations on each of these points. In particular, they emphasise that fumigants like Telone are complex to apply, which often requires expensive specialised technicians, and sterilise the soil (killing nematodes but also diseases, weeds and insects). In addition, they must be used at least four to eight weeks before planting to avoid destroying the crop. By contrast, Vydate – like many other crop protection products – is typically applied post-planting through drip irrigation, and is effective against nematodes only. Occasionally, Vydate is also applied by incorporation into the soil at planting or at the earliest one or two days before planting.¹¹⁷⁰
- (1606) Similarly, the Parties explain that [...].¹¹⁷¹
- (1607) The Parties further argue that 1,3-dichloropropene and other soil fumigants are significantly (more than four times) more expensive [...], and are usually applied by specialised technicians, which further increases their cost.¹¹⁷²
- (1608) Moreover, unlike oxamyl, 1,3-dichloropropene is not currently approved for use in the EEA, and is only available in certain Member States with EUPs. EUPs are normally granted under Article 53 of Regulation 1107, which enables emergency use for "*danger[s] which cannot be constrained by any other reasonable means*". Thus, the Parties argue that oxamyl cannot be viewed as a viable alternative to 1,3-dichloropropene, especially for high levels of infestation in high-value crops like

¹¹⁶⁸ See Commission Decision in Case M.1932 - BASF/American Cyanamid (2000), recital 27.

¹¹⁶⁹ Form CO, Annex B.II.07; Parties' response to the Statement of Objections, paragraphs 680-738 and 818-819; Parties' response to the first Letter of Facts, paragraphs 43-56 and 58-61; [confidential document], (ID12680), page 3; Parties' response to the Article 6(1)(c) Decision, paragraphs 154-161. See also the Parties' response to the Commission's request for information RFI 27 (ID5765), question 3, as well as the Commission Decisions in Cases M.1932 – BASF/American Cyanamid (AHP) (2000) and M.6141 – CNAC/Koor Industrie/Makhteshim Agan Industries (2011), recital 24.

¹¹⁷⁰ Form CO, Annex B.II.07; Parties' response to the Statement of Objections, paragraphs 680-738 and 818-819; Parties' response to the first Letter of Facts, paragraphs 43-56 and 58-63; [confidential document], (ID12680), page 3.

¹¹⁷¹ Parties' response to the Statement of Objections, paragraphs 764-783; Parties' response to the first Letter of Facts, paragraphs 73-82; [confidential document], ID12680, pages 4-5; Parties' response to the Article 6(1)(c) Decision, paragraph 162-165; see also the Parties' response to the Commission's request for information RFI 27 (ID5765), question 3.

¹¹⁷² Parties' response to the Article 6(1)(c) Decision, paragraph 159; See the Parties' response to the Commission's request for information RFI 27 (ID5765), question 3.

vegetables, where fumigants would be the preferred – and, in fact, only effective – option.¹¹⁷³ In any event, the scope of Telone's EUPs is more limited than Vydate's product authorisations.

- (1609) The Parties claim that these points would be unambiguously supported by the Commission's market investigation, whereby a majority of respondents would have confirmed that fumigants and non-fumigant chemical nematicides are very different products which would not really compete.¹¹⁷⁴
- (1610) The Parties also claim, in essence, that the fact that Vydate and Telone do not constrain each other is confirmed by the natural experiment constituted by DuPont's Vydate shortage after the La Porte, Texas incident. Indeed, as a consequence of the shortage, most users of Vydate switched to Syngenta's Nemathorin (fosthiazate), and not to Telone.¹¹⁷⁵
- (1611) Consequently, the Parties argue that 1,3-dichloropropene and oxamyl ([...]) do not constrain, but rather are complementary to, each other, which, according to the Parties, is also established by scientific articles.¹¹⁷⁶

6.5.3.3. The Commission's assessment

- (1612) As explained in Section V.4.2.1 the Commission's starting point in defining the relevant product market for agrochemicals is the specific crop/pest combination corresponding to a specific treatment need for the farmer. For nematode control, the relevant product market would therefore be the grouping of all chemical solutions available to a farmer to deal with a specific nematode problem in a given crop, possibly varying with different nematode species.
- (1613) The investigation indicated that nematicides are a group of products distinct from insecticides.¹¹⁷⁷ In addition, [...] industry reports also distinguish between insecticide and nematicide markets.
- (1614) This contrasts with the Parties' reasoning apparently identifying nematicides as being part of insecticides, and would support the conclusion that oxamyl, like other nematicides, is not in the same market as insecticides. The Commission reached a similar conclusion regarding soil fumigants in the previous decisions referred to by the Parties.
- (1615) The investigation also indicated that soil fumigants – or at least Telone in the EEA – are part of the nematicide market.

¹¹⁷³ Form CO, Annex B.II.07; Parties' response to the Statement of Objections, paragraphs 715-716; Parties' response to the first Letter of Facts, paragraph 53; [confidential document], (ID12680), page 3; Parties' response to the Article 6(1)(c) Decision, paragraphs 156-158 and 159; Parties' response to the Commission's request for information RFI 27 (ID5765), question 3.

¹¹⁷⁴ Form CO, Annex B.II.07; Parties' response to the Statement of Objections, paragraphs 678, 712-714, 728-733, 755-758; Parties' response to the first Letter of Facts, paragraphs 55-56 and 61-63; [confidential document], (ID12680), page 3.

¹¹⁷⁵ Parties' response to the Statement of Objections, paragraphs 734-735; Parties' response to the first Letter of Facts, paragraphs 58-60. [...].

¹¹⁷⁶ Parties' response to the Article 6(1)(c) Decision, paragraphs 156-158; Parties' response to the Commission's request for information RFI 27 (ID5765), question 3.

¹¹⁷⁷ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128). Questionnaire to Crop Protection Customers (Q1), question 48; Questionnaire to Crop Protection Competitors (Q2), question 103; Questionnaire to Crop Protection Stakeholders (Q3), question 28.

- (1616) **First**, as explained in Section V.6.5.3.2, the Parties argue that 1,3-dichloropropene and oxamyl are not in the same market, in essence because of different characteristics (chemistry, spectrum, timing of use, method of application, cost) and use by farmers. However, they also acknowledge that 1,3-dichloropropene is "*referred to as a nematicide because it is predominantly used in Europe to control nematodes*" [emphasis added]. [...].¹¹⁷⁸ It is in parallel not contested that nematode control is the use of oxamyl in the EEA in spite of some efficacy as an insecticide.¹¹⁷⁹
- (1617) The Commission finds that, while they are differentiated products which cater to somewhat different – but partially overlapping – needs, fumigants and non-fumigant chemical nematicides are part of the same relevant product market. Indeed, 1,3-dichloropropene and oxamyl can be used alternatively for some uses. Arysta explained that, from a demand-side perspective and in the EEA, they can be used interchangeably for at least some uses: "*[f]or at least some uses, farmers have a choice between using fumigants and using nematicides like oxamyl, the essential difference being the timing of application.*"¹¹⁸⁰ This would likely be the case [...].
- (1618) [Internal document].¹¹⁸¹ For example, [pipeline information; description of internal procedures].^{1182,1183}
- (1619) More specifically, both 1,3-dichloropropene ("D") and oxamyl ("VG" for granules; "VL" for liquid) can be legally used on the same crops in a number of EEA countries to target nematodes.¹¹⁸⁴ As described in Section V.6.5.4 for market figures, industry reports like Kline also point to the use of the Parties' AIs for the same crops or crop groupings.¹¹⁸⁵
- (1620) In addition, nematicides are typically authorised for use on all nematodes, and the Parties' AIs have activity at least on the most relevant nematode species in the EEA, as detailed in Section V.6.5.1.1, in particular RKNs.
- (1621) Regarding the alleged difference in the timing of application, oxamyl may in fact be used to a certain extent at the same timing as 1,3-dichloropropene, that is prior to planting.¹¹⁸⁶ This is for example the case for tomatoes, tobacco and strawberries. It is

¹¹⁷⁸ Parties' response to the Commission's request for information RFI 44 (ID6843), questions 12 and 13.

¹¹⁷⁹ Parties' response to the Commission's request for information RFI 44 (ID6843), question 14.

¹¹⁸⁰ Agreed non-confidential minutes of a call with a competitor, 27 September 2016 (ID8568). See also agreed non-confidential minutes of a call with a competitor, 9 September 2016 (ID7972); agreed non-confidential minutes of a call with a customer, 3 October 2016 (ID7528).

¹¹⁸¹ [Internal document] (ID6827-27238), slide 26; [...] response to the Commission's request for information RFI 56, Annex RFI56 4.05 (ID8091-32), page 31.

¹¹⁸² See the Parties' response to the Commission's request for information RFI 27 (ID5765), question 4.

¹¹⁸³ DuPont's response to the Commission's request for information RFI 56, Annex 4.05 (ID8091-32), page 31.

¹¹⁸⁴ See Dow's response to the Commission's request for information RFI 59, [internal document] (ID8833-000084 to ID8833-000090); Parties' response to the Commission's request for information RFI 27, Annex 3.61 (ID5776-61); DuPont's response to the Commission's request for information RFI 59, [internal document] (ID8833-000117), as well as the Parties' response to the Commission's request for information RFI 59 (ID8827), Figure 1.

¹¹⁸⁵ DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.1 (ID9304-000097), Kline global nematicide market 2014. See also Annexes RFI 49 1.2-1.4 (ID9304-000098-ID9304-000100), Kline nematicide reports for France, Italy and Spain.

¹¹⁸⁶ Parties' response to the Commission's request for information RFI 59 (ID8827), question 2, as well as DuPont's response to the Commission's request for information RFI 59, [internal document] (ID8833-000117) and RFI 43, [internal document] (ID7837-141), page 13. See also DuPont's response

also the case for nematode control in potatoes, for instance in the United Kingdom (a market worth USD [...]) and Belgium.¹¹⁸⁷ Similarly, recent standard practice in the United Kingdom is pre-planting use of oxamyl, and post-planting use has only been recently considered, as a change in practice.¹¹⁸⁸ [...].¹¹⁸⁹

- (1622) Moreover, many nematicides, in particular 1,3-dichloropropene but also oxamyl for some uses, may only be used once per crop cycle, or even only once every two or three years.¹¹⁹⁰ Growers, therefore, in any event need to plan treatments for whole years, and possibly need to use different types of products within or between crop cycles, with a limited number of available solutions overall.
- (1623) Furthermore, regarding the alleged difference in the method of application and efficacy, DuPont is [...].¹¹⁹¹ Indeed, using [...], at a [...] cost (EUR [...]), compared to, for example, EUR [...] for Dow's Telone in Spain for tobacco in 2014).¹¹⁹² In fact, DuPont [...].¹¹⁹³ DuPont is also considering a [...].

to the Commission's request for information RFI 49, Annex RFI 49 1.3 (ID9304-000099), Kline nematicide market Italy 2014, tables 11, 14 and 17. The Parties argue that, even in pre-planting applications, Vydate and Telone are still quantitatively different because Telone must be applied at the latest four weeks before planting, whereas Vydate will be applied – in the small number of applications where it will be used pre-planting – only one or two days before planting (Parties' response to the Statement of Objections, paragraphs 707-711; Parties' response to the first Letter of Facts, paragraph 47). Qualitatively, however, both products are applied pre-planting. The Parties do not explain why differences in the specific period or day of application would entail that the products are not constrained by one another. In both cases, farmers need to plan application of the product ahead of planting. Moreover, in both cases this will typically be the only application of the product – either Vydate or Telone – in that crop cycle.

¹¹⁸⁷ DuPont's response to the Commission's request for information RFI 59, [internal document] (ID8833-000117), pages 6 and 11, [internal document] (ID1332-1063), Kline nematicide market United Kingdom 2014, page 21.

¹¹⁸⁸ [Internal document] (ID6825-08764), slide 8.

¹¹⁸⁹ The Parties argue that, [pipeline information] would still be quantitatively different even in pre-planting applications because Telone must be applied at the latest four weeks before planting, [pipeline information] (Parties' response to the Statement of Objections, paragraph 767). Qualitatively, however, both products would be applied pre-planting. The Parties do not explain why differences in the specific period or day of application would entail that the products are not constrained by one another. In both cases, farmers need to plan the application of the product ahead of planting. Moreover, in both cases this will typically be the only application of the product – [pipeline information] – in that crop cycle.

¹¹⁹⁰ See, for instance, Dow's response to the Commission's request for information RFI 59, Annexes Dow RFI 59_5.6 and 5.7 (ID8833-000089 and ID8833-000090).

¹¹⁹¹ DuPont's response to the Commission's request for information RFI 43, [internal document] (ID7837-141), page 14. [Internal document] (ID6827-17700), slide 13, [internal document].

¹¹⁹² Parties' response to the Commission's request for information RFI 59 (ID8827), question 4; and DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.4 (ID9304-000100), Kline nematicide market Spain 2014, page 49. See also the Parties' response to the Commission's request for information RFI 59 (ID8827), paragraph 2.5.

¹¹⁹³ DuPont's response to the Commission's request for information RFI 59, Annex RFI 59 4.1 (ID8833-000115). [Confidential document], (ID12680), pages 4-5). The Commission does not contest that the effect of Telone on yield in this test was larger than that of Vydate: [...]. Similar differences are found for added yield compared to untreated crops. However, the Commission notes that the doses of each product used were very different (from 55 kg/H or 55 L/H to 100L/H for Vydate; from 150L/H to 305L/H for Telone), which was not taken into account by the Parties in their explanations. Indeed, for products with different prices, these different use doses strongly impact the cost and therefore added yield per euro spent. Telone being significantly more expensive than Vydate, it is thus unclear whether its added yield would be significantly superior to Vydate on a by cost basis, which is the relevant consideration for farmers.

- (1624) More generally, [pipeline information], again suggesting some degree of substitutability between [pipeline information].¹¹⁹⁴
- (1625) Overall, oxamyl and 1,3-dichloropropene are thus used to control nematodes for a number of the same crops in several EEA countries. Moreover, it seems that these two AIs are at least partly used for the same uses.
- (1626) For instance, a fumigant producer explains that, while Dow's and DuPont's AIs are different, "*a farmer may decide not to treat his soil with a fumigant before planting – while this i[s] not advisable it does of course happen. Once a crop has been planted and a nematode problem has been discovered, a farmer using nematicides must be careful to ensure that residues do not remain on the product*".¹¹⁹⁵
- (1627) This supports the finding that some growers would have a choice to use fumigants pre-planting or non-fumigant chemical nematicides pre-planting or post-planting, as further illustrated [internal document].¹¹⁹⁶
- (1628) Similarly, a competitor of Dow and DuPont considers that "[f]or at least some uses, farmers have a choice between using fumigants and using nematicides like oxamyl, the essential difference being the timing of application."¹¹⁹⁷ It seems that this would in particular be the case for high-value specialty crops like vegetables, where the higher cost of fumigants can be borne by growers.¹¹⁹⁸
- (1629) Finally, and as explained in Section V.6.5.3.3, [internal document].¹¹⁹⁹
- (1630) In sum, contrary to the Parties' claims, the characteristics of 1,3-dichloropropene and oxamyl – and more generally of fumigants and other non-fumigant chemical nematicides – do not point to them not being in the same relevant product market.
- (1631) **Second**, the precedents that the Parties mention merely point to the fact that fumigants are separate from insecticides. This is fully in line with the Commission's analysis that both fumigants and non-fumigant chemical nematicides are used for

¹¹⁹⁴ [Internal document] (ID6825-9226). [Internal document] (ID6827-22394). The Parties argue that the fact that [pipeline information] only indicates that Telone, as a very effective product to kill nematodes, is a good required benchmark for registration purposes, and is in no way an indication that the two AIs would be in the same product market (see the Parties' response to the first Letter of Facts, paragraph 72, as well as [confidential document], (ID12680), pages 4-5). The Commission assumes that the same logic would also apply to [pipeline information]. However, the Parties also state that "*[w]hen constructing trial programs, it is normal practice to make decisions on standard treatments to be included in efficacy testing. A reference product should be a product known to provide consistent performance under conditions in the area of intended use. In general, mode of action, time of application and method of application should be as close as possible to those of the test product. It would, therefore, not be common (based on all the differentiating factors set out in Section A) to include a soil fumigant as a reference product in trial programs for non-fumigant chemical nematicides [pipeline information]*" (Parties' response to the Statement of Objections, paragraph 782; emphasis added). Conversely, they explain that "*the absence of benchmarking against soil fumigants serves only to confirm the fact that soil fumigants and non-fumigant chemical nematicides do not compete*" ([Parties' submission], ID10360). Accordingly, the Parties' own explanations support the conclusion that field testing [pipeline information] would indicate at least some level of substitutability and closeness.

¹¹⁹⁵ Agreed non-confidential minutes of a call with a customer, 3 October 2016 (ID7528).

¹¹⁹⁶ [Internal document] (ID6827-8523).

¹¹⁹⁷ Agreed non-confidential minutes of a call with a competitor, 27 September 2016 (ID8568).

¹¹⁹⁸ Agreed non-confidential minutes of a call with a competitor, 9 September 2016 (ID7972); agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521); agreed non-confidential minutes of a call with a customer, 28 September 2016 (ID8049).

¹¹⁹⁹ [Internal document] (ID6827-45553), slide 5.

(chemical) nematode control, which is a separate market from insecticides. Contrary to the Parties' claims, these precedents do not support the conclusion that non-fumigant chemical nematicides would either be part of insecticides or separate from fumigants when considering nematode control. This is particularly the case since nematode control (and specifically non-fumigant chemical nematicides) was not the focus of these earlier cases and was not closely analysed. This in contrast with fumigants, which can also target other pests and were an area of focus in the precedents referred to by the Parties. [Internal document].¹²⁰⁰

- (1632) **Third**, the Parties allege that the fact that 1,3-dichloropropene regularly obtains EUPs in the EEA is a further element showing the absence of adequate alternative solutions and, hence, substitutability between the two compounds.
- (1633) Nevertheless, EUPs are not uncommon, and their delivery does not necessarily mean that no other products exist for the same pests, in spite of the requirement that there be an insufficiently addressed farmer need. Indeed, the Parties' claim would essentially mean that all EUP products are their own market and that no other solutions at all exist for the needs they cater to.
- (1634) On the contrary, product authorisations are granted for uses on certain crops to deal with specific pests. They are not granted on the basis of and for specific needs within that crop/pest combination, in particular for specific intensities of infestation. Indeed, not all products authorised on a specific crop/pest combination are as effective, and especially not for specific uses within that combination, for instance levels of infestation. Farmers choose among all registered products, with their differentiated attributes, those which best address their specific need.
- (1635) Accordingly, EUPs may be and are granted to products which, although other products are also registered for the same crop/pest combination, may be the only available solutions for a given specific use within that crop/pest combination. This need is explained and substantiated by the interested third parties applying for EUPs. However, once authorised, those products may be used beyond that specific use, also for uses where other products are available and effective. The fact that a given product may be irreplaceable for some uses justifying a derogation does not exclude that the same product may and will also be used for other uses where substitutes are available.
- (1636) For instance, Telone II 2016 and Condorsis II 2016 obtained EUPs for pre-plant applications for tomatoes and tobacco in Italy in 2016, for which Vydate 5G is also authorised.¹²⁰¹ In that example, Telone may have been considered indispensable by some farmers for a given use (perhaps a high level of infestation) in tomatoes. However, once authorised – even under derogation – farmers were able to use it not only for that specific use, for which effective alternative products may not have been available, but also for other uses on that crop, where it may have competed with other available and effective solutions. Of course, all crop protection products are differentiated, notably in terms of efficacy, spectrum and price.

¹²⁰⁰ [Internal document] (ID8001), slide 24.

¹²⁰¹ Dow's response to the Commission's request for information RFI 59, [internal document] (ID8833-000084) and DuPont's response to the Commission's request for information RFI 59, [internal document] (ID8833-000117).

- (1637) The Parties' claim is also contradicted by the fact that Dow's tricyclazole – the leading rice blast fungicide – is used in the EEA only under EUPs even though at least three other products are fully authorised for this use.¹²⁰² These products are in the same market, but not all with the same level of efficacy and value for the farmer. In addition, few products are available overall. A situation which is similar to the one of fumigants and non-fumigant chemical nematicides for nematode control.
- (1638) **Fourth**, several market participants refer to Dow's soil fumigant as a nematicide. For example: "*Dow is particularly strong in nematicides*"¹²⁰³ and "*[n]ematicides are a separate class of soil borne pest and a particularly difficult problem since they can reside in soil in dormant form (cysts) for several years....DowAgroSciences has Telone (1,3-dichloropropene) for control of potato cyst nematode. It is effective at controlling this nematode and others (it is almost a soil sterilant), which would otherwise prevent growers from intensive potato culture more than [sic] once every 4-5 years. It would end certain segments of potato growing in the Netherlands and some other parts of central Europe, without Telone (1,3-dichloropropene). 1,3-dichloropropene is unique in its class of chemistry and mode of action in Europe. DuPont has Oxamyl [sic] (one of the last from the carbamate chemistry class) for the control of a wide variety of nematodes for many different crop types in glass house cultures. Without oxamyl, some aspects of greenhouse culture would not be possible any longer... There are very few other effective soil nematocides [sic] on offer*".¹²⁰⁴
- (1639) Diachem, an Italian generic company, confirmed that 1,3-dichloropropene "*is indeed a nematicide*".¹²⁰⁵ Certis also highlighted that: "*[f]or nematicides, a distinction should be made between soil fumigants (chemicals converted into gases), which are used by farmers in rotation, between crops, with [sic] non-fumigant nematicides*".¹²⁰⁶
- (1640) Scientists looking into nematode control also view non-fumigant chemical nematicides and fumigants as two options for the chemical control of nematodes.¹²⁰⁷
- (1641) Overall, the available evidence unambiguously points to the fact both fumigants and non-fumigant chemical nematicides, and in particular the Parties' AIs, are in the relevant product market for nematode control.

6.5.3.4. Conclusion

- (1642) In conclusion, in light of the available evidence and the results of the market investigation, for the purpose of assessing this Transaction, the Commission considers that, firstly, nematicides can be deemed to constitute a separate relevant product market from insecticides and, secondly, that both non-fumigant chemical nematicides and soil fumigants are part of the nematicide market. Therefore and also taking into account the considerations in recital (1612) that the starting point for the definition of the relevant product market is the specific crop/pest combination corresponding to a specific treatment need, the Commission will assess the effects of

¹²⁰² See Section V.6.6.5.

¹²⁰³ Questionnaire to Crop Protection Customers (Q1), question 65 (ID9530).

¹²⁰⁴ Questionnaire to Crop Protection Competitors (Q2), question 103 (ID9445).

¹²⁰⁵ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

¹²⁰⁶ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹²⁰⁷ See Lambert, K. and S. Bekal (2002), "Introduction to Plant-Parasitic Nematodes", American Phytopathological Society website (<http://www.apsnet.org/edcenter/intropp/PathogenGroups/Pages/IntroNematodes.aspx>).

the Transaction on the markets for nematode control across the EEA in all relevant national and crop segmentations.

(1643) As to the geographic dimension of these nematicide markets, as explained in Section V.4.2.2, the Commission considers that the markets for formulated products are national in their geographic scope.

6.5.4. *Market figures are unreliable for nematode control*

(1644) The Commission was unable to find entirely reliable sources of market data for nematicides, to a greater extent than the general issues described in Section V.5.1. On the one hand, the Parties provide data drawn from the Agrowin database. However, these figures do not always coincide with those extracted directly by the Commission from the same database. They also generally do not reconcile with actual sales data provided by the Parties for their own products. On the other hand, the Parties provided industry reports by Kline, where the figures are also different.

(1645) For instance, actual sales of 1,3-dichloropropene provided by Dow for Italy, Greece, France, Spain and Belgium in 2014 make a total of EUR [...], including more than EUR [...] in Spain and more than EUR [...] in Italy.¹²⁰⁸ Data is unavailable for other countries. However, figures provided by the Parties based on third party data show total sales for Dow in Spain for 2014 of, at most, EUR [...] (out of a total segment of EUR [...], [...] the likely nematode control segment) and EUR [...] (out of a total segment of EUR [...]) for the whole EEA.¹²⁰⁹

(1646) Overall, Agrowin data is not sufficiently reliable, in particular because the allocation of sales to different categories of products varies across crops, countries and companies. As an independent industry report, which market players are willing to purchase for its value, Kline can be considered a more reliable source beyond actual sales by the Parties. It is also specifically focused on nematode control, whereas third-party sources like Agrowin may allocate sales in different groups. Where possible, it will accordingly be preferred. However, Kline data is only available for a limited number of EEA Member States, and only for some crop groups within those. Moreover, Kline data is often provided for aggregate groupings of several crops and not for each specific crop. In such cases, the Commission will complement Kline data with all other relevant available data, including Agrowin data. The tables in this section identify data from Kline and data from Agrowin, which are to be read in light of the limitations explained and are used for illustrative purposes.

(1647) Moreover, DuPont suspended production of oxamyl in late 2014, with ensuing supply shortages, after an accident in its La Porte, Texas production facility. Therefore, data from 2014 will be preferred to 2015 data, which likely underestimates DuPont's real position on the market. In April 2016, DuPont found an alternative source of oxamyl.¹²¹⁰ The latest available data from Kline is also for 2014.

¹²⁰⁸ Dow's response to the Commission's request for information RFI 59, [internal document] (ID8833-000084).

¹²⁰⁹ Parties' response to the Commission's request for information RFI 59, Annex RFI 59 6.1 (ID8833-000139).

¹²¹⁰ [Internal document] (ID6827-5261), slide 38.

Table 36 – Kline data nematicide market shares

	Market size (EUR million)	Dow	DuPont	Combined	Competitor 1	Competitor 2	Others	Comment
POTATOES								
France	[...]	[0-5]	[30-40]	[40-50]	[30-40] ([...])	[10-20]δ	[5-10]	[...]
Spain	[...]	[20-30]	[0-5]	[20-30]	[40-50]	[20-30]β	[10-20]	
TOMATOES								
Spain	[...]	[10-20]	[0-5]	[20-30]	[30-40]	[20-30]	[20-30]	
Italy	[...]	[10-20]	[10-20]	[20-30]	[40-50]	[10-20]	[10-20]	
OTHER VEGETABLES								
Italy	[...]	[20-30]	[5-10]	[20-30]	[10-20]	[10-20]α	[30-40]	
CUCURBITS								
Spain	[...]	[20-30]	[0-5]	[20-30]	[20-30]	[20-30]	[20-30]	
CITRUS								
Spain	[...]	[5-10]	[20-30]	[20-30]	[40-50]	[10-20]	[20-30]	
FLOWERS								
Spain	[...]	[30-40]	[10-20]	[40-50]	[20-30]	[10-20]	[10-20]	
SUGAR BEETS								
Spain	[...]	[20-30]	[10-20]	[30-40]	[20-30]	[10-20]	[20-30]	
TOBACCO								
Spain	[...]	[60-70]	[0-5]	[60-70]	[30-40]	-	[5-10]	[...]
STRAWBERRIES								
Spain	[...]	[20-30]	[0-5]	[20-30]	[20-30]	[20-30]	[20-30]	

Source: Parties' response to the Commission's request for information RFI 49, Annexes DuPont RFI 49 1.1 to 1.4 (ID9304-000097-ID9304-000100)

Notes: [...]

Table 37 – Parties' data nematicide market shares

	Market size (EUR million)	Dow	DuPont	Combined	Competitor 1	Competitor 2	Others	Comment
POTATOES								
EEA	[...]		[50-60]	<i>[50-60]</i>			[40-50]	[...]
United Kingdom	[...]		[50-60]	<i>[50-60]</i>			[40-50]	[...]
Netherlands	[...]	[0-5]	[90-100]	<i>[90-100]</i>			[0-5]	[...]
VEGETABLES AND FLOWERS								
Greece	[...]	[20-30]	[10-20]	<i>[40-50]</i>			[50-60]	
Italy	[...]	[10-20]	[10-20]	<i>[30-40]</i>			[60-70]	
France	[...]	[0-5]	[90-100]	<i>[90-100]</i>			[0-5]	[...]
Netherlands	[...]	[0-5]	[60-70]	<i>[60-70]</i>			[30-40]	[...]
CORN								
France	[...]	[0-5]	[90-100]	<i>[90-100]</i>			[0-5]	[...]
FRUITS AND NUTS								
Italy	[...]	[0-5]	[90-100]	<i>[90-100]</i>			[0-5]	[...]
OTHER CROPS								
EEA	[...]		[90-100]	<i>[90-100]</i>			[5-10]	[...]
Italy	[...]	[0-5]	[90-100]	<i>[90-100]</i>			[0-5]	[...]
BEETS								
Netherlands	[...]	[0-5]	[90-100]	<i>[90-100]</i>			[0-5]	[...]
United Kingdom	[...]	[0-5]	[90-100]	<i>[90-100]</i>			[0-5]	[...]

Source: Parties' response to the Commission's request for information RFI 59, Annex RFI 59 6.1 (ID8833-000139)

Notes: [...]

6.5.5. The Commission's concerns in the Statement of Objections

(1648) In its Statement of Objections, the Commission raised concerns on a preliminary basis with respect to nematode control in the EEA, including all relevant national and crop segmentations. The preliminary concerns were raised in light of the elements detailed in the following sub-sections and having regard to the evidence available to the Commission at the moment of the issuing of the Statement of Objections.

6.5.5.1. In the Statement of Objections, the Commission preliminarily considered that the Parties appear to have high market shares in some segments

(1649) Although available data is unreliable and inconsistent from source to source, it suggests that the Parties have strong positions in a number of nematode control segments across the EEA.

(1650) For nematode control (including both fumigants and non-fumigant chemical nematicides), Kline gives [...] shares for Dow and DuPont combined in

Spain ([30-40]%) and Italy ([20-30]%).¹²¹¹ The Parties themselves acknowledge a large share in Greece ([30-40]%).¹²¹²

(1651) DuPont internal documents also point to a significant combined share in EMEA, for example [10-20]% for Dow and [10-20]% for DuPont for a combined [30-40]% in SEU-Turkey, with the largest competitors (Mitsui and Adama) [... 10-20]%.¹²¹³

(1652) At the crop level, available data shows significant combined shares in some countries for the following segments:¹²¹⁴ **vegetables and flowers** (Greece [30-40]% and Italy [30-40]%), **potatoes** (France [40-50]% and Spain [20-30]%), **tomatoes** (Italy [20-30]% and Spain [20-30]%), **flowers** (Spain [40-50]%) and **beets** ([30-40]%).

(1653) However, as explained in Sections V.6.5.6 to V.6.5.8, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.

6.5.5.2. In the Statement of Objections, the Commission preliminarily considered that Dow's Telone and DuPont's Vydate are leading products which appear to enjoy market power in several EEA countries

(1654) According to data from Kline, each of Dow and DuPont has a [20-30]% share in the overall chemical nematode control business.¹²¹⁵

(1655) According to data provided by Dow, its actual 2014 sales of 1,3-dichloropropene for Italy, Greece, France, Spain and Belgium make a total of EUR [...], including more than EUR [...] in Spain and more than EUR [...] in Italy.¹²¹⁶ Data is unavailable for other countries.

(1656) According to data from Kline, Dow 1,3-dichloropropene sales for 2014 in Europe amounted to USD [...], out of a total of USD [...] for fumigant nematicides (or [40-50]%), making it the leader in its category.¹²¹⁷

(1657) Moreover, 1,3-dichloropropene is acknowledged by market players as a key product in the EEA nematode control business. As one market participant explained, "*DowAgroSciences has Telone (1,3-dichloropropene) for control of potato cyst nematode. It is effective at controlling this nematode and others (it is almost a soil sterilant), which would otherwise prevent growers from intensive potato culture more than [sic] once every 4-5 years. It would end certain segments of potato growing in the Netherlands and some other parts of central Europe, without Telone (1,3-dichloropropene). 1,3-dichloropropene is unique in its class of chemistry and mode of action in Europe*".¹²¹⁸

¹²¹¹ DuPont's response to the Commission's request for information RFI 49, Annexes RFI 49 1.1 to 1.4 (ID9304-000097-ID9304-000100).

¹²¹² Parties' response to the Commission's request for information RFI 44 (ID6843), question 13.

¹²¹³ [Confidential document] (ID5736-24/ID6028-24/ID7237-138), page 23.

¹²¹⁴ Data drawn from Kline and the Parties.

¹²¹⁵ DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.1 (ID9304-000097), Kline global nematicide market 2014.

¹²¹⁶ Dow's response to the Commission's request for information RFI 59, [internal document] (ID8833-000084).

¹²¹⁷ DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.1 (ID9304-000097), Kline global nematicide market 2014.

¹²¹⁸ Questionnaire to Crop Protection Competitors (Q2), question 103 (ID9445).

- (1658) An Italian distributor further considered that Dow's product is indispensable in light of its efficacy: "*Dow has a product – Telone – which, because of its indispensability, obtains every year a derogation to authorise its use on relevant crops*".¹²¹⁹ [Pipeline information].¹²²⁰
- (1659) As to Vydate, Kline gives oxamyl sales for 2014 in Europe of USD [...], out of a total of USD [...] for non-fumigant chemical nematicides (or [40-50]%), making it [...] in its category.¹²²¹
- (1660) [...]: approximately USD [...] in the Union in 2014.¹²²²
- (1661) Significantly, in Greece DuPont internally records sales of USD [...] out of a total nematicide market of USD [...], a [30-40]% share.¹²²³
- (1662) While oxamyl is under regulatory pressure in the EEA as a candidate for substitution and is currently in the process of having its approval renewed, [internal document].
- (1663) Overall, DuPont appears to see nematode control [internal document], Vydate is a strong and important product in nematode control in the EEA.
- (1664) However, as explained in Sections V.6.5.6 to V.6.5.8, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.
- 6.5.5.3. In the Statement of Objections, the Commission preliminarily considered that [pipeline information]
- (1665) Pre-Transaction, DuPont is [...]. This currently represents a total market value of approximately [...].¹²²⁴
- (1666) [...].¹²²⁵
- (1667) Overall, [...].^{1226,1227}
- (1668) In fact, at this stage DuPont [...].^{1228,1229,1230,1231}

¹²¹⁹ Agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521). Courtesy translation from Italian: "*Dow detiene un prodotto – il Telone – il quale, a causa della sua indispensabilità, beneficia ogni anno di una deroga per autorizzare il suo utilizzo sulle colture interessate*".

¹²²⁰ DuPont's response to the Commission's request for information RFI 56, Annex RFI 56 4.05 (ID8091-32), page 19.

¹²²¹ DuPont's response to the Commission's request for information RFI 49, Annex RFI 49 1.1 (ID9304-000097), Kline global nematicide market 2014.

¹²²² DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.02 (ID7837-158), page 6 and RFI 43, [internal document] (ID7837-142), page 13.

¹²²³ [Internal document] (ID6827-50942), pages 35-38.

¹²²⁴ [Internal document] (ID6827-17700), slides 4 and 8. The total market value is for Southern Europe and Turkey.

¹²²⁵ DuPont's response to the Commission's request for information RFI 56, Annex RFI 56 4.05 (ID8091-32), pages 12, 18-19, 29-32; DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.02 (ID7837-158), pages 13-14 and Annex RFI 54 6.03 (ID7837-159), page 15; [internal document] (ID1329-1260), page 11. See also [internal document] (ID6827-17700), slides 13-14.

¹²²⁶ [Internal document] (ID6827-17700), slide 15.

¹²²⁷ [...].

¹²²⁸ DuPont's response to the Commission's request for information RFI 27, Annex RFI 27 5.24 (ID5736-24/ID5028-24/ID7837-138), pages 5 and 23.

¹²²⁹ [Internal document] (ID6827-17700), slide 15. [Internal document] (ID6827-48637), slide 10, [...].

- (1669) However, as explained in Sections V.6.5.6 to V.6.5.8, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.
- 6.5.5.4. In the Statement of Objections, the Commission preliminarily considered that competitive constraints imposed by competitors appear relatively limited
- (1670) The Parties explain that their products face strong competition, both current and forthcoming.¹²³² The Parties' response to the Statement of Objections also mentioned a number of competing pipeline products for the first time, for which very few details were provided.¹²³³
- (1671) The main competing products are assessed in this section. As to the products mentioned by the Parties for the first time in their response to the Statement of Objections, in addition to being owned by relatively minor market players, they typically are either seed treatments (a distinct product market) or biologicals, which have lower efficacy and constitute a niche segment.
- (1672) A fumigant, Arkema's dimethyl disulfide (DMDS, sold under the Accolade and Paladin brands), marketed by Certis in the EEA, is currently awaiting approval (the request was filed in 2013). It was granted an EUP in Italy in 2015. However, farmers show resistance to using the product because of a strong and unpleasant smell.¹²³⁴ It is unclear to what extent the product will be able to gain significant sales in the EEA in those circumstances.
- (1673) The Parties also mention Monsanto's tioxazafen/Nemastrike pipeline project. However, this is a seed treatment project, focused on soy and corn.¹²³⁵ Its launch in the EEA, where soy and corn are relatively minor crops, is therefore very uncertain, and in any event no public plans or timing for such a launch are available. Furthermore, seed treatment products constitute a different product market from nematicides.
- (1674) Another product mentioned by the Parties is Adama's fluensulfone (Nimitz). However, this AI is not approved in the EEA, as confirmed by Adama.¹²³⁶
- (1675) Finally, Bayer's fluopyram is currently registered in the EEA as a fungicide, not a nematicide, although it obtained an emergency registration for that use in Italy

¹²³⁰ [Internal document] (ID1329-1260), page 13.

¹²³¹ See DuPont's response to the Commission's request for information RFI 43, Annex RFI 43 18.03 (ID7837-140), page 38, on kiwis in Greece.

¹²³² Form CO, Annex B.II.07; Parties' response to the Statement of Objections, paragraphs 784-817; Parties' supplemental response to the Statement of Objections, ID10357; [Parties' submission] (ID10360).

¹²³³ Parties' response to the Statement of Objections, paragraph 806.

¹²³⁴ Dow's response to the Commission's request for information Dow RFI 27, Annexes 3.63 (ID5776-63) and 3.64 (ID5776-64), pages 5 and 9.

¹²³⁵ See the Monsanto documents provided by the Parties as Dow's response to the Commission's request for information RFI 54, Annexes Dow RFI 54 1.4(b) through 1.4(e) (ID6388/ID7837-00031 to ID6391/ID7837-00034), in particular 1.4(b) (ID6388/ID7837-00031).

¹²³⁶ Adama's response to the Commission's request for information to competitors on fungicides and nematicides (ID9262).

in 2015, with some sales in 2016.¹²³⁷ Moreover, the Parties [internal document].^{1238,1239} Overall, it appears to be of limited competitive relevance.

- (1676) Bayer is also developing a nematocide for launch after 2025, but seems not to plan to launch it in the EEA.¹²⁴⁰
- (1677) Regarding 1,3-dichloropropene specifically, the Parties explain that Agro-Kanesho manufactures a generic version of the AI, and several generic players sell generic products. Nevertheless, Dow is still, decades after patent expiry, the top seller. Generic versions of 1,3-dichloropropene may thus constitute a limited competitive constraint on Dow's Telone, [...].¹²⁴¹
- (1678) The Parties also explain that several companies have recently launched generic versions of oxamyl,¹²⁴² which will likely impact Vydate sales, market shares and revenues going forward.
- (1679) As discussed in Section V.6.5.2.3 and confirmed by market players, the number of available chemical solutions for nematode control is thus in fact somewhat limited.¹²⁴³ Indeed, this limited number of products overall likely explains the Parties' significant market shares in several EEA countries with AIs which themselves face regulatory constraints.
- (1680) The Parties also argue that the regulatory pressure on existing products would foster future innovation and competition. This, however, is a general and hypothetical statement in support of which the Parties have not provided evidence. Moreover, this pressure would only lead to potential projects many years into the future. As explained in Section V.3.3, only AIs with a high likelihood of reaching the market are assessed in terms of product and price competition.
- (1681) However, as explained in Sections V.6.5.6 to V.6.5.8, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.

6.5.6. *Assessment of non-coordinated effects across the EEA in light of the additional evidence produced by the Parties*

- (1682) In their response to the Statement of Objections, the Parties contested that the Commission would have met its legal obligations to find such a significant impediment to effective competition, in particular because – even assuming that Telone and Vydate would be in the same relevant product market, which they contest – their different characteristics entail that they would effectively overlap only for a minimal part of possible nematode control uses in the EEA. [...].

¹²³⁷ DuPont's response to the Commission's request for information RFI 27, Annex RFI 27 5.24 (ID5736-24/ID6028-24/ID7837-138), page 11.

¹²³⁸ [Internal document] (ID6827-48205). [Internal document] (ID6827-2892).

¹²³⁹ [Internal document] (ID6696-10984).

¹²⁴⁰ Bayer's response to the Commission's Article 11(3) request for information to competitors decision dated 31 October 2016 (ID9506); Bayer's response to the Commission's request for information to competitors on fungicides and nematocides (ID8824).

¹²⁴¹ [Internal document] (ID06696-32779), [...].

¹²⁴² Parties' response to the Statement of Objections, paragraphs 797-798.

¹²⁴³ Dow's response to the Commission's request for information RFI 27, Annex RFI 27 3.64 (ID5776-64), pages 4 and 5.

(1683) [...].¹²⁴⁴

(1684) Following further investigation – and in particular in light of the absence of detailed and reliable market share data for all crops and countries or complaints from market participants, as well as the other elements provided in the two following sections – the Commission concludes that, on balance, the available evidence does not support a finding of significant impediment to effective competition on price and market share competition in the nematicide markets within the EEA.

6.5.7. *Telone and Vydate are not particularly close competitors*

(1685) There is little doubt that Telone and Vydate are effective and leading nematode control solutions. However, the exact scope of head-to-head competition between Telone and Vydate for specific farmer needs is difficult to assess precisely, and is likely confined to a minimal part of the overall differentiated nematode control business. The Transaction would accordingly have limited effects on price and product competition in that segment.

(1686) First, as emphasised by the Parties and detailed in Section V.6.5.3.2, Telone and Vydate have significantly different characteristics and typical uses. These differences do not exclude that both products are in the same differentiated relevant product market – as explained in Section V.6.5.3.3 – but they may nevertheless suggest that Telone and Vydate would be more distant competitors than each of them is in relation to other products in their respective market segments.

(1687) In particular, the fact that using Telone typically requires specialised fumigation service providers, with an added cost, whereas Vydate is applied directly by farmers in a way similar to other agrochemicals, highlights the distance between the two products.

(1688) The finding that Vydate and Telone might not be each other's closest competitors is supported by the natural experiment constituted by DuPont's incident at La Porte, Texas. The incident caused Vydate shortage. As a consequence of the shortage, [...]. This supports the finding that Vydate competes more closely with other non-fumigant chemical nematicides than with fumigants such as Telone.¹²⁴⁵

(1689) Second, although both products are registered and used on a number of the same crops in a number of countries, it is likely that they are mainly used to satisfy distinct farmer needs. Fumigants are the preferred option for high value crops – such as greenhouse vegetables – and/or high levels of infestation. Non-fumigant chemical nematicides are typically used in other cases, in particular crops with lower value and less severe nematode infestations. In fact, fumigants may be used once every several years to strongly reduce nematode populations, where non-fumigant chemical nematicides would then be used between these fumigations to control limited nematode pressure.

(1690) In this regard, the Parties explained that [Parties' confidential document] – would not constitute a significant constraint on Telone: it would not provide a level of control equivalent to that of fumigation, and it would be confined to minimal sales and uses

¹²⁴⁴ Parties' response to the Statement of Objections, paragraphs 759 and 764-783; Parties' response to the first Letter of Facts, paragraphs 73-82.

¹²⁴⁵ Parties' response to the Statement of Objections, paragraphs 734-735; Parties' response to the first Letter of Facts, paragraphs 58-60. [...].

(circa USD [...]) because of its limited potential scope ([...]).¹²⁴⁶ It is therefore likely that its effect on price competition with Telone would be limited.

(1691) Third, while the fact that Telone is sold only under EUPs in the EEA, unlike Vydate, does not entail that it would not be in the same relevant product market as Vydate, as explained in Section V.6.5.3.3, it nevertheless highlights that Vydate and Telone typically cater to different needs. In fact, their respective scopes appear to be sufficiently distinct for Telone to be authorised as the only viable solution for some specific needs in spite of the regulatory concerns having led to its non-approval in the EEA. This suggests that the overlapping applications are of limited significance compared to the total sales of both products.

6.5.8. [...]

(1692) There is also little doubt that [...]. It is likely that the Parties would [pipeline information; information on Parties' market position]. The Transaction would accordingly have limited effects on price and product competition in nematode control overall.

(1693) In that respect, the elements described in Section V.6.5.7 in relation to competition between Vydate and Telone, in particular regarding their significantly different characteristics and typical uses, [...].

(1694) [...].

(1695) [...]. Specifically, regulatory constraints would make it unlikely that [...].¹²⁴⁷

(1696) Therefore, the exact extent to which [pipeline information]. The level of competition [...] would face from other companies in [...] is also unclear at this stage given the many factors (resistance, regulatory pressure, pipeline products) to take into account. It is therefore difficult to quantify to the requisite legal standard [...].

(1697) Moreover, [...]. In particular, [...]. This decision will likely significantly impact the scope of possible profitable uses [...] and the resulting effects on competition.

(1698) In parallel, the evidence available to the Commission does not allow it to project the specific market situation of the Parties and their main competitors on the relevant markets in [...] as accurately as needed to meet the required legal standard to find that [...] would cause a significant impediment to effective competition.

(1699) On the one hand, as explained in recitals (1589) to (1591), regulatory constraints on existing products will likely lead to the elimination or restriction of several products. However, which ones and to what degree is uncertain, especially so many years beforehand. Indeed, regulations may become stricter in the meantime, and the progression of resistance will vary for different molecules. By [...], pipeline products which the Commission has not identified in its investigation because they are currently in early stages of discovery or have not yet been discovered may also be entering the market. [...] several years forward thus cannot be determined with reasonable certainty in light of the available evidence.

¹²⁴⁶ Parties' response to the Statement of Objections, paragraphs 699-702; Parties' response to the first Letter of Facts, paragraphs 64-72; [Parties' confidential document], (ID12680), pages 4-5.

¹²⁴⁷ Parties' response to the Statement of Objections, paragraphs 772-778; Parties' response to the first Letter of Facts, paragraphs 73-82; [Parties' confidential document].

(1700) On the other hand, [pipeline information], out of a total segment of approximately USD [...] ([... 10-20]% share). [...] to the Parties' current sales ([...]) would thus be [...]. Moreover, it is likely that some of the sales [...] Telone and Vydate, so that the market position of the combined entity is unlikely [...] each of Dow's and DuPont's [...]. In fact, these [...] sales are [...] what would [...] seem to be one of the [...] for nematode control, and increase uncertainty [pipeline information].

6.5.9. Conclusion on the assessment of non-coordinated effects in the markets for nematicides

(1701) Therefore, on balance and in light of the results of the market investigation and the evidence available to it, the Commission considers that in this particular case the evidence available is not sufficient to comprehensively establish to the requisite standard that the Transaction would significantly impede effective competition with respect to nematode control in the EEA, including all national and crop segmentations.

6.6. Fungicides

6.6.1. Introduction

6.6.1.1. Definition

(1702) Fungicides are agrochemicals that control diseases. Accordingly, this section will use "fungicides" and "disease control" interchangeably.

6.6.1.2. Overall market size globally and in the EEA

(1703) Globally, total fungicide sales amount to about [product specific turnover], of which [product specific turnover] in the EEA.¹²⁴⁸ In a more generic overview, the global fungicide market has been valued at around [market size], equivalent to [20-30]% of the agrochemical market.¹²⁴⁹

6.6.1.3. Types of diseases

(1704) Many diseases affect agricultural crops. Industry players appear to typically follow the general biological taxonomy of fungi, identifying the main relevant fungi for agricultural crops, as illustrated by the [reference to content of the Parties' internal documents] example below.

Figure 74 – Fungicide disease classification and value

[...]

Source: [Internal document] (ID3665-00021), pages 17-20

6.6.1.4. Relevant crop groups in the EEA

(1705) Cereals, fruits and vegetables and rice are the main crop groups for the use of fungicides in the EEA.

(1706) With regard to cereals, Europe accounted for [60-70]% of the global cereal fungicide market in 2014 with a value of about [product specific turnover]. France, Germany

¹²⁴⁸ Form CO and estimates of the Parties (EC Template – see the Parties' response to the Commission's request for information RFI 8 and follow-up requests). [Information extracted from internal document] [internal document] (ID6696-3350) [internal document] (ID06696-17348).

¹²⁴⁹ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 8.

and the United Kingdom account for [60-70]% of this total. Cereals are the most important crop for fungicides and cereal fungicides accounted for [20-30]% of all EEA crop protection sales in 2014.¹²⁵⁰

(1707) With regard to fruits and vegetables, grapes/vines are the largest crop, with a value of [...] in 2014. Europe accounted for [40-50]% of the global acreage planted with grapes/vines. The most important EEA countries in this segment are [countries].¹²⁵¹

(1708) With regard to rice, the Union is a relatively minor rice market globally.¹²⁵² Nonetheless, rice is significantly present in some countries such as [countries].¹²⁵³

6.6.1.5. Main MoAs and chemical classes currently used for disease control

(1709) The key MoAs in the fungicide markets assessed in this Transaction are multi-sites, demethylation inhibitors ("DMIs"/"azoles"), melanin biosynthesis inhibitors ("MBIs"), strobilurins and succinate dehydrogenase inhibitors ("SDHIs").¹²⁵⁴ Other MoAs and chemical classes may be relevant for different crops and diseases.

(1710) **Multi-sites** are old products dating from the 1960s, targeting essentially septoria in cereals, with only protectant activity. Because they target several sites, they are usually used in mixtures with other AIs to manage resistance, and do not trigger resistance themselves. Syngenta's chlorothalonil is the key product, also with mancozeb.¹²⁵⁵

(1711) **Demethylation inhibitors ("DMIs"/"azoles")** include the triazole and imidazole chemical classes. Also old products dating from the 1970s and relatively genericised, they have a broad spectrum and both protectant and curative activity. Because of widespread resistance,¹²⁵⁶ they are typically used in mixtures with more recent AIs to broaden spectrum, and most cereal fungicides contain an azole. However, they also face increasing regulatory pressure: most azoles are candidates for substitution in the EEA, and anticipated to leave the market in the coming years. BASF's epoxiconazole and Bayer's prothioconazole (still patent protected), two of the most recent products (1990 and 2002, respectively) are the key products currently. Other common AIs include metconazole, tebuconazole, propiconazole and cyproconazole.¹²⁵⁷

¹²⁵⁰ Form CO and estimates of the Parties (EC Template – see Parties' response to the Commission's request for information RFI 8 and follow-up requests).

¹²⁵¹ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 17.

¹²⁵² Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 167.

¹²⁵³ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 172.

¹²⁵⁴ [Internal document] (ID5588-00008), [internal document] (ID7079-298), slide 100; [internal document] (ID8836-00194), page 19; agreed non-confidential minutes of a call with an institute, 7 September (ID8738); agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246).

¹²⁵⁵ Dow's response to the Commission's request for information RFI 53, [internal document] (ID7661), pages 5-9; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 21.8.

¹²⁵⁶ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

¹²⁵⁷ Dow's response to the Commission's request for information RFI 53, [internal document] (ID7661), pages 10-24; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 21.9.

- (1712) **Melanin biosynthesis inhibitors (“MBIs”)** are the main MoA for rice blast control, and are specific to that use. They were originally developed from the late 1960s. Tricyclazole is the main MBI fungicide registered for use in Europe. Tricyclazole exclusively targets rice blast due to its high efficacy.¹²⁵⁸ It was registered in 1975.
- (1713) **Strobilurins/Quinone outside inhibitors (“QoIs”)** are the second most recent MoA, mainly dating from the late 1990s. They have a broad spectrum and target essentially septoria in cereals with mostly protectant but also some curative activity, as well as other diseases in other crops. They are mitochondrial respiration inhibitors (MET III complex).¹²⁵⁹ They are typically used in mixtures (with azoles and SDHIs) to broaden spectrum and manage resistance (which is already widespread in Europe).¹²⁶⁰ They also provide "greening" effect (improved crop yield).¹²⁶¹ Common AIs include pyraclostrobin, azoxystrobin and picoxystrobin.¹²⁶²
- (1714) **Succinate dehydrogenase inhibitors (“SDHIs”)/carboxamides** include the pyridine and pyrazole chemical classes. They are considered the latest MoA, since although older products date back to the early 1960s, more effective new generation AIs were launched from the early 2000s. They are also mitochondrial respiration inhibitors (MET II complex), but not cross-resistant to strobilurins. They have a narrower spectrum than strobilurins, targeting essentially septoria in cereals with strong protectant activity and sometimes some curative activity, as well as other diseases in other crops. They are usually sold in mixtures with azoles (and sometimes strobilurins) to broaden spectrum and increase efficacy, as well as to manage resistance. Resistance nevertheless is beginning to spread in cereal fungi, particularly septoria, and is anticipated to strongly develop in the next few years. Most modern cereal fungicides contain an SDHI. BASF's fluxapyroxad, Syngenta's isopyrazam and DuPont's penthiopyrad are the three best AIs. Others include boscalid and bixafen, as well as penflufen and sedaxane for seed treatment only.¹²⁶³
- 6.6.1.6. Key features: growing resistance, the importance of timing, the prevalence of mixtures and the need for new MoAs
- (1715) Many AIs and products are available to control fungi.¹²⁶⁴ However, these represent only a limited number of MoAs, and new MoAs have not been introduced to the market in a number of years. Managing growing resistance to existing MoAs is therefore of paramount importance in disease control.¹²⁶⁵ In practice, most AIs can

¹²⁵⁸ Dow's response to the Commission's request for information RFI 53, [internal document] (ID7661), pages 5-9; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 18.8.

¹²⁵⁹ See Commission Decision in Case M.1806 – AstraZeneca/Novartis (2000), recital 31.

¹²⁶⁰ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738).

¹²⁶¹ See Commission Decision in Case M.1806 – AstraZeneca/Novartis (2000), recital 32-34.

¹²⁶² Dow's response to the Commission's request for information RFI 53, [internal document] (ID7661), pages 25-30; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 21.10.

¹²⁶³ Dow's response to the Commission's request for information RFI 53, [internal document] (ID7661), pages 31-67; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 21.11.

¹²⁶⁴ [Internal document] (ID6033-00004), pages 98-140.

¹²⁶⁵ Form CO, part B.3, paragraphs 12, 94-95 and 97; agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246).

only be used once or, at most, twice per crop cycle, and sometimes even whole MoAs are limited to one or two uses per crop cycle.¹²⁶⁶

- (1716) The timing of application is another key element to look at when considering fungicides. Fungicide timings of application typically refer to crop development stages as classified by the industry under the so-called "BBCH growth stages".¹²⁶⁷ Different diseases target different crops at different growth stages, and AIs may be most effective only on some of those. Consequently, most products are usually targeted at only a few relevant timings for each crop.
- (1717) As a result of these two constraints – resistance management and a limited number of windows for treatment – fungicides differ somewhat from other crop protection segments in that the majority of products are mixtures of several AIs with different MoAs.¹²⁶⁸ The aim is both to limit resistance development and to broaden spectrum in order to solve as many disease problems as possible in the few available treatment opportunities.¹²⁶⁹ Another way to limit resistance is to rotate AIs – in particular different MoAs and chemical classes.¹²⁷⁰

6.6.2. *Relevant products of the Parties and their competitors*¹²⁷¹

6.6.2.1. Existing products of the Parties

(A) Dow

- (1718) Dow's EEA sales of fungicides in 2015 were approximately EUR [product specific turnover].

¹²⁶⁶ Agreed non-confidential minutes of a call with an institute, 10 March 2016 (ID245): "*Il y a récemment eu des nouveautés en fongicides, notamment les SDHI. Cette nouvelle famille est la seule vraie nouveauté. Pour la préserver et limiter l'apparition de résistances, Arvalis recommande de ne pas l'utiliser plus d'une fois par an.*"

¹²⁶⁷ "Biologische Bundesanstalt, Bundessortenamt und Chemische Industrie", initially sponsored by four companies: Bayer, BASF, Ciba-Geigy and Hoechst. The BBCH monograph is available [internal document] (ID6839) [internal document] (ID7454).

¹²⁶⁸ Form CO, part B.3, paragraph 12 and Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 73; Questionnaire to Crop Protection Customers (Q1), question 53.1; agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

¹²⁶⁹ Form CO, part B.3, paragraph 97.

¹²⁷⁰ Agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246); agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

¹²⁷¹ Form CO, part B.3; Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.2 (ID6033-2), slide 24; [internal document], (ID1329-1201), slide 1; [internal document], page 19 (ID1329-186); [internal document] (ID4384-00006), page 8.

Table 38 – Dow's proprietary fungicide portfolio in the EEA

AI name	Region	Crop	Pest	Chemical class	EEA sales in €m (2015)	Patent status and additional comments
Myclobutanil	EEA	Fruit and vegetables	Ascomycetes, fungi imperfecti and basidiomycetes	Triazole	[...]	Off-patent since 2007
Quinoxyfen	EEA	Fruit and vegetables	Powdery mildew	Aryloxyquinoline	[...]	Off-patent since 2009
Meptyldinocap	EEA	Fruit and other crops including strawberries and grapes	Powdery mildew	Dinitrophenol	[...]	Patent expires in 2025
Tricyclazole	EEA	Rice	Rice blast	Triazolobenzothiazole	[...]	Off-patent since 1990s
Fenbuconazole	EEA	Fruit, nuts and vegetable crops	Powdery mildew, Black Rot and Scab	Triazole	[...]	Off-patent since 2007
Mancozeb	Divested for EEA	Potatoes, Vine	Broad spectrum (blights, scabs)	Dithiocarbamate	[...]	Divested in 2012 to Indofil Industries

Source: Parties' submissions

- (1719) Myclobutanil. Dow's 2015 EEA sales of myclobutanil were approximately EUR [product specific turnover]. Myclobutanil is used to control ascomycetes, fungi imperfecti and basidiomycetes. It is a triazole fungicide which was first marketed in 1989. Myclobutanil can be applied on fruit and vegetable crops, including apples, grapes, mangoes, melons, peaches, lettuce, peppers, tomatoes, as well as soybean. In the EEA, myclobutanil is marketed under the brand names Arius System Plus, Systhane, Systhane Forte, Systhane Duplo, Syathene Max, Systhane Super, Vento Power, Thiocur Forte, Legend Power, Rally, Rally Q, TSAR, Postalon, Licorne, Trankilo, Talent. Myclobutanil has been off-patent since 2007.
- (1720) Quinoxyfen. Dow's 2015 EEA sales of quinoxyfen were approximately EUR [product specific turnover]. Quinoxyfen is mainly used to control powdery mildew in fruit and vegetable crops, such as hops, grapes, melons, peaches and tomatoes. It belongs to the quinoline chemical class. Quinoxyfen is marketed in the EEA under the brand names Arius, Legend, Atlas, Fortress, Elios, IQ-Crystal, Rondo and Elios Inox. Quinoxyfen has been off-patent since 2009.
- (1721) Meptyldinocap. Dow's 2015 EEA sales of meptyldinocap were approximately EUR [product specific turnover]. Introduced in 2007, meptyldinocap belongs to the dinitrophenol chemical class, and is active against powdery mildew mainly on fruit and other crops including strawberries and grapes. In the EEA, meptyldinocap is marketed under the brand names Karathane Star, Karathane New, Karathane 3D, Karathane Gold, Kindred and Inox. Meptyldinocap's patent will expire in 2025.

- (1722) Tricyclazole. Dow's 2015 EEA sales of tricyclazole were approximately EUR [product specific turnover]. Tricyclazole belongs to the triazolobenzothiazole chemical class. It is used for control of rice blast disease caused by the blast fungus *Pyricularia grisea*. In the EEA, tricyclazole is marketed under the brand names Beam, Beam System and Bim. Tricyclazole was first introduced in 1975 and has been off-patent since the 1990s.
- (1723) Fenbuconazole. In 2015, Dow's EEA sales of fenbuconazole were approximately EUR [product specific turnover]. Fenbuconazole is a fungicide used to control a range of diseases including powdery mildew, black rot and scab. It can be applied on fruit, nuts and vegetable crops, including almonds, apples, cherries, peaches and peppers. Fenbuconazole is a triazole fungicide that works systemically to prevent the growth of fungi by interrupting their normal growth cycle. In the EEA, fenbuconazole is marketed under the brand names Indar, Impala, Impala Jardin and Simitar. Fenbuconazole has been off-patent since 2007.
- (1724) Dow's fungicide offering also included mancozeb (Dithane). Dow divested its European mancozeb business to Indofil Industries Ltd. in 2012. Dow currently [sales strategy] (2015 sales were EUR [product specific turnover]). [Sales strategy]. Mancozeb is commonly used to control a wide range of fungal diseases including blights and scabs on crops. It belongs to the carbamate chemical class, and can be applied on cereals, cotton, maize, as well as fruit, nuts and vegetable crops, including apples and pears, peanuts, potatoes and tomatoes.
- (1725) Finally, Dow [information on strategic decisions] market products containing epoxiconazole and boscalid in the EEA.¹²⁷² It also sells [information on strategic decisions] azoxystrobin and isopyrazam.¹²⁷³ Dow's 2015 EEA sales of such third party products amounted to EUR [turnover].

(B) DuPont

- (1726) DuPont's EEA sales of fungicides in 2015 were EUR [turnover].

¹²⁷² Dow's response to the Commission's request for information RFI 51, [internal document] (ID7576-10); Form CO, part B.3, paragraphs 86 and 123; Form CO, Annex B.I.8.13 CP; [internal document] (ID1329-484).

¹²⁷³ Form CO, part B.3, paragraph 106; Form CO, Annex B.I.8.13 CP; agreed non-confidential minutes of a call with a competitor, 10 June 2016 (ID8262).

Table 39 – DuPont's proprietary fungicide portfolio in the EEA

AI name	Region	Crop	Pest	Chemical class	EEA sales in €m (2015)	Patent status and additional comments
Picoxystrobin	EEA	Cereals, corn, soybeans, dry beans, canola, rice and other crops	Fungal diseases, including brown rust, tan spot, powdery mildew, and net blotch	Strobilurin	[...]	Off-patent since 2008 in the Union Acquired from Syngenta in 2006
Proquinazid	EEA	Cereals and grapes	Powdery mildew	Quinazolone	[...]	Patent expires in 2019 in Austria, Germany, Spain, France, UK, Greece, Hungary, Ireland, Poland and Portugal
Penthiopyrad	EEA	Cereals, potatoes, sugarbeets, vegetables, soybeans and other plants	Rust, septoria, rhizoctonia and other fungal diseases	SDHI	[...]	Patent expires in April 2016 in the Union
Cymoxanil	EEA	Potatoes, tomatoes and grapes	Downy mildew	Cyanoacetamide oxime	[...]	Off-patent since the 1990s
Famoxadone	EEA	Potatoes, tomatoes and other vegetables	Broad spectrum of plant pathogenic fungi (downy mildew, blights, etc.)	Strobilurin	[...]	Off-patent since 2015

Source: Parties' submissions

(1727) Picoxystrobin.¹²⁷⁴ Picoxystrobin is DuPont's most important fungicide product, with EEA sales of EUR [product specific turnover] in 2015. Picoxystrobin is a strobilurin-based fungicide. Acquired from Syngenta by DuPont in 2006,¹²⁷⁵ it is viewed in the industry as an effective, particularly systemic, strobilurin. Originally targeted at the T1 timing of application for cereals by Syngenta in complement to azoxystrobin in T2, DuPont has developed its uses more broadly.¹²⁷⁶ It is used to control a range of fungal diseases in cereals, including brown rust, tan spot, powdery mildew and net

¹²⁷⁴ Form CO, part B.3, paragraphs 30, 87 and 106; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21; DuPont's response to the Commission's request for information RFI 54, [Parties' submissions] (ID8091-32); Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 74.

¹²⁷⁵ Agreed non-confidential minutes of a call with a competitor, 10 June 2016 (ID8262).

¹²⁷⁶ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 74.

blotch, as well as fungal diseases in corn, soybeans, dry beans, canola and other crops like rice. In the EEA, it is marketed mainly under the brand names Acanto and Acanto Plus. Its patent in the Union expired in 2008. DuPont [sales estimates].¹²⁷⁷

- (1728) Proquinazid. In 2015, DuPont's EEA sales of proquinazid were approximately EUR [product specific turnover]. Proquinazid belongs to the quinazolinone chemical class. It provides control of powdery mildew in a range of crops including cereals and grapes. In the EEA, the product is marketed under the brand names Talendo and Talius. It is also sold in a three-way mixture mainly under the brand names Vareon and Wirtuoz. In Austria, Germany, Spain, France, the United Kingdom, Greece, Hungary, Ireland, Poland and Portugal, DuPont's patent for proquinazid expires in 2019.
- (1729) Penthiopyrad (LEM17).¹²⁷⁸ In 2015, DuPont's EEA sales of penthiopyrad were approximately EUR [product specific turnover]. It is a recent SDHI (carboxamide) co-developed with Mitsui.¹²⁷⁹ Penthiopyrad is very effective on septoria,¹²⁸⁰ and industry consensus is that it is the third best SDHI after BASF's fluxapyroxad and Syngenta's isopyrazam.¹²⁸¹ [Strategic decisions].¹²⁸² It is used to control rusts, septoria, rhizoctonia and other fungal diseases of cereals, potatoes, sugar beets, vegetables, soybeans and other crops. In the EEA, the product is marketed mainly under the brand names Fontelis and Vertisan, and in mixtures as Treoris and Abrusta. Patent protection in the Union expired in April 2016.
- (1730) Cymoxanil. In 2015, DuPont's sales of cymoxanil were approximately EUR [product specific turnover]. Cymoxanil is used to control diseases on a range of crops including potatoes, tomatoes and grapes. Cymoxanil belongs to the cyanoacetamideoxime chemical class. In the EEA, the product is marketed mainly under the brand name Curzate. It was first introduced in the mid-1970s and has been off-patent since the 1990s. There are numerous generic suppliers of cymoxanil.
- (1731) Famoxadone. In 2015, DuPont's EEA sales of famoxadone were approximately EUR [product specific turnover]. Famoxadone is a strobilurin-based fungicide used to control a broad spectrum of plant pathogenic fungi including downy mildew and blights. Famoxadone belongs to the oxazolinedione chemical class. It can be applied on potatoes, tomatoes and other vegetables. In the EEA, it is marketed mainly under the brand names Tanos and Equation Pro, and is also sold in mixtures with cymoxanil. It was first introduced in 1998, and its patent expired in 2015.

¹²⁷⁷ [Internal document] (ID1329-79), page 2.

¹²⁷⁸ Parties' response to the Article 6(1)(c) Decision, paragraph 175; Form CO, part B.3, paragraphs 32, 87 and 109; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21, and request for information RFI 54, [internal document] (ID7837-162); Dow's response to the Commission's request for information RFI 53, [internal document] (ID7661).

¹²⁷⁹ Parties' response to the Commission's request for information RFI 51 (ID7597), questions 4-6 and relevant annexes.

¹²⁸⁰ DuPont's response to the Commission's request for information RFI 43, Annex RFI 43 18.06 (ID7837-143), slides 9-10; agreed non-confidential minutes of a call with a competitor, 27 September 2016 (ID8568).

¹²⁸¹ See for example Dow's response to the Commission's request for information RFI 53, [Parties' submissions] (ID7661), page 64, and DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.06 (ID7837-162), page 21. Isopyrazam is not authorised in France, where penthiopyrad would hence be the second best SDHI.

¹²⁸² DuPont's response to the Commission's request for information RFI 56, Annex RFI56 2.01 (ID8091-27), page 6.

(1732) As is apparent from Table 38 and Table 39, the Parties' portfolios of proprietary fungicide AIs are limited. In light of this weak position, Dow and DuPont tend to cooperate with other companies to have a larger presence, in particular by procuring third-party AIs for mixtures.¹²⁸³

6.6.2.2. Pipeline products of the Parties

(1733) The Parties both have several discovery and development pipeline projects.

(A) Dow's Inatreq (fenpicoxamid; [pipeline information])¹²⁸⁴

(1734) Inatreq is a project in development of the picolinamide chemical class.¹²⁸⁵ It is planned for launch¹²⁸⁶ [launch plans]. [[Pipeline information]¹²⁸⁷ control of septoria in wheat through a novel MoA ([pipeline information]),¹²⁸⁸ and also has efficacy on rusts. Dow plans to register Inatreq for use in cereal crops (wheat), and to pursue registrations for other uses (for example on bananas) as identified. Since it is a natural fermentation product, Inatreq may qualify for biocontrol [pipeline information].¹²⁸⁹ [Sales estimates].

Figure 75 – [Extract from internal document]

[...]

Source: [Internal document](ID6033-00004), page 112

(1735) As its focus is septoria for wheat, which is relevant mostly in Europe, [pipeline information].¹²⁹⁰

(B) [Pipeline information]¹²⁹¹

(1736) [Pipeline information and strategic decisions].^{1292,1293,1294,1295}

¹²⁸³ Form CO, part B.3, paragraphs 15, 28, 225, 252, 254 and footnote 21.

¹²⁸⁴ Dow's response to the Commission's request for information RFI 56, Annex 4.4 (ID8091-4); Form CO, part B.3, paragraph 156; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21; Parties' response to the Commission's request for information RFI 54, Annexes RFI 54_5.1(a) through (d) (ID7837-45 to ID7837-48).

¹²⁸⁵ See the Parties' response to the Commission's request for information RFI 51 (ID7597), questions 4 through 6 and relevant annexes.

¹²⁸⁶ [Internal document] (ID8836-00194), page 19.

¹²⁸⁷ [Internal document] (ID7576-12), especially page 45.

¹²⁸⁸ [Internal document] (ID6150-20876), slide 42.

¹²⁸⁹ Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248).

¹²⁹⁰ Parties' submission to the US DOJ, [...] (ID7965).

¹²⁹¹ Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.5 (ID8091-5).

¹²⁹² According to internal assessments, [information on pipeline products] (Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.1 (ID6033-1), slides 18 and 44, and Annex RFI 26 4.2 (ID6033-2), slide 26). [Information on pipeline products] (Dow's responses to the Commission's request for information RFI 59, [internal document] (ID9408), page 9, and request for information RFI 26, Annex RFI 26 4.3 (ID6033-3), slide 11, and Annex RFI 26 4.4 (ID6033-4), slide 51; see also [internal document] (ID6082-71/ID7088-444), page 42; Parties' response to the Commission's request for information RFI 44, [internal document] (ID6775-5), slide 21. [Information on pipeline products] Dow's response to the Commission's request for information RFI 59 [internal document] (ID9408).

¹²⁹³ Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.1 (ID6033-1), slide 3.

¹²⁹⁴ [Information on pipeline products] (Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.1 (ID6033-1), slides 14 and 24). [Information on pipeline products] (Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.3 (ID6033-3), slide 13;

Figure 76 – [Extract from internal document]

[...]

Source: [Internal document] (ID6033-00004), page 158

Figure 77 – [Extract from internal document]

[...]

Source: [Internal document] (ID6082-00071/ID7080-00444), page 42

- (C) [Pipeline information]
- (1737) [Pipeline product information].¹²⁹⁶
- (D) DuPont's Zorvec ([pipeline product information]; oxathiapiprolin)
- (1738) DuPont's Zorvec is a new fungicide co-developed with Syngenta that is intended for use against late blight (oomycete) on potatoes, grapes, vegetables and other specialty crops, and is based on a new MoA ([pipeline product information]).¹²⁹⁷
- (E) DuPont's [pipeline product information]¹²⁹⁸
- (1739) [Pipeline information] is a project in development, [pipeline information].¹²⁹⁹ It is intended to control [pipeline information] diseases in cereals [pipeline information].^{1300,1301,1302}

Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.4 (ID6033-4), slide 82). [Information on pipeline products] (Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.4 (ID6033-4), slide 51). [Internal document] (ID6082-71/ID7088-444), page 42.

¹²⁹⁵ Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.3 (ID6033-3), slide 28.

¹²⁹⁶ Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.2 (ID6033-2), slides 26 and 30-32. The latest available internal document on [pipeline information] is Dow's response to the Commission's request for information RFI 59, [internal document] (ID9408).

¹²⁹⁷ [Portfolio strategy].

¹²⁹⁸ DuPont's response to the Commission's requests for information RFI 54, Annex RFI 54 6.04 (ID7837-160) and RFI 56, Annex RFI 56 2.01 (ID8091-27); Form CO, part B.3, paragraphs 42, 157 and 163.

¹²⁹⁹ In their response to the Statement of Objections (paragraphs 874-877), the Parties [pipeline information and strategic decisions] (see for instance DuPont's response to the Commission's request for information RFI 64, Annex RFI 64_2_01 (ID10456), pages 3, 5 and 29). Second, the Commission's framework for the assessment of potential competition (see Section V.3.3, as well as recital (302)) is not a timeframe so much as it is an overall assessment of which molecules have a high likelihood of reaching the market. This factors in many elements, and [pipeline information].

¹³⁰⁰ While [...] claims that [pipeline information] (Parties' response to the Commission's request for information RFI 44 (ID6843)), [internal document] (ID1329-943), page 3). Moreover, [internal document] (ID1329-958), pages 11 and 31). [Strategic decisions] (DuPont's response to the Commission's requests for information RFI 54, Annex RFI 54 6.04 (ID7837-160), page 5). It must be noted that mixtures are the standard in fungicides in any event, partly to broaden spectrum, [pipeline information] (DuPont's response to the Commission's requests for information RFI 54, Annex RFI 54 6.04 (ID7837-160) [internal document] (ID1157-68), page 18). Furthermore, [internal document] (ID7837-111), page 23).

¹³⁰¹ [Internal document] (ID1157-68), page 25. In its response to the Commission's request for information RFI 56 (ID8089), question 1, [strategic decision] (see also agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248)), [strategic decision]. The latest available internal document [pipeline information] DuPont's response to the Commission's request for information RFI 64, Annex

- (F) [Pipeline information]
- (1740) [Strategic decision and pipeline information].¹³⁰³ [Pipeline information; sales estimates].
- (G) [Pipeline information]
- (1741) [Strategic decision].
- (1742) [Pipeline information]¹³⁰⁴ [strategic decisions].^{1305,1306}
- (1743) [Strategic decision].¹³⁰⁷
- (1744) [Strategic decision].¹³⁰⁸
- (1745) [Pipeline information].
- (H) Other early pipeline projects
- (1746) Finally, both Dow and DuPont have fungicides further up in the pipeline, in the discovery stage. [Pipeline information].^{1309,1310}

6.6.2.3. Competing products

- (A) BASF
- (1747) BASF is one of two leaders of the EEA fungicide market with Bayer. More specifically, it sells a number of leading AIs against wheat diseases. Xemium (fluxapyroxad), its latest SDHI, claims stronger control than earlier products and is considered the standard AI in terms of efficacy, with anticipated global peak sales of EUR 600 million.¹³¹¹ [Internal document reference].¹³¹² Epoxiconazole is one of the two most effective DMIs, but is now off-patent and offered by several generics. It is also under regulatory pressure in the EEA as a candidate for substitution and will likely be taken off the market in the coming years (2019-2020). BASF also sells pyraclostrobin, usually in mixtures with fluxapyroxad and/or epoxiconazole. Finally, boscalid is BASF's first SDHI, but is currently not considered as best in class.¹³¹³

¹³⁰² RFI 64_2_01 (ID10456). [Strategy] DuPont's response to the Commission's request for information RFI 64, Annex RFI 64_3_01 (ID10457).

¹³⁰³ DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.04 (ID7837-160).

¹³⁰⁴ Parties' response to the Commission's request for information RFI 44, [internal document] (ID6775-26/ID6885-184/ID7837-149), slides 2 and 3.

¹³⁰⁵ See [internal document] (ID1331-80).

¹³⁰⁶ [Internal document] (ID9606-166), slide 9.

¹³⁰⁷ Parties' response to the Commission's request for information RFI 44 (ID6843), question 16.

¹³⁰⁸ DuPont's response to the Commission's request for information RFI 58, Annex RFI 58 1.05 (ID8322), pages 2, 30-31.

¹³⁰⁹ Parties' response to the Commission's request for information RFI 44, [internal document] (ID6775-29), page 8.

¹³¹⁰ Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.1 (ID8091-1), page 17.

¹³¹¹ Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.1 (ID8091-1), page 19.

¹³¹² DuPont's response to the Commission's request for information RFI 9, Annex RFI 9 1.215 (ID1162-00239) (also [Parties' submission] (ID1331-00013)).

¹³¹³ [Internal document] (ID1329-66), slide 9.

¹³¹³ Form CO, part B.3, paragraph 99.

(B) Bayer

(1748) Bayer's main and almost only leading AI for wheat is prothioconazole, a very effective latest generation DMI, which, unlike many DMIs, does not currently face pervasive resistance and is not under regulatory pressure. [Parties' competitive assessment].¹³¹⁴ Bayer also sells bixafen, an old and apparently not very effective SDHI.¹³¹⁵ For rice, Bayer essentially sells tebuconazole only.

(C) Syngenta

(1749) Syngenta sells chlorothalonil, an off-patent multi-site with only preventive action, but which is considered as *the* resistance breaker and is found in a large number of mixtures. It is sold by a number of generic players as well. Syngenta also sells azoxystrobin, an off-patent strobilurin with moderate efficacy on septoria, which is mainly effective on rice sheath blight and brown spot, but also on rice blast.¹³¹⁶ Finally, Syngenta is the owner of isopyrazam, an effective SDHI, which, however, is approved in the EEA but not authorised in France due to its toxicological characteristics.¹³¹⁷ For rice, Syngenta also sells cyproconazole.

(D) Generics

(1750) In addition to the three R&D players, a number of generic players offer mixtures of off-patent AIs. Nonetheless, as explained in Section V.6.2.1, these generic players typically do not constrain global R&D-integrated players like Dow and DuPont to the same extent as other global R&D-integrated players, in essence because their market reach and product portfolios are not as strong.

(E) Pipeline projects

(1751) [...] a number of publicly available sources,¹³¹⁸ it appears that the three competing global R&D-integrated players are developing new AIs for cereals, which target mainly septoria:¹³¹⁹ at least one next generation DMI (Revysol/mefentrifluconazole from BASF for 2020) and several SDHIs (Solatenol/benzovindiflupyr already on the market and Adepidyn/pydiflumetofen for 2020 from Syngenta, cypropamide/"460" for 2021 from Bayer).¹³²⁰ Other players like FMC/Isagro (fluindapyr, for 2022, [pipeline information])¹³²¹ also have SDHIs in the pipeline, and are developing new mixtures of existing AIs.

(1752) [Pipeline information], the Parties also list two competitor pipeline products,¹³²² both allegedly with very good efficacy: dichlorobentiazox from Bayer/Kumiai and tolprocarb, a new site of action (SoA) fungicide from Mitsui.

¹³¹⁴ [Internal document] (ID1329-66), slide 9.

¹³¹⁵ Form CO, part B.3, paragraph 100.

¹³¹⁶ Form CO, part B.3, paragraphs 101-102.

¹³¹⁷ See [internal document] (ID9304-75) page 4. [Parties' internal assessment].

¹³¹⁸ [Internal document] (ID7837-145).

¹³¹⁹ Form CO, part B.3, paragraph 161; [internal document] (ID6825-16572); [internal document] (ID1157-68), page 17.

¹³²⁰ Form CO, part B.3, paragraph 165.

¹³²¹ Agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7111). [Source], this appears to be the only product from FMC targeting cereals [internal document] (ID6825-12667), slide 50).

¹³²² Parties' response to the Commission's request for information RFI 44, Annex RFI 44 Q19 (ID6775-00049).

6.6.3. Market definition

6.6.3.1. Past decisional practice

- (1753) In previous decisions, the Commission first assessed fungicides by crop (cereals, sugar beets, oilseed rape, forage crops, potatoes, tobacco, fruit and nuts, vegetables and ornamentals).¹³²³ The Commission also proposed a further split for instance for cereals,¹³²⁴ into notably wheat, barley, oats, rye and triticale.
- (1754) Secondly, the Commission considered further possible distinctions by disease. For instance, for wheat, the Commission noted that distinctions could be made between fungicides for powdery mildew, rusts, eyespot and septoria.¹³²⁵
- (1755) Finally, the Commission considered a distinction between strobilurin-based and non-strobilurin-based fungicides for cereals.¹³²⁶

6.6.3.2. The Parties' views

- (1756) The Parties disagree with a market definition at the crop/disease/country level. In essence, they allege that this would not be in line with precedents and, more importantly, that it would not be appropriate in light of the existence of mixtures as well as the fact that treatments typically target more than one disease. In addition, it would not be "*universally endorsed*" by the market investigation.¹³²⁷
- (1757) The Parties nonetheless submit that given their small fungicide activity, the Transaction would not raise issues under any possible market definition.

6.6.3.3. The Commission's assessment

- (1758) As explained in Section V.4.2.1, the Commission's starting point in defining the relevant product market is the specific crop/pest combination corresponding to the specific treatment need of the farmer.
- (1759) First, as to the subdivision of the market by crop, the results of the investigation broadly support Commission precedents dividing fungicides by crop.¹³²⁸ However, market players are divided as to a further segmentation for cereal fungicides (for example wheat, barley and other cereal fungicides).¹³²⁹ On the one hand, some market players explain that there are "*different diseases in different cereal crops*". [Reference to content of internal document]. On the other hand, some companies highlight that the "*same active ingredient can be used both on wheat and barley*."¹³³⁰
- (1760) The fact that a given AI may be effective on more than one crop does not mitigate these earlier considerations, and is also applicable across crop groupings. For example, a given AI could be used on cereals (even perhaps both wheat and barley)

¹³²³ See Commission Decision in Cases M.6141 – CNAC/Koor Industrie/Makhteshim Agan Industries (2011), recital 23; M.2547 – Bayer/Aventis Crop Science (2002), recital 655; M.1806 – AstraZeneca/Novartis (2000), recital 25; and M.1378 – Hoechst/Rhône-Poulenc (2004), recital 34.

¹³²⁴ See Commission Decision in Case M.1806 – AstraZeneca/Novartis (2000), recital 26.

¹³²⁵ See Commission Decision in Case M.1806 – AstraZeneca/Novartis (2000), recital 26.

¹³²⁶ See Commission Decision in Case M.1806 – AstraZeneca/Novartis (2000), recital 31.

¹³²⁷ Parties' response to the Statement of Objections, paragraphs 848-852.

¹³²⁸ Questionnaire to Crop Protection Customers (Q1), question 49; Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 104.

¹³²⁹ Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 105; Questionnaire to Crop Protection Customers (Q1), question 50.

¹³³⁰ Questionnaire to Crop Protection Customers (Q1), question 50.1 (compare ID2164 with ID9596).

but also specialty crops like fruits and vegetables or others. No argument is made by the Parties that these different crop groupings should also be grouped together.

- (1761) From a demand-side perspective, there are differing disease patterns for different cereal crops – in particular wheat, rye and triticale, on the one hand, and barley, on the other hand – which point to separate product markets for each crop.¹³³¹ Moreover, the fact that products are authorised by specific crop further strengthens this conclusion.¹³³²
- (1762) Second, as regards a distinction by disease, the results of the market investigation support the view that a further distinction by type of disease is appropriate.¹³³³ Indeed, from a demand-side perspective, the farmer's need is defined by the specific crop/disease combination for which a treatment is needed.
- (1763) Some respondents mitigated this distinction by explaining that it only applies to certain crops, for instance stating that "*this would not be relevant to cereals*".¹³³⁴ Nevertheless, different diseases in a given crop generally warrant different treatments. This is typically the case for rice as well as grapes/vines.
- (1764) For cereals, a small number of key diseases determine treatment plans. Indeed, [reference to content of internal document].
- (1765) Overall, the majority of responding crop protection stakeholders considers that both the distinction of fungicides by crops and by disease is relevant.¹³³⁵
- (1766) Third, as regards a distinction by MoAs and chemical classes, these are regarded as important by market participants.¹³³⁶ MoAs and chemical classes are taken into account to ensure effectiveness, to fight resistance and depending on the timing of application. Consequently, some respondents explain that "*most fungicides can only be bought as mixtures of at least 2 modes of action*".¹³³⁷ Respondents highlighted particular MoAs that are especially relevant to them (for instance SDHIs for cereals or grape, triazoles for cereals, oilseed rape or fruits, strobilurins for cereals and fruits, etc.).¹³³⁸

¹³³¹ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738). See also agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7383) on the importance of looking at differences in pests for each crop.

¹³³² Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7383). The Commission notes that, at least in some countries, product authorisations for a given crop may be automatically extended to neighbouring – often less grown – crops. This appears to be the case for the extension of authorisations for wheat to rye and triticale (see agreed non-confidential minutes of a call with a competitor, 27 September 2016 (ID8568)).

¹³³³ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738). Questionnaire to Crop Protection Customers (Q1), question 51; Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 106.

¹³³⁴ Questionnaire to Crop Protection Customers (Q1), question 51.1 (ID9087).

¹³³⁵ Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 29.

¹³³⁶ Questionnaire to Crop Protection Customers (Q1), question 53; Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 108; Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 30.

¹³³⁷ Questionnaire to Crop Protection Stakeholders (Q3a), question 30 (ID3671).

¹³³⁸ Questionnaire to Crop Protection Customers (Q1), question 54; Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 109; Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 31.

(1767) While recognising the importance of combining different MoAs, however, the market investigation does not support the view that the definition of separate markets by MoA or chemical class is appropriate. MoAs and chemical classes, as well as the importance of their combination, will be assessed in the framework of the competitive assessment.

(1768) Finally, as explained in Section V.4.2.2, the Commission concludes that the markets for formulated products are national in their geographic scope.

6.6.3.4. Conclusion

(1769) For the reasons set out in Section V.6.6.3.3 and in light of the available evidence and the results of the market investigation, the Commission considers that each crop/disease/country combination constitutes a separate relevant market. Where necessary, for analytical purposes, the Commission will assess groupings at the crop level of relevant crop/disease product markets, focusing on the main diseases for that crop. Distinctions based on different MoAs and chemical classes will be considered in the competitive assessment.

6.6.4. Cereals

6.6.4.1. Introduction

(1770) Cereals are the largest crop group for disease control in the EEA ([40-50]%), and cereal fungicides are the largest crop protection segment in the EEA (USD [Parties' internal segment size estimate]).¹³³⁹ Conversely, cereal fungicides are a much less relevant market out of the EEA.¹³⁴⁰ The main cereals are wheat ([70-80]%) and barley ([20-30]%), together [90-100]% of the EMEA cereal fungicide market.¹³⁴¹ The largest cereal fungicide national markets in the EEA are France, Germany and the United Kingdom,¹³⁴² followed by smaller markets such as Poland.

Figure 78 – European cereal fungicide market figures

[...]

Source: *Parties' response to the Commission's request for information RFI 56, [internal document] (ID8091-4), page 25*

Figure 79 – EMEA rotational crop fungicide market

[...]

Source: *Parties' response to the Commission's request for information RFI 54, [internal document] (ID7837-160), page 13*

(1771) Many fungi target cereal crops in the EEA, and their prevalence varies with geography and climate, but also with weather, agronomic practices and crop

¹³³⁹ [Internal document] (ID1157-68), page 22; agreed non-confidential minutes of a call with a technical institute, 13 September 2016 (ID8557).

¹³⁴⁰ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), pages 71 and 78.

¹³⁴¹ DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.04 (ID7837-160), page 11.

¹³⁴² DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.04 (ID7837-160), page 13.

varieties.¹³⁴³ In practice, the main diseases in the EEA are *Septoria tritici* (leaf spot/leaf blotch, "septoria"), rusts, powdery mildew, eyespot and fusarium.¹³⁴⁴ Septoria is the key wheat disease – and accordingly the key cereal disease – affecting a very large part of crops and triggering the bulk of treatment efforts.¹³⁴⁵ For example, according to a technical institute, crop losses due to septoria are on average 15% in France – the largest EEA producer – sometimes going up to 35%.¹³⁴⁶ The Parties even refer to "*serious yield losses* [Parties' internal assessment of the segment]" in the Union.¹³⁴⁷

- (1772) In spite of its economic importance for European farmers and contrary to the Parties' claims,¹³⁴⁸ the number of effective solutions available for cereal disease control is limited. Septoria, in particular, was identified in the investigation as one of the key diseases for which there is a limited number of effective crop protection products.¹³⁴⁹ Indeed, many of the theoretically available products are rather old, off-patent and accordingly available from several suppliers but also not very effective: "*[c]onversely, some products are strategically registered for some uses, which are on their label, but in fact only have limited actual efficacy. Rice fungicides is an example of a segment where this is frequently the case*".¹³⁵⁰ Recent, truly effective, products are few: [company's internal assessment of competitive landscape].¹³⁵¹
- (1773) For septoria in cereals specifically, only four MoAs have efficacy: multi-sites, DMIs, SDHIs and strobilurins.¹³⁵² Resistance is already widespread in the EEA, and spreading further.¹³⁵³ Accordingly, the leading formulated products typically combine at least two AIs: an SDHI and a DMI (sometimes adding a strobilurin).¹³⁵⁴

¹³⁴³ See Commission Decision in Case M.1806 – AstraZeneca/Novartis (2000), recital 20. For a general overview of EU cereal fungicides, see Dow's response to the Commission's request for information RFI 53, [internal document] (ID7661).

¹³⁴⁴ Form CO, part B.3, paragraph 92; DuPont's response to the Commission's request for information RFI43, Annex RFI 43 18.06 (ID7837-143), slide 13; [internal document] (ID1157-68), page 24.

¹³⁴⁵ [Internal document] (ID8604), page 4; [internal document] (ID6150-20876), slide 36; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 21.5; agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557); agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521).

¹³⁴⁶ Agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

¹³⁴⁷ Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21.

¹³⁴⁸ Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 21.5.

¹³⁴⁹ Questionnaire to Crop Protection Customers (Q1), question 17; agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738).

¹³⁵⁰ Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938); Form CO, part B.3, paragraphs 58, 96, 103.

¹³⁵¹ [Internal document] (ID6696-3977), slide 12.

¹³⁵² Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21; agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

¹³⁵³ Form CO, part B.3, paragraphs 12, 93-94; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21; agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); see also the Parties' response to the Commission's request for information RFI 44, [internal document] (ID6775-5), slide 21; Arvalis, *Synthèse nationale interventions de printemps 2015-2016, blé tendre et blé dur, lutte contre les maladies* (ID12627), page 90, available at <https://www.arvalis->

- (1774) Indeed, septoria resistance was identified in the investigation as one of the main challenges in crop protection in the EEA.¹³⁵⁵ [Company's strategy].¹³⁵⁶ A customer also confirms that "[t]riazole development, provided increased control of cereal diseases, [sic] Their efficacy started to decline and strobs were introduced, [sic] they lasted about 3 years in wheat before full septoria resistance became the norm, then SDHI were introduced but azole performance further declined. Currently azole performance on septoria is less than 20% and decreasing, putting significant selectin [sic] pressure on the SDHI".¹³⁵⁷ The concern is that "in the medium term wheat production may become impossible."¹³⁵⁸
- (1775) Even newer products face the general problem of severe resistance.¹³⁵⁹ One of the most prominent examples of resistance is strobilurins, introduced to the market only in the early 2000s but which already face pervasive resistance in the largest markets.¹³⁶⁰ This has spurred public authorities and industry players to mandate or recommend the use of mixture products only,¹³⁶¹ with strict limitations on the number of uses for each MoA.
- (1776) An important consequence of these mixture obligations is that a large number of finished products are on the market, with a high level of differentiation and segmentation to address the specific needs of the farmer (in particular for added disease spectrum beyond septoria, protectant or curative action, timing of application).¹³⁶²
- (1777) Consequently, although a farmer may have only a few specific crop/disease needs, AIs and formulated products typically have activity on several diseases for a given crop, and often also on several crops (sometimes with different, but biologically related, diseases). [Crop protection players, however, focus their analyses on key crops and diseases to a certain extent. AIs for disease control are thus largely the same across all cereal crops, combined in different mixtures. Each AI also targets more than one disease, and will be combined with others to broaden spectrum further and prevent resistance development. For instance, Dow's Inatreq targets not only septoria in wheat but also addresses rusts in wheat].

infos.fr/file/galleryelement/pj/04/08/b3/fc/3_bt_bd_maladies9000946019959109316.pdf); [internal document] (ID366), pages 7 and 11; [internal document] (ID8836-00194), page 19.

1354 Form CO, part B.3, paragraphs 12, 93, 94; [internal document] (ID8604), page 4; [internal document] (ID1329-01186), page 19; [internal document] (ID366), page 7; [internal document] (ID4384-00006), page 5; agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557); Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21.

1355 Questionnaire to Crop Protection Customers (Q1), question 29; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 21.6.

1356 [Internal document] (ID8604), page 4.

1357 Questionnaire to Crop Protection Customers (Q1), question 25 (ID5973). See also [internal document] (ID366), pages 7 and 11; [internal document] (ID8836-00194), page 19.

1358 Questionnaire to Crop Protection Customers (Q1), question 25 (ID2362).

1359 Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738).

1360 Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521).

1361 [Internal document] (ID7998), slides 2, 12-13 and 20 [internal document].

1362 [Internal document] (ID9304-11), page 4; Form CO, part B.3, paragraphs 95, 104 and 230; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21; [internal document] (ID1329-484); DuPont's response to the Commission's request for information RFI 43, [internal document] (ID7837-143), slides 8, 10, 12, 14, 17; [internal document] (ID4384-00006), page 9.

- (1778) Accordingly, the effects of the Transaction on current and forthcoming fungicides which mainly target septoria in wheat would not be limited to the markets for septoria control in wheat. While septoria control in wheat remains the key driver, these effects would follow the spectrum of formulated products containing these AIs and expand to other diseases and crops, such that the Transaction would in effect impact the whole cereal fungicide segment. [Strategy regarding portfolio]. For instance, [strategy regarding portfolio].¹³⁶³
- (1779) In terms of timing of application, cereal fungicides are usually applied at T0, T1, T2 or T3, with uses against septoria focused on T1 (including BBCH growth stages 31 to 37) and T2 (including BBCH growth stages 39 to 51).¹³⁶⁴

Figure 80 – Wheat timings of application in EU

[...]

Source: [Internal document] (ID1157-68), page 33

- (1780) The availability of products is also constrained by regulatory pressure, in particular the risk of older molecules not being able to achieve renewal of their approval. This is particularly true of DMIs, where many AIs are candidates for substitution and will likely be taken out of the market in the coming years.¹³⁶⁵
- (1781) The need for new AIs, especially ones with new MoAs, is thus great,¹³⁶⁶ in particular in the EEA context of intensive production where disease control "*is of paramount importance*".¹³⁶⁷ [Internal document].¹³⁶⁸ In the words of a technical institute, "*fungicides based on novel modes of action are highly needed because of resistance development*".¹³⁶⁹ [Internal document].¹³⁷⁰ However, few products with new MoAs are in the pipeline,¹³⁷¹ and the opportunity for important changes to the market is high.¹³⁷²

¹³⁶³ DuPont's response to the Commission's request for information RFI 56, Annex RFI 56 2.01 (ID8091-27), page 3.

¹³⁶⁴ Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 21; [internal document] (ID6775-47), slide 15; DuPont's response to the Commission's request for information RFI 43, Annex RFI 43 18.06 (ID7837-143), slides 6 and 13; [internal document] (ID1157-68), page 3.

¹³⁶⁵ [Internal document] (ID366), pages 3, 7, 10 and 11; [internal document] (ID4384-00006), page 4.

¹³⁶⁶ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with a competitor, 10 June 2016 (ID8262); Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 18; Form CO, part B.3, paragraph 92; [internal document] (ID4384-00006), pages 5 and 9.

¹³⁶⁷ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 71; Form CO, part B.3, paragraph 92; See also [internal document], (ID561-10), [internal document].

¹³⁶⁸ [Internal document] (ID8604), page 4. See also DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.04 (ID7837-160), page 7.

¹³⁶⁹ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738). See also agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521).

¹³⁷⁰ Parties' response to the Article 6(1)(c) Decision, paragraph 171.

¹³⁷¹ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 78; [internal document] (ID1329-01186), page 19; agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738).

¹³⁷² [Internal document] (DuPont's response to the Commission's request for information RFI 43, Annex RFI 43 18.06 (ID7837-143), slides 2, 3, 5); agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738).

6.6.4.2. Current market shares in major markets

(1782) On the downstream grouping for cereal septoria fungicides, the data provided by the Parties shows limited shares for Dow and DuPont.

Table 40 – Cereal septoria market shares in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
SEPTORIA								
EEA	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[10-20]	[10-20]
France	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[10-20]	[10-20]
Germany	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[40-50]	[5-10]	[5-10]
United Kingdom	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[5-10]	[10-20]
Poland	[...]	[0-5]	[10-20]	<i>[10-20]</i>	[20-30]	[20-30]	[10-20]	[20-30]

Source: Parties' response to the Commission's request for information RFI 44, Annex RFI 44 Q21

(1783) On the downstream grouping for wheat fungicides, the available data shows limited shares for Dow and DuPont.

Table 41 – Wheat fungicide market shares in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
ALL DISEASES								
EEA	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[10-20]	[10-20]
France	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[10-20]	[10-20]
Germany	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[40-50]	[10-20]	[10-20]
United Kingdom	[...]	[0-5]	[0-5]	<i>[5-10]</i>	[30-40]	[30-40]	[5-10]	[10-20]
Poland	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[20-30]	[20-30]	[10-20]	[20-30]
LEAFSPOTS - CAPNODIALES (incl. SEPTORIA)								
EEA	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[10-20]	[10-20]
France ¹³⁷³	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[80-90]	[5-10]	[0-5]	[5-10]
Germany	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[10-20]	[10-20]
United Kingdom	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[30-40]	[30-40]	[10-20]	[10-20]
Poland	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[10-20]	[30-40]	[10-20]	[20-30]

Source: Agrowin

¹³⁷³ [Market share information].

(1784) On the downstream grouping for barley fungicides, the available data shows limited shares for Dow and DuPont.

Table 42 – Barley fungicide market shares in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
ALL DISEASES								
EEA	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[40-50]	[20-30]	[10-20]	[5-10]
France	[...]	[0-5]	[0-5]	<i>[0-5]</i>	[50-60]	[20-30]	[20-30]	[0-5]
Germany	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[40-50]	[20-30]	[10-20]	[5-10]
United Kingdom	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[60-70]	[10-20]	[10-20]	[5-10]
Poland	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[20-30]	[20-30]	[30-40]	[10-20]
LEAFSPOTS - CAPNODIALES (incl. RAMULARIA)								
EEA	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[40-50]	[20-30]	[10-20]	[5-10]
France ¹³⁷⁴	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[50-60]	[20-30]	[10-20]	[0-5]
Germany	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[40-50]	[10-20]	[20-30]	[0-5]
United Kingdom	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[40-50]	[20-30]	[5-10]	[10-20]
Poland	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
ERYSIPHALES/POWDERY MILDEWS (incl. OIDIUM)								
EEA	[...]	[0-5]	[5-10]	<i>[5-10]</i>	[40-50]	[10-20]	[10-20]	[10-20]
Czech Republic	[...]	[10-20]	[5-10]	<i>[20-30]</i>	[30-40]	[10-20]	[20-30]	[10-20]
Slovakia	[...]	[10-20]	[10-20]	<i>[20-30]</i>	[10-20]	[10-20]	[20-30]	[10-20]

Source: Agrowin

6.6.4.3. The Commission's concerns [...] in the Statement of Objections

(1785) In its Statement of Objections, the Commission preliminarily considered that the Transaction would be likely to cause a significant impediment to effective competition in the national markets for cereal disease control throughout EEA countries, and especially in France, Germany, the United Kingdom and Poland. [...].

(1786) The Commission's preliminary concerns were raised in light of the elements detailed in the following sub-sections and considering the evidence available to the Commission at the moment of the issuing of the Statement of Objections.

(A) In the Statement of Objections, the Commission preliminarily considered that current market leaders face regulatory and resistance issues which would likely reduce the competitive strength of their existing products in the near future

(1787) BASF and Bayer, as Syngenta to a lesser extent, are the current cereal fungicide market leaders, [Parties' internal assessment of competitive landscape].¹³⁷⁵

¹³⁷⁴ [Market share information].

- (1788) As explained in Section V.6.6.1.5, a number of products currently on the market are likely to be restricted or prohibited by stricter regulations in the coming years. DMIs are particularly vulnerable to this threat since many such molecules are candidates for substitution, as well as chlorothalonil, the current key resistance breaker.¹³⁷⁶
- (1789) Competitors themselves confirm this increased regulatory pressure, and anticipate that a number of their products will face regulatory limitations or bans. Syngenta acknowledges "*that for certain AIs, due to regulatory challenges, it may no longer be able to successfully obtain re-registration*".¹³⁷⁷ Bayer also confirms possible restrictions for tebuconazole.¹³⁷⁸ Finally, Adama itself confirmed that epoxiconazole, propiconazole and tebuconazole will lose efficacy against septoria.¹³⁷⁹
- (1790) Increased regulatory pressure also applies to the Parties' AIs and products, especially those currently on the market. However, the elements detailed in this assessment show that the Parties are overall and as a general rule less vulnerable to that increased pressure than competitors.
- (1791) First, their current sales are smaller than those of current market leaders BASF, Bayer and Syngenta, and to a certain extent based on in-licensed third party AIs, [cost structure]. Their potential loss in profits is therefore smaller.
- (1792) Second, AIs under regulatory pressure are mainly older DMIs. The Parties have few AIs [...] in this MoA: mainly cyproconazole and fenbuconazole for Dow, as well as tebuconazole for DuPont. [...], current market leaders have large sales with these AIs, which are important elements of their portfolio. For example, epoxiconazole accounted for 49% of EMEA cereal fungicide sales for BASF in 2013.¹³⁸⁰
- (1793) As explained in Section V.6.6.1.6, resistance is another major challenge in fungicides. Already today, a significant number of AIs show decreased efficacy on septoria in the EEA. In the near future, it is anticipated that all current MoAs will face significant resistance, although the exact level of resistance pressure is difficult to assess precisely because it will vary with different molecules, geographies and agronomic practices.¹³⁸¹ In fact, resistance explains the almost exclusive use of fungicides in mixtures.
- (1794) Even more recent products and MoAs, widely used today as alternatives to products with decreasing efficacy, are likely to face significant resistance in the near future.

¹³⁷⁵ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with a competitor, 10 June 2016 (ID8262).

¹³⁷⁶ Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.4 (ID8091-4), page 19; Dow's response to the Commission's request for information RFI 51, Annex RFI 51 6.12 (ID7576-12), pages 18-19, 27-28 and 34-35; [internal document](ID4384-00006), page 3; [internal document] (ID1157-68), page 17; [internal document] (ID6150-20876), slide 36; [internal document] (ID7998), slides 2, 20, 29, 32.

¹³⁷⁷ Syngenta's response to the Commission's request for information to competitors on fungicides and nematicides (ID8809).

¹³⁷⁸ Bayer's response to the Commission's request for information to competitors on fungicides and nematicides (ID8824).

¹³⁷⁹ Adama's response to the Commission's request for information to competitors on fungicides and nematicides (ID9262).

¹³⁸⁰ See Dow's response to the Commission's request for information RFI 51, Annex RFI 51 6.12 (ID7576-12), page 28 and Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.4 (ID8091-4), pages 26 and 28, as well as [...], (ID6696-8737), slide 4.

¹³⁸¹ DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.04 (ID7837-160), page 7.

For instance, Bayer's leading AI, prothioconazole, is already facing resistance in the United Kingdom. [Parties' internal assessment of competitive landscape].¹³⁸²

(1795) However, as explained in Sections V.6.6.4.4 to V.6.6.4.6, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.

(B) In the Statement of Objections, the Commission preliminarily considered that [...]

(1796) [...].

(1797) **Dow's Inatreq** [assessment of efficacy of Parties' products and pipeline].¹³⁸³ Second, it shows [assessment of efficacy of Parties' products and pipeline] efficacy on septoria, as well as good efficacy on rusts, [assessment of efficacy of Parties' products and pipeline].¹³⁸⁴ [Assessment of efficacy of Parties' products and pipeline]. Third, it is a natural fermentation product, which could qualify for biocontrol [assessment of efficacy of Parties' products and pipeline].¹³⁸⁵

(1798) [Company's strategy regarding its portfolio].¹³⁸⁶

(1799) [Strategy regarding pipeline].^{1387,1388} Syngenta confirms that "*DuPont has a pipeline fungicide for septoria control with possibly a larger spectrum [than Inatreq]*".¹³⁸⁹

(1800) [Pipeline information].^{1390,1391}

(1801) [Pipeline information].^{1392,1393,1394}

(1802) [Pipeline information].¹³⁹⁵

(1803) [Pipeline information]. In the case of Inatreq, the application for approval of the AI in the EEA was submitted in December 2014. The ISO common name (fenpicoxamid) was obtained in August 2016.

(1804) [Pipeline information].

¹³⁸² DuPont's response to the Commission's request for information RFI 56, Annex RFI 56 2.01 (ID8091-27), page 8.

¹³⁸³ Dow's response to the Commission's request for information RFI 51, [Parties' submission] (ID7576-12), pages 18-19.

¹³⁸⁴ Dow's response to the Commission's request for information RFI 51, [Parties' submission] (ID7576-12), pages 3, 17 and 32.

¹³⁸⁵ [...]: see Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.4 (ID8091-4), page 10; also [...] (ID6696-3977), slide 24.

¹³⁸⁶ Dow's response to the Commission's request for information RFI 51, [Parties' submission] (ID7576-12), page 40.

¹³⁸⁷ See for instance [internal document] (ID6827-30282), slides 36-38.

¹³⁸⁸ [Parties' submission] (ID4384-00006), page 24.

¹³⁸⁹ Agreed non-confidential minutes of a call with a competitor, 10 June 2016 (ID8262).

¹³⁹⁰ [Internal document] (ID8091-00025/ID6353-00091/ID4384-00061/ID3953-00124), [internal document].

¹³⁹¹ Parties' response to the Commission's request for information 64, [...] (ID10457).

¹³⁹² Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.5 (ID8091-5), page 37.

¹³⁹³ [Internal document] (ID6082-71) [internal document] (ID7080-444), page 42.

¹³⁹⁴ [Internal document] (ID9408), page 28.

¹³⁹⁵ Dow's response to the Commission's request for information RFI 59, [...] (ID9408), page 14.

- (1805) [Pipeline information]. Syngenta confirms that "*Dow and DuPont each have one new product in their pipeline which are similar to each other*".¹³⁹⁶ [Quotes from internal documents; internal analysis].^{1397,1398} [Pipeline information].
- (1806) Moreover, these AIs have new MoAs, which are strongly needed in the cereal fungicide market. [Pipeline information]
- (1807) Finally, as explained in Section V.6.6.4.3(A), by the time Inatreq is launched, several AIs will be under regulatory and resistance pressure and probably be exiting the market. This is in particular the case of DMIs like BASF's epoxiconazole, one of the two leading triazoles with prothioconazole.¹³⁹⁹ The number of competing AIs would thus likely be reduced compared with today.
- (1808) However, as explained in Sections V.6.6.4.4 to V.6.6.4.6, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.
- (C) In the Statement of Objections, the Commission preliminarily considered that the Parties appear to be the only global R&D-integrated players with [pipeline information] AIs with novel MoAs in the pipeline¹⁴⁰⁰
- (1809) [Pipeline information].^{1401,1402}
- (1810) Pre-Transaction, each of Dow and DuPont would have used their new MoA to capture market share. Market players would have been able to go to two independent and competing companies to gain access to new MoAs, and could have leveraged them one against the other. Post-Transaction, they would be forced to go to one and the same company for access to one of these two new MoAs, giving the merged entity a particularly strong position.
- (1811) [...].
- (1812) However, as explained in Sections V.6.6.4.4 to V.6.6.4.6, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.
- (D) In the Statement of Objections, the Commission preliminarily considered that competitor pipelines largely lack new MoAs
- (1813) The Parties carefully monitor competitors, in particular pipelines, through expert intelligence.¹⁴⁰³ [...]. The Parties are thus able to identify competitor pipeline

¹³⁹⁶ Agreed non-confidential minutes of a call with a competitor, 10 June 2016 (ID8262).

¹³⁹⁷ See [internal document] (ID366), page 7.

¹³⁹⁸ [Internal document] (ID1329-186), page 19.

¹³⁹⁹ See, for example, Dow's response to the Commission's request for information RFI 51, [...] (ID7576-12), pages 18-19.

¹⁴⁰⁰ Parties' response to the Commission's request for information RFI 44 (ID6843), question 22.

¹⁴⁰¹ Dow's response to the Commission's request for information RFI 59, [internal document] (ID9408), page 16; Parties' submission of [...], [internal document] (ID8604), page 4.

¹⁴⁰² See the Parties' response to the first Letter of Facts, paragraph 95, explaining the latest changes in the [pipeline information]. See also DuPont's response to the Commission's request for information RFI 64, Annex RFI 64_2_01 (ID10456), page 19.

¹⁴⁰³ Form CO, Annex A.13.30.1. [Internal document] (ID6825-16572), slide 7. See also [internal document] (ID1329-00192), especially pages 24-27; [internal document] (ID4384-00006), pages 4 and 8; DuPont's response to the Commission's request for information RFI 43, Annex RFI 43 18.08 [internal document] (ID7837-145), page 16. Also, [internal document] (ID1327-158); [internal document] (ID8091-11); [internal document] (ID719-32); [internal document] (ID719-72); [internal document] (ID719-73);

pressure, which is notably needed to correctly project future sales and the current value of their own pipeline projects. These competing existing and future products are thus taken into account in the Parties' predictions for the success of their own forthcoming products.¹⁴⁰⁴

- (1814) As explained in recital (1751), at least the other three global R&D-integrated players target cereal fungicides with their efforts and are developing new products for cereals, which target mainly septoria.¹⁴⁰⁵
- (1815) These products have good efficacy, and are even foreseen by their owners as blockbusters. For instance, Syngenta plans peak sales for Adepidyn at USD 750 million globally.¹⁴⁰⁶ In that regard, these currently large players will be able to leverage those new AIs across their existing portfolio and market presence, which likely explains this high level of sales.
- (1816) However, the consensual assumption in the industry is that these existing MoAs – in particular SDHIs, which are the leading products currently – would face growing resistance and lowered efficacy [...],¹⁴⁰⁷ although the exact level of resistance pressure on current and forthcoming AIs is difficult to assess precisely because it will vary with different molecules, geographies and agronomic practices. In particular, the extent to which newer generation AIs from existing MoAs would be affected by resistance is difficult to assess.
- (1817) [Pipeline information].^{1408,1409} The Parties would thus possibly remain the only global R&D-integrated players with new MoAs, although other competitors may have new MoAs in their pipelines.
- (1818) In particular, Dow is at this stage the only company active in the picolinamide chemical class, which has a new MoA and includes Inatreq, [pipeline information].¹⁴¹⁰
- (1819) [Pipeline information].

[internal document] (ID8091-15); [internal document] (ID8091-16); [internal document] (ID8091-17); [internal document] (ID1329-590); [internal document] (ID8091-19); [internal document] (ID1332-1188).

¹⁴⁰⁴ Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.4 (ID8091-4), pages 20 and 29; [internal document] (ID1329-1261), page 17.

¹⁴⁰⁵ Form CO, part B.3, paragraph 161; [internal document] (ID6825-16572); [internal document] (ID1329-1261), page 17.

¹⁴⁰⁶ [Internal document] (ID1332-79) page 30.

¹⁴⁰⁷ Dow's response to the Commission's request for information RFI 51, [internal document] (ID7576-12); [internal document] (ID7576-12), pages 19, 27-28 and 34-35; [internal document] (ID4384-00006), page 9; [internal document] (ID1329-1261), page 17; [internal document] (ID6150-20876), slide 36; [internal document] (ID7998), slides 2, 20, 29, 32; [internal document] (ID7079-274), page 19; [internal document] (ID7837-160), page 7.

¹⁴⁰⁸ [Internal document] (ID6150-20876), slide 21. See also Dow's response to the Commission's request for information RFI 51, [internal document] (ID7576-12), page 19; [internal document] (ID1329-1261), page 17; [internal document]. See also [internal document] (ID4384-00006), page 8. In this regard, [internal document].

¹⁴⁰⁹ Parties' submission of [date] [Parties' submission] (ID8604), page 4; DuPont's response to the Commission's request for information RFI 54, Annex RFI 54 6.04 (ID7837-160), page 7.

¹⁴¹⁰ Dow's response to the Commission's request for information RFI 56, Annex RFI 56 4.5 (ID8091-5), pages 5 and 19. See also Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.2 (ID6033-2), page 26.

- (1820) On the contrary, most competitors – in particular current market leaders Bayer, BASF and Syngenta – would not have such new proprietary MoAs. In fact, their new AIs, using older MoAs, may face some resistance from market launch, and would most likely only be used in mixtures with other MoAs, which would slow the development of resistance. Considering that most effective older MoAs will likely face resistance [pipeline information], even competitors would likely need to procure new MoAs to preserve the efficacy of their own products and most recent AIs.
- (1821) However, as explained in Sections V.6.6.4.4 to V.6.6.4.6, these elements are insufficient to find that the Transaction would likely significantly impede effective competition in the relevant markets.
- 6.6.4.4. Assessment of non-coordinated effects in [cereal fungicides] in light of the additional evidence produced by the Parties
- (1822) In their response to the Statement of Objections, the Parties contested that the Commission would have met its legal obligations to find a significant impediment to effective competition. In particular, they highlighted: their current marginal market positions; undue emphasis placed on the Parties' aspirational market share and revenue expectations; the existence of strong players with quality current and pipeline products; and the requirement of evidencing significant effects on product and price competition at a nine – in fact, six to eight – year horizon.¹⁴¹¹
- (1823) Following further investigation – and in particular in light of the Parties' current small presence in cereal ([pipeline information]) fungicides and the absence of complaints from market participants, as well as the other elements provided in the following sections – the Commission concludes that, on balance, the available evidence does not support the finding that there is a significant impediment to effective product and price competition in the national cereal fungicide markets within the EEA, [pipeline information].
- 6.6.4.5. The Parties are very small players in cereal ([pipeline information]) fungicides, thereby reducing the likelihood that the Transaction would cause a significant impediment to effective competition
- (1824) The Parties explain that very few affected markets arise with the Transaction.¹⁴¹² Indeed, the Parties' sales currently overlap only in nine countries for cereal fungicides in the EEA.¹⁴¹³ Moreover, as is apparent from Section V.6.6.2 on the Parties' products, their portfolios of proprietary AIs for disease control in cereals – and especially for septoria – are limited.¹⁴¹⁴ DuPont's AIs for septoria are limited to picoxystrobin and penthiopyrad (either straight or in mixture with third party AIs), while Dow does not have any proprietary AI for this use.¹⁴¹⁵ Dow and DuPont thus

¹⁴¹¹ Parties' response to the Statement of Objections, paragraphs 828, 830, 833, 876-877, 986 also paragraphs 914-916 and 982.

¹⁴¹² Parties' response to the Statement of Objections, paragraphs 914-916, 931-932, 941 and 982. Parties' response to the Article 6(1)(c) Decision, paragraph 176.

¹⁴¹³ Form CO, part B.3, paragraphs 90 and 169 (and table 3.1 page 32).

¹⁴¹⁴ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738); agreed non-confidential minutes of a call with an institute, 13 September 2016 (ID8557).

¹⁴¹⁵ [Internal document] (ID1239-484); Parties' response to the Commission's request for information RFI 44 (ID6843), question 21.

need to cooperate with other companies to have a larger presence.¹⁴¹⁶ [Pipeline information].

- (1825) This confirms that the Parties' have a currently weak position in the EEA national cereal fungicide markets [pipeline information]. Accordingly, finding that the Transaction would significantly impede effective competition would require that the market positions of the Parties would be sufficiently enhanced by their forthcoming pipeline AIs for them to capture significant market power. Such an increase in market power would need to occur in the face of strong current incumbents with the corresponding incentives and abilities to at least preserve their own positions on these markets.
- (1826) Consequently, in order to find a significant impediment to effective competition, the Commission need not only show that the Parties' currently very limited combined market strength would be significantly increased. It also needs to show that this increased market power of currently small players would lead to a significant and detrimental effect on competition, rather than to increased competition through the creation of a stronger third player better able to compete with the current market leaders.
- (1827) In that context, the Parties emphasise that, even looking forward with their [...] forthcoming AIs, it is unlikely that they would be able to sufficiently increase their combined market position – [...] – in the face of current market leaders to significantly impede effective competition. Specifically, they disagree with the Commission's reliance on their projected market shares and sales in an assessment of product and price competition eight years into the future, and emphasise the existence of significant competitors.¹⁴¹⁷
- 6.6.4.6. The available evidence does not support a finding of significant impediment to effective competition in these markets
- (1828) There is little doubt that the Parties' forthcoming AIs are [...]. However, the reliability of the Parties' market share and revenue projections as well as the level of competition they would face are subject to a number of uncertainties. It is thus not possible to quantify to the requisite legal standard the likely increase the Parties could achieve in their combined market power.
- (1829) [Pipeline information].
- (1830) Moreover, the Parties claim that strong competition exists from branded and generic competitors.¹⁴¹⁸ Indeed, competitors – particularly the three market leaders (BASF and Bayer, as well as Syngenta) – would currently be developing or have registered and be planning to launch innovative products for the control of fungal diseases in cereals, including septoria. These would notably be Syngenta's Solatenol

¹⁴¹⁶ Form CO, part B.3, paragraphs 15, 28, 225, 252, 254 and footnote 21.

¹⁴¹⁷ Parties' response to the Statement of Objections, paragraphs 828, 830, 833, 876-877, 986 also paragraphs 914-916 and 982.

¹⁴¹⁸ Parties' response to the Statement of Objections, paragraphs 829-830, 911-915, 930, 934-940, 942-944, 948-950; Parties' supplemental response to the Statement of Objections (ID10357); [...] (ID10360); Parties' response to the Article 6(1)(c) Decision, paragraph 166; Form CO, part B.3, paragraphs 2 and 48 for R&D players; Form CO, part B.3, paragraph 96 for generics.

(benzovindiflupyr) and Adepidyn (pydiflumetofen), BASF's Revysol and Bayer's cyproamide, as well as other AIs from a number of smaller competitors.¹⁴¹⁹

- (1831) As explained in Sections V.6.6.4.3(A) and V.6.6.4.3(D), these products are from existing MoAs, which will face growing resistance and lowered efficacy [pipeline information]. They are in any event not new MoAs.
- (1832) However, competitors' pipeline products are expected to generate considerable sales and to have good efficacy. In addition, the exact level of resistance pressure on current and forthcoming AIs is difficult to assess precisely, in particular when looking forward in time: resistance to some molecules will evolve quickly, resistance to others more slowly. Resistance may also evolve differently in different geographies. In particular, the extent to which newer generation AIs from existing MoAs would be affected by resistance is difficult to assess. It is thus not possible to predict when and to what extent different AIs would be regulated out of the market or face strongly limited efficacy due to resistance.
- (1833) Furthermore, the scarcity of new MoAs from global R&D-integrated players notwithstanding, the Commission found, in light of its investigation, that at least one other new MoA AI for septoria control developed by a competitor will likely reach the EEA market [...].¹⁴²⁰
- (1834) Accordingly, the specific market situation of the Parties and their main competitors in several years cannot be determined with reasonable certainty. On the one hand, the Parties would be likely to increase their currently very low combined market power. On the other hand, competitors would be likely to continue to constitute a countervailing competitive force which would constrain the Parties. Overall, the available evidence cannot support a finding that the Transaction would likely significantly impede effective competition due to non-coordinated effects in these markets.

6.6.4.7. Conclusion on [pipeline information]

- (1835) In sum, on balance and in light of the results of the market investigation and the evidence available to it, the Commission considers that in this particular case the evidence available is not sufficient to comprehensively establish to the requisite standard that the Transaction would likely significantly impede effective competition [cereal fungicides] in the national markets for cereal disease control throughout EEA countries, and especially in France, Germany, the United Kingdom and Poland.

¹⁴¹⁹ Parties' response to the Statement of Objections, paragraphs 829, 923-929, 934-939, 948-950. Parties' response to the Article 6(1)(c) Decision, paragraph 177; Form CO, part D, section A.III.

¹⁴²⁰ Parties' supplemental response to the Statement of Objections (ID10357); [...] (ID10360).

6.6.4.8. Cereal powdery mildew fungicides in the Czech Republic, Slovakia and the United Kingdom

(1836) Table 43 presents market shares in cereal powdery mildew control affected markets.

Table 43 – Cereal powdery mildew affected markets in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
ERYSIPTHALES/POWDERY MILDEWS (incl. OIDIUM)								
CEREALS: BARLEY								
EEA	[...]	[0-5]	[5-10]	[5-10]	[40-50]	[10-20]	[10-20]	[10-20]
Czech Republic	[...]	[10-20]	[5-10]	[20-30]	[30-40]	[10-20]	[20-30]	[10-20]
Slovakia	[...]	[10-20]	[10-20]	[20-30]	[10-20]	[10-20]	[20-30]	[10-20]
CEREALS: OTHER								
EEA	[...]	[0-5]	[5-10]	[5-10]	[20-30]	[30-40]	[10-20]	[20-30]
United Kingdom	[...]	[0-5]	[20-30]	[20-30]	[5-10]	[20-30]	[10-20]	[30-40]

Source: Agrowin

(1837) The Commission notes that the Parties' combined market shares amount to [20-30]% in the Czech Republic, [20-30]% in Slovakia and [20-30]% in the United Kingdom. The merged entity would continue to be challenged by a number of competitors, including Bayer ([30-40]% in the Czech Republic; [10-20]% in Slovakia; [5-10]% in the United Kingdom), BASF ([10-20]% in the Czech Republic; [10-20]% in Slovakia; [20-30]% in the United Kingdom) and Syngenta ([20-30]% in the Czech Republic; [20-30]% in Slovakia; [10-20]% in the United Kingdom). [Pipeline information].

(1838) The Commission further notes that Dow's quinoxifen [...] ¹⁴²¹ – is likely to lose its regulatory approval in the EEA as a candidate for substitution [...] ^{1422,1423}. Dow's quinoxifen and DuPont's proquinazid are the only two AIs in a given and important MoA for powdery mildew control. ¹⁴²⁴ In other chemical classes for powdery mildew control several options exist. Since quinoxifen [...] already shows growing resistance and reduced efficacy, farmers have started abandoning its use. ¹⁴²⁵

(1839) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would likely not significantly impede effective

¹⁴²¹ See [internal document] (ID1329-484).

¹⁴²² See [internal document] (ID06696-32779), [internal document] (ID3987-00126), pages 3-4, 9-10, 12, 29-33; [internal document] (ID9304-76), pages 8-9; [internal document] (ID1327-40), pages 2, 6-7, 17, 28, 47, 53; [internal document] (ID9304-12), pages 10, 17-19.

¹⁴²³ Agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

¹⁴²⁴ Agreed non-confidential minutes of a call with an institute, 5 October 2016 (ID8147); agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938); agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

¹⁴²⁵ Agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938); agreed non-confidential minutes of a call with an institute, 20 October 2016 (ID8525).

competition with respect to cereal powdery mildew fungicides in the Czech Republic, Slovakia and the United Kingdom.

6.6.4.9. Cereal fungicides in Slovenia

(1840) Table 44 presents market shares in cereal disease control affected markets for which Agrowin data was missing.

Table 44 – Cereal affected market in the EEA for countries missing in Agrowin

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
CEREALS								
Slovenia	[...]	[5-10]	[20-30]	[20-30]	[30-40]	[10-20]	[10-20]	[5-10]

Source: Parties' response to the Commission's request for information RFI 29, Annex RFI29 Q.3.1

(1841) The Commission notes that the Parties' combined market share amounts to [20-30]%. The merged entity would continue to be challenged by a number of competitors, including Bayer ([30-40]%), BASF ([10-20]%), Syngenta ([10-20]%) and Adama ([5-10]%). [Developments and pipeline information].

(1842) The Commission further notes that Agrowin does not contain data on the specific products counted in these market share figures, nor does it provide the specific disease(s) targeted.¹⁴²⁶ However, the Parties explain in the Form CO that Dow's sales of proprietary cereal fungicides in the EEA include mancozeb and quinoxifen.¹⁴²⁷ Dow's European mancozeb business was divested to Indofil in 2012, and sales by Dow are only residual.¹⁴²⁸ Quinoxifen, as explained in recital (1838), currently faces resistance issues [...].

(1843) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would likely not significantly impede effective competition with respect to cereal fungicides in Slovenia.

6.6.5. Rice blast

6.6.5.1. Introduction

(1844) Rice seems a relatively minor crop in the EEA compared to cereals, or to the importance of rice in Asia. However, significant rice growing regions exist within the EEA – Italy, Spain, Greece and (the South of) France – where that crop is culturally important. In 2015, rice cultivation covered [market size information] ha in the Union (including [national market size information] in Italy, [national market size information] in Spain, [national market size information] in Greece), of which [national market size information] were Clearfield varieties (tolerant to BASF's imazamox herbicide; including [national market size information] in Italy, [national market size information] in Spain, [national market size information] in Greece). Of the total Union rice crop protection market of EUR [market size information], Italy

¹⁴²⁶ See [internal document] (ID1329-484) and the Form CO, part B.3, paragraph 105.

¹⁴²⁷ Form CO, part B.3, paragraphs 86 and 109.

¹⁴²⁸ Form CO, part B.3, paragraph 25.

represents [50-60]%, Spain [20-30]%, Greece [5-10]% and Portugal [5-10]%.¹⁴²⁹ In sum, it is an important niche market. Indeed, Italy is the [...] rice fungicide market outside of Asia, after [...].¹⁴³⁰ Globally, a conservative estimate of the rice fungicide market is USD [market size information].¹⁴³¹

- (1845) In terms of rice diseases, two stand out as being the most prevalent and detrimental worldwide, and accordingly the most relevant: rice blast (*Pyricularia oryzae*) and rice sheath blight (*Rhizoctonia solani*).¹⁴³² Rice blast, in particular, is the key disease for rice production in the EEA, with the notable exception of France where climatic conditions limit its impact.¹⁴³³ It accounts for more than [70-80]% of EEA rice disease control sales. [Quote from internal document].¹⁴³⁴
- (1846) There are a large number of rice fungicides globally, which is likely explained by the importance of rice in Asia. In particular, a large number of Japanese companies are active in the discovery of new compounds to address local needs.¹⁴³⁵
- (1847) Nevertheless, data shows that only a fraction of these AIs reach the EEA, in all likelihood because many crop protection companies do not view this segment as sufficiently large or profitable to justify the requisite investments (AI approval, product authorisation, marketing, technical support).
- (1848) In the words of Certis: "*[r]ice is not a priority crop in Europe. Few products are developed for this crop, except in Japan. The economics for rice (cost of registering a product versus expected sales) are not good enough in Europe to justify significant product developments*".¹⁴³⁶ For example, none of the main AIs listed for the EEA by Phillips McDougall is also [...].¹⁴³⁷
- (1849) Similarly, [pipeline information].¹⁴³⁸
- (1850) As a result, few AIs are available in the EEA,¹⁴³⁹ from essentially three MoAs: strobilurins (only azoxystrobin and picoxystrobin are approved for rice), MBIs (tricyclazole) and DMIs (difenoconazole, tebuconazole, propiconazole, flutriafol and

¹⁴²⁹ Dow's response to the Commission's request for information RFI 43, [Parties' submission] (ID6545); Dow's response to the Commission's request for information RFI 59, [Parties' submission] (ID8833-000007), pages 3 and 5.

¹⁴³⁰ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 172.

¹⁴³¹ Dow's response to the Commission's request for information RFI 26, Annex RFI 26 4.4 (ID6033-00004), page 146.

¹⁴³² Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), pages 167-168; agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

¹⁴³³ Agreed non-confidential minutes of a call with an institute, 21 September 2016 (ID8144); agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

¹⁴³⁴ [Internal document] (ID6696-16254).

¹⁴³⁵ For a general overview of rice fungicide development in Japan, see [internal document] (ID6748-18584).

¹⁴³⁶ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹⁴³⁷ The main AIs for Europe are: [...]. The main AIs for Japan are: [...]. Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), pages 170 and 172.

¹⁴³⁸ DuPont's response to the Commission's request for information RFI 58, [Parties' submission] (ID8322), page 2.

¹⁴³⁹ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

prochloraz are registered). Tricyclazole is the "*indispensable*"¹⁴⁴⁰ and most effective product against rice blast. Strobilurins have a broader spectrum: they provide some control of rice blast, but also sheath blight – for which azoxystrobin appears to be the current standard treatment¹⁴⁴¹ – and *Helminthosporium*/brown spot.¹⁴⁴² DMIs are mainly effective against brown spot.¹⁴⁴³ Products sold appear to typically contain mainly two AIs: tricyclazole and azoxystrobin,¹⁴⁴⁴ which are also [...] globally.¹⁴⁴⁵

6.6.5.2. Market shares

(1851) On the downstream markets for rice fungicides (in particular rice blast control), the available data shows Dow's strong dominance in the EEA, and especially in Greece and Italy, with Syngenta a distant second player in a duopoly market. In Spain, Dow's dominance is less strong, with Bayer a distant second player and BASF a very distant third player. However, this data appears not to be fully reliable since figures (in particular market size) vary significantly between different versions compiled by the Parties and the Commission. Some of those shares are also only an informative aggregation at grouping level, not actual market shares. Moreover, as will be explained, this data is from 2015, and accordingly fails to account for DuPont's launch of picoxystrobin, one of only two strobilurins approved for rice in the EEA with azoxystrobin.¹⁴⁴⁶

¹⁴⁴⁰ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983); agreed non-confidential minutes of a call with an institute, 22 March 2016 (ID8910).

¹⁴⁴¹ [Internal document] (ID6082-00071), also [internal document] (ID7080-00444), page 42. Thifluzamide, an SDHI which is another standard treatment for sheath blight, is apparently not registered in the EEA. See also the agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

¹⁴⁴² Parties' response to the Commission's request for information RFI 44 (ID6843), question 20; agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

¹⁴⁴³ Parties' response to the Commission's request for information RFI 44 (ID6843), question 20.

¹⁴⁴⁴ Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 18.

¹⁴⁴⁵ Phillips McDougall – AgriService, Crops Section – 2014 Market (ID129/ID6827-05379/ID7081-02857/ID7081-02863), page 165.

¹⁴⁴⁶ See also the Parties' response to the Commission's request for information RFI 44, Annex RFI 44 Q18 (ID7978/ID8833-000082) and the Parties' response to the Commission's request for information RFI 59, Annex RFI 59 Q.7.01 (ID8833-000140), [sales estimate and market share information].

Table 45 – Rice disease control shares in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
ALL DISEASES								
EEA	[...]	[50-60]	[0-5]	[50-60]	[0-5]	[0-5]	[20-30]	[10-20]
Greece	[...]	[80-90]	[0-5]	[80-90]	[0-5]	[0-5]	[10-20]	[0-5]
Italy	[...]	[50-60]	[0-5]	[50-60]	[0-5]	[0-5]	[30-40]	[10-20]
Spain	[...]	[40-50]	[0-5]	[40-50]	[10-20]	[5-10]	[0-5]	[30-40]
RICE BLAST								
EEA	[...]	[70-80]	[0-5]	[70-80]	[0-5]	[0-5]	[10-20]	[10-20]
Greece	[...]	[90-100]	[0-5]	[90-100]	[0-5]	[0-5]	[5-10]	[0-5]
Italy	[...]	[70-80]	[0-5]	[70-80]	[0-5]	[0-5]	[10-20]	[5-10]
Spain	[...]	[50-60]	[0-5]	[50-60]	[5-10]	[5-10]	[0-5]	[30-40]

Source: Agrowin

6.6.5.3. Competitive landscape of leading rice disease control AIs in the EEA until 2024

Table 46 – Competitive landscape of leading rice disease control AIs in the EEA until 2024

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Dow	Tricyclazole								
	[Pipeline information]								
DuPont	Picoxystrobin								
	[Pipeline information]								
Syngenta	Azoxystrobin								
Bayer	Tebuconazole								
FMC/Isagro							Fluindapyr		

Source: Commission computation of available data (Parties, competitors, third parties)

6.6.5.4. Parties' arguments

(1852) First, the Parties stress that in rice fungicides no overlaps can be conceived since DuPont made no sales in 2014 and 2015. Picoxystrobin would allegedly not be sufficiently effective on rice blast, and also under regulatory pressure.¹⁴⁴⁷

¹⁴⁴⁷ Parties' response to the Statement of Objections, paragraphs 836 and 954-955. See also the Parties' response to the first Letter of Facts, paragraphs 118-121, 123-126; Parties' response to the Commission's request for information RFI 59 (ID8827), footnote 10; Parties' response to the Commission's request for information RFI 64 (ID10449), paragraphs 1-3. See also [internal document], page 3; [internal document], (ID12680), page 7.

(1853) Moreover, Dow is present mainly with tricyclazole, with strong uncertainty regarding its regulatory situation.¹⁴⁴⁸ Indeed, the Parties underline that this AI has not been approved at the EEA level, and up to now has only received temporary authorisations for emergency use (EUPs) in some countries – Italy, Greece and Spain.¹⁴⁴⁹ These EUPs are not guaranteed and need to be delivered each year upon request.¹⁴⁵⁰

(1854) Second, according to the Parties, other players are present in the rice blast control market. For instance, branded – Syngenta among others – and generic – Adama and UPL among others – companies are active in rice blast control, including with pipeline AIs.¹⁴⁵¹

(1855) In addition, generic companies like Cheminova and Sapec also sell tricyclazole in countries where EUPs have been granted.¹⁴⁵²

(1856) [Pipeline information].^{1453,1454}

6.6.5.5. The Parties are important and close competitors for rice blast control

(A) At the EEA level

(1857) **Dow** sells tricyclazole (under the Beam and Bim brands), which – although not approved at the EEA level – benefits from EUPs every year in relevant countries¹⁴⁵⁵ because it is indispensable to fight rice blast, no other AI providing a similar level of control.¹⁴⁵⁶ [Quote from internal document].¹⁴⁵⁷ It is the standard treatment worldwide, and it is estimated that without it crop yield would decrease by [...]%.¹⁴⁵⁸ It is [product information], with approximately [...]% standard margin in Europe ([product information]).¹⁴⁵⁹

¹⁴⁴⁸ Parties' response to the Statement of Objections, paragraphs 956; Parties' response to the first Letter of Facts, paragraphs 127-131; Parties' response to the Commission's request for information RFI 59 (ID8827), paragraphs 7.3-7.8 and 7.16; [internal document], (ID12680), page 7; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 18.5 and 18.6.

¹⁴⁴⁹ Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 18.5 and Annex RFI 44 Q18 (ID8833-00082).

¹⁴⁵⁰ Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 18.6.

¹⁴⁵¹ Parties' response to the Statement of Objections, paragraphs 953, 957-958, 967-969; Parties' response to the Commission's request for information RFI 44, Annexes RFI 44 Q18 (ID8833-00082) and Q19 (ID6775-00049).

¹⁴⁵² Parties' response to the Commission's request for information RFI 59 (ID8827), paragraph 7.31; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraph 18.7.

¹⁴⁵³ Parties' response to the Commission's request for information RFI 44 (ID6843), questions 19 and 20.

¹⁴⁵⁴ Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraphs 18.3, 19.3, 20.2, 23.2; Parties' response to the Commission's request for information RFI 44, Annex RFI 44 Q19 (ID6775-00049).

¹⁴⁵⁵ Parties' response to the Commission's request for information RFI 44 (ID6843), questions 17 and 18.

¹⁴⁵⁶ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983); agreed non-confidential minutes of a call with a customer 29 September 2016 (ID7521); agreed non-confidential minutes of a call with an institute, 22 March 2016 (ID8910); agreed non-confidential minutes of a call with a customer, 14 October 2016 (ID8938).

¹⁴⁵⁷ [Internal document] (ID6150-20876), slide 14. [Internal document] (ID8833-000008).

¹⁴⁵⁸ [Internal document] (ID8833-000008), page 9 and [internal document] (ID8833-000009).

¹⁴⁵⁹ [Internal document] (ID8833-000008), page 7. See also [internal document] (IDID3987-126), page 25; [internal document] (ID6696-16254).

Figure 81 – [Extract from internal document]

[...]

Source: [Internal document] (ID06696-32779), [internal document]

- (1858) Dow also sells azoxystrobin – the sheath blight standard, which is also active on rice blast to a more limited extent than tricyclazole¹⁴⁶⁰ – [information on supply sources].¹⁴⁶¹ This AI is the main competing AI to tricyclazole in rice disease control in the EEA. On rice blast specifically, however, there does not appear to be full technical equivalence between tricyclazole and azoxystrobin due to their different efficacy.¹⁴⁶² In fact, it is recommended to use them in mixtures to prevent the development of resistance, since tricyclazole is a multi-site with low resistance risk.¹⁴⁶³
- (1859) **DuPont** only registered its first AI on rice in the EEA, picoxystrobin (under the Acanto brand), in 2015/2016. [Product information].^{1464,1465}
- (1860) The Parties contest that picoxystrobin has commercial level efficacy on rice blast.¹⁴⁶⁶ However, this submission is not supported by documentary evidence, which, on the contrary, rather supports the finding that picoxystrobin does have commercial level efficacy on rice blast.
- (1861) For instance, Figure 82 – [...].

Figure 82 – [Extract from internal document]

[...]

Source: Parties' response to the Commission's request for information RFI 54, [internal document] (ID7837-00050), [internal document]

- (1862) Further, Figure 83 is part of DuPont's Acanto brochure for rice in Italy, available on its website in the section for rice crop protection. In it, DuPont insists that one of Acanto's key attributes is that it has high efficacy against rice blast ("*brusone*").

¹⁴⁶⁰ [Internal document] (ID6082-00071), [internal document] (ID7080-00444), page 42.

¹⁴⁶¹ Form CO, part B.3, paragraphs 86, 106; Parties' response to the Commission's request for RFI 44, supplemental response (ID7282), question 18.

¹⁴⁶² Agreed non-confidential minutes of a call with a customer, 29 September 2016 (ID7521).

¹⁴⁶³ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983). See also Dow's response to the Commission's request for information RFI 59, [Parties' submission] (ID8833-000010), page 7.

¹⁴⁶⁴ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983); Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 20; Dow's response to the Commission's request for information RFI 54, [...] (ID7837-00050); DuPont's response to the Commission's request for information RFI 58, [...] (ID8322), pages 30-31. [Internal document] (ID1329-165), page 12). [...].

¹⁴⁶⁵ [...] (ID6827-5261), slide 18; [...] (ID6827-30282), slide 9.

¹⁴⁶⁶ Parties' response to the Statement of Objections, paragraphs 836 and 954-955. See also the Parties' response to the first Letter of Facts, paragraphs 123-126.

Figure 83 – Picoxystrobin high efficacy on rice blast in Italian product brochure

CARATTERISTICHE DEL PRODOTTO	BENEFICI PER L'AGRICOLTORE
Elevata efficacia su Brusone ed Elmintosporiosi	La pianta non perde il suo potenziale produttivo
Specifica capacità di muoversi all'interno ed all'esterno delle piante trattate	controllo delle malattie anche nelle parti della pianta dove è più difficile raggiungere il bersaglio
Miscibile con altri agrofarmaci (erbicidi, fungicidi ed insetticidi)	risparmio di tempi e costi
Rapidamente assorbito dalla vegetazione	non viene dilavato dalle piogge successive al trattamento
Si scioglie velocemente nella botte	filtri, ugelli ed attrezzature di distribuzione sempre puliti ed operativi
Effetto rinverdire sulla coltura trattata ("green effect")	la pianta lavora correttamente fino alla fine del suo ciclo (non c'è ritardo nella maturazione)
Stimolatore dell'attività fotosintetica della pianta	maggiori produzioni con migliori parametri qualitativi
Eco-tossicologico ed ambientale	sicurezza per l'operatore e per l'ambiente

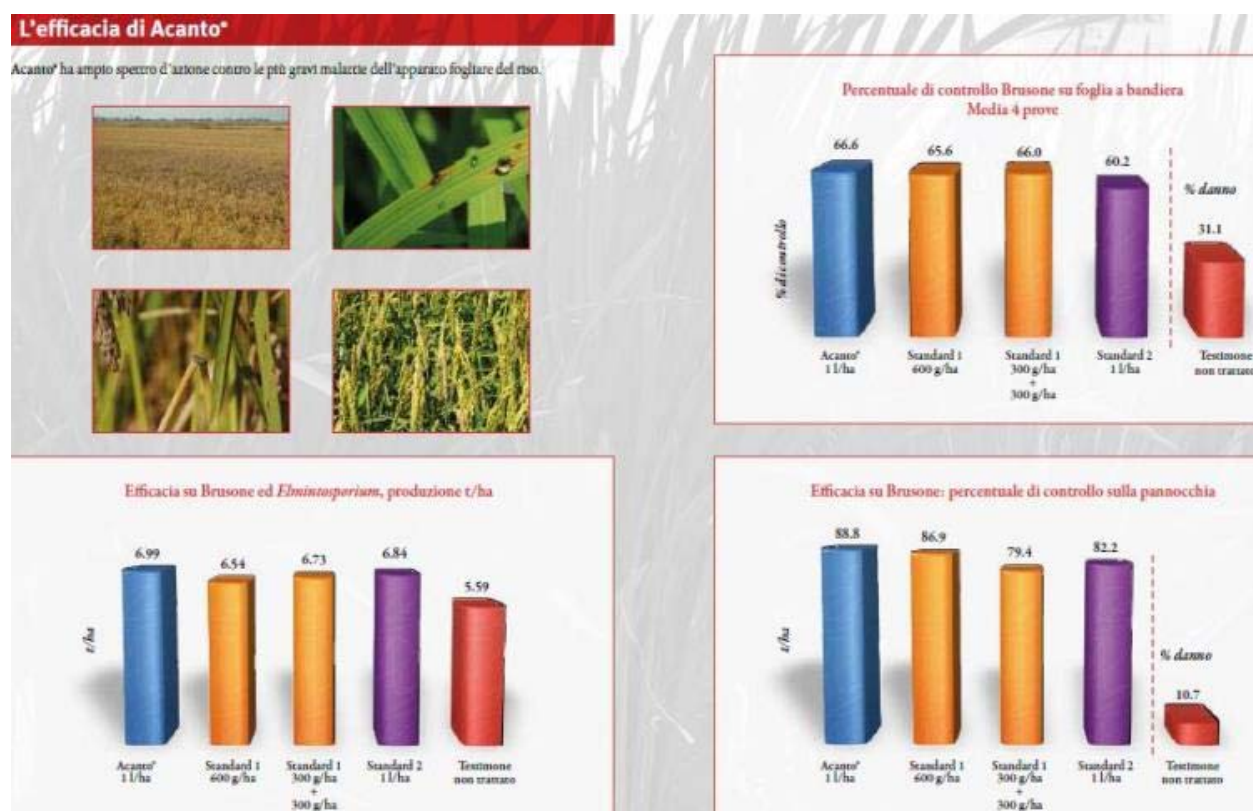
Source: DuPont's commercial document "DuPont™ Acanto®: efficacia superiore per la difesa del riso" (ID12625), page 3, available at http://www.dupont.it/content/dam/dupont/products-and-services/crop-protection/documents/it_it/BROCHURE_ACANTO_RISO.pdf

(1863) Similarly, Figure 84, also part of DuPont's Acanto brochure for rice in Italy, features trial results showing that picoxystrobin provides better control of rice blast than – unidentified, but likely tricyclazole and azoxystrobin, the two current main products for rice blast control in Italy, as acknowledged by the Parties¹⁴⁶⁷ – standard treatments. As such, it runs directly counter to the Parties' claim that picoxystrobin is not as good as tricyclazole for rice blast,¹⁴⁶⁸ and confirms picoxystrobin's high efficacy on rice blast.

¹⁴⁶⁷ Parties' response to the Statement of Objections, paragraphs 953 and 957.

¹⁴⁶⁸ Parties' response to the Statement of Objections, paragraphs 954-955.

Figure 84 – Picoxystrobin high efficacy on rice blast in trials against standards in Italian product brochure



Source: DuPont's commercial document "DuPont™ Acanto®: efficacia superiore per la difesa del riso" (ID12625), page 4, available at http://www.dupont.it/content/dam/dupont/products-and-services/crop-protection/documents/it_it/BROCHURE_ACANTO_RISO.pdf

(1864) Therefore, while it may not be established with certainty whether picoxystrobin's efficacy rises to that of tricyclazole – the clear industry standard, considered as indispensable – as the Parties claim in their response to the first Letter of Facts,¹⁴⁶⁹ it nevertheless reaches commercial levels of control, similarly to azoxystrobin, which is approved for and used against rice blast.¹⁴⁷⁰

Figure 85 – [Extract from internal document]

[...]

Source: Parties' response to the Commission's request for information RFI 59, [internal document] (ID8833-000008), page 8

(1865) Furthermore, [assessment of the Parties' products]. At the same time, they also explain that azoxystrobin is complementary to tricyclazole with a broader spectrum, in particular following Syngenta's launch of a new mixture (Amistar Top, combining azoxystrobin with difenoconazole), which would provide value to the farmer.¹⁴⁷¹

¹⁴⁶⁹ Parties' response to the first Letter of Facts, paragraph 126.

¹⁴⁷⁰ See for instance [internal document] (ID8833-000008), page 8, [internal document], paragraphs 124-125). See also the agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

¹⁴⁷¹ Parties' response to the Statement of Objections, paragraphs 953-958. The Commission notes that this added spectrum has little bearing on the assessment of competition on the markets for rice blast control.

- (1866) On the one hand, picoxystrobin's spectrum is similar to that of azoxystrobin – the second-best product for rice blast control in Europe, as acknowledged by the Parties – and picoxystrobin should thus in all likelihood have the same value to farmers as azoxystrobin does. The fact that picoxystrobin does not yet have high sales or market shares for rice blast control in the EEA, or that market players view it mainly as a cereal product rather than a rice product is straightforwardly explained by the fact that picoxystrobin products have only recently been authorised on rice and have just started being sold for that use in the last year. It typically takes some time for any new entrant to acquire significant sale volumes and market share, as well as product recognition from users. The elements raised by the Parties thus cannot be taken as evidence of picoxystrobin's alleged lesser efficacy or lower value to farmers.¹⁴⁷²
- (1867) On the other hand, contrary to what the Parties seem to imply, whether or not picoxystrobin is as good as tricyclazole on rice blast is not the relevant question for the competitive assessment. Indeed, azoxystrobin is clearly not as effective as tricyclazole on rice blast, but is nevertheless currently seen as the second-best AI for that use and a competitor to tricyclazole. The relevant question in this regard is whether picoxystrobin is a viable substitute to tricyclazole for rice blast control and acts as a competitive constraint. In so far as azoxystrobin appears to act as a constraint on tricyclazole, likely so would picoxystrobin, as supported by the evidence provided in the preceding recitals. Furthermore, very few AIs are available for effective rice blast control in the EEA – in essence, only tricyclazole, azoxystrobin and picoxystrobin – which increases the likelihood of a significant impediment to effective competition between AIs which are not entirely equally effective, but are the only viable alternatives.
- (1868) In their response to the Statement of Objections (paragraph 868), the Parties also claim regarding picoxystrobin that [quote from internal document]. However, as quoted in the response to the Statement of Objections at paragraph 649, the immediately preceding bullet in the internal document [content of an internal document].^{1473,1474}
- (1869) In fact, DuPont's registrations of picoxystrobin on rice blast themselves reveal its clear ambitions in rice in the EEA, [...]. For instance, [quote from internal document].¹⁴⁷⁵ Picoxystrobin would pre-Transaction likely have enabled DuPont to build a strong market position.

¹⁴⁷² This also explains why the initial market investigation did not reveal Dow and DuPont to be important fungicide players or as having must-have products, an element which the Parties raise (Parties' response to the Statement of Objections, paragraphs 839-845). It is natural that players with limited market shares would not be seen as important players. But this does not say anything of their ability to become important players in the future, in particular when they have promising pipeline products.

¹⁴⁷³ See the Parties' response to the Statement of Objections, paragraph 649, [internal document].

¹⁴⁷⁴ Parties' response to the Statement of Objections, paragraphs 649 and 868, [...] (ID4384-00006), page 4. Indeed, this example illustrates the more general point that different AIs will be affected differently by generic pressure even within a given chemical class – where the duration of patents and other intellectual property rights will vary for each AI – without these differences being attributable to some alleged bias or "*double standard*" in the Commission's assessment, in contrast to the Parties claims (see the Parties' response to the Statement of Objections, paragraphs 866-868 and 987).

¹⁴⁷⁵ [Internal document] (ID6827-49217).

Figure 86 – [Extract from internal document]

[...]

Source: [Internal document] (ID1329-165), page 3

- (1870) For example, sales for rice are forecast to grow between 2015 and 2019 from EUR [...] to EUR [...] in the EEA ([5-10]% market share to [5-10]%), including from EUR [...] to [...] in Italy ([0-5]% to [0-5]%, already as early as 2017) and from EUR [...] to [...] in Spain ([0-5]% to [30-40]%).¹⁴⁷⁶
- (1871) Moreover, as already highlighted, azoxystrobin and picoxystrobin are the only two strobilurins approved for rice in the EEA.
- (1872) Overall, it is evident that the Parties combined have a strong portfolio of AIs for rice blast control in the EEA – two of the three effective molecules currently available – which is not yet fully reflected in sales because DuPont's picoxystrobin was only recently launched.
- (1873) In particular, on the one hand, Dow has a dominant position in rice blast fungicides in the EEA, selling both the proprietary indispensable product as well as one of the only two other available treatments procured from a third party. It is also recommended to use them in mixtures to prevent the development of resistance to azoxystrobin.¹⁴⁷⁷
- (1874) [Quote from internal document].¹⁴⁷⁸ [Product information].¹⁴⁷⁹
- (1875) DuPont, on the other hand, has just launched picoxystrobin, a promising product for rice blast control.
- (B) At the country level
- (1876) At the country level, the latest available data shows that Dow has the leading products in Greece, Italy and Spain.¹⁴⁸⁰ DuPont sales of picoxystrobin in Spain and Italy in 2016 do not register in the most recently available data because it dates back to 2015. DuPont's current market strength is thus likely inaccurately reflected in that data.
- (1877) In **Italy**, data for 2015 shows that Dow sold tricyclazole – for which EUPs are granted every year¹⁴⁸¹ – and azoxystrobin. It also sold FMC's flutriafol, effective mainly on brown spot. According to data from the Parties, Dow's sales in the overall rice fungicide grouping accounted for [60-70]% of rice fungicide sales in 2015.¹⁴⁸² Adama sold azoxystrobin and propiconazole, accounting for [10-20]% of sales.

¹⁴⁷⁶ DuPont's response to the Commission's request for information RFI 59, Annex RFI 59 Q7.03 (ID8833-000142).

¹⁴⁷⁷ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983). See also Dow's response to the Commission's request for information RFI 59, [Parties' submission] (ID8833-000010), page 7.

¹⁴⁷⁸ Dow's response to the Commission's request for information RFI 43, [internal document] (ID6545), page 15. [Internal document] (ID9304-15).

¹⁴⁷⁹ Dow's response to the Commission's request for information RFI 59, [Parties' submissions] (ID8833-000007), page 9; Dow's response to the Commission's request for information RFI 59, [Parties' submissions] (ID8833-000010).

¹⁴⁸⁰ Based on the Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 18.

¹⁴⁸¹ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

¹⁴⁸² Dow also sold [...] mancozeb in 2015.

Syngenta sold the same AIs as Adama, accounting for [5-10]% of sales. BASF sold iprodione, accounting for [0-5]% of sales. UPL sold mancozeb, accounting for [0-5]% of sales, and other players sold different AIs (including tricyclazole for [0-5]% of sales). The Commission's Agrowin data provides somewhat different shares, which nonetheless also show Dow's strong position in the grouping for rice disease control ([50-60]%), largely attributable to its dominance in the market for rice blast control ([70-80]%) since its share for sheath blight control is [...] in that data set. DuPont registered picoxystrobin in 2015/2016.

(1878) [Reference to internal document].

Figure 87 – [Extract from internal document]

[...]

Source: [Internal document] (ID6827-49217)

(1879) In **Spain**, data for 2015 shows that Dow only sold tricyclazole – for which EUPs are granted every year – accounting for [40-50]% of rice fungicide sales. Other players also sold tricyclazole for a total of [20-30]% of sales (including [5-10]% of sales for Sapec). Bayer sold tebuconazole, accounting for [10-20]% of sales (other players also sold tebuconazole for [0-5]% of sales). BASF sold prochloraz for [0-5]% of sales (other players also sold prochloraz for [0-5]% of sales). Adama also sold a mixture of prochloraz and propiconazole for [0-5]% of sales. DuPont registered picoxystrobin in 2015/2016.

(1880) The availability of more products in Spain, particularly DMIs, may be due to the relatively higher level of brown spot – at which they are mainly targeted – pressure there compared to Italy and Greece.

(1881) In **Greece**, data for 2014 – the last available year – shows that Dow only sold tricyclazole – for which EUPs are granted every year – accounting for [80-90]% of rice fungicide sales. The only other player was Syngenta, selling azoxystrobin for [10-20]% of sales. DuPont registered picoxystrobin in 2015.

6.6.5.6. Competitive constraints imposed by competitors are limited, largely because molecules used in Asia do not reach the EEA niche markets

(1882) As illustrated by the availability of AIs at the country level, there are only few products competing with the Parties', most likely due to the fact that rice disease control is a niche segment in the EEA.¹⁴⁸³ [Quote from internal document].¹⁴⁸⁴

(1883) Most importantly, Syngenta's azoxystrobin is the second-largest selling AI in the EEA, after Dow's tricyclazole. It is off-patent and sold by several companies, including Dow and Adama in addition to Syngenta. In fact, according to some data sources, in Italy Adama has larger sales of azoxystrobin than Syngenta. Conversely, as explained in recital (1868), picoxystrobin is not currently genericised. Sales of tricyclazole and azoxystrobin account for approximately [80-90]% of EEA rice

¹⁴⁸³ Agreed non-confidential minutes of a call with an institute, 22 March 2016 (ID8910); agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312); Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), question 18.

¹⁴⁸⁴ Dow's response to the Commission's request for information RFI 59, [Parties' submissions] (ID8833-000014), page 15.

fungicide sales, thereby illustrating the importance of these molecules and relative irrelevance of other AIs currently.

- (1884) While azoxystrobin provides control of rice blast, it does not match the level of control provided by tricyclazole. These products are therefore not fully equivalent in terms of efficacy.¹⁴⁸⁵ As already explained, it is even recommended to use them in mixtures – mainly to slow the development of resistance to azoxystrobin by taking advantage of tricyclazole's multi-site MoA, which makes tricyclazole largely immune to resistance – which is also a way of leveraging tricyclazole's dominance over azoxystrobin sales.
- (1885) Other available products, much less significant in terms of sales, include tebuconazole (Bayer), cyproconazole and difenoconazole (Syngenta), as well as products like prochloraz, propiconazole (Syngenta), mancozeb, iprodione (BASF) and copper salts, all sold by several companies.
- (1886) AIs such as tebuconazole and difenoconazole are under regulatory pressure as candidates for substitution, and will likely be restricted or have their renewal rejected in the coming years, as explained in Section V.6.6.4.3(A). This would in particular impact Syngenta's new mixture product Amistar Top, which combines azoxystrobin and difenoconazole.
- (1887) Significantly, tricyclazole appears to be the cheapest available product. For example, in Spain, Dow's Bim is priced at EUR/ha [...], while Bayer's and BASF's products are at EUR/ha [...] and [...], respectively, and Syngenta's azoxystrobin product is even at EUR/ha [...].¹⁴⁸⁶
- (1888) Furthermore, although tricyclazole has been off-patent for decades and in spite of sales by generic players such as Sapec, [quote from internal document].¹⁴⁸⁷ In fact, in Spain where a number of other players, some of which sell generic tricyclazole, are present, Dow is able to maintain a farmer price for tricyclazole [pricing information] than generics.¹⁴⁸⁸ As explained in Section V.6.2.1, this situation highlights the limited constraint generic players generally constitute for global R&D-integrated players.
- (1889) In conclusion, while a large number of other AIs are available outside the EEA – including by companies strongly active in the EEA for other products but also in Asia for rice fungicides – they are not sold in the EEA. As already explained, this is likely due to the fact that the EEA rice fungicide segment is a niche. The stricter regulatory approach in the EEA, whereby many AIs available worldwide fail to meet EEA approval conditions and which makes product registrations more costly than in other geographies, may in that regard play a critical part. The net result in any event is that effective competition for rice blast control in the EEA is very limited, currently largely to tricyclazole and azoxystrobin only, with the ongoing addition of picoxystrobin.

¹⁴⁸⁵ Agreed non-confidential minutes of a call with an institute, 10 October 2016 (ID7983).

¹⁴⁸⁶ Dow's response to the Commission's request for information RFI 59, [Parties' submissions] (ID8833-000014), page 33.

¹⁴⁸⁷ [Internal document] (ID561-10), [internal document].

¹⁴⁸⁸ [Internal document] (Dow's response to the Commission's request for information RFI 59, [internal document] (ID8833-000014), page 33).

(1890) As detailed in recitals (1877) to (1881), competition is also limited at the country level. In Italy, Dow's current main competitors are Syngenta and Adama (each with approximately [10-20]% of the market, selling azoxystrobin). In Greece, Syngenta is currently the only player aside from Dow, selling azoxystrobin. In Spain, more players are present.¹⁴⁸⁹ In 2015, Bayer sold tebuconazole ([10-20]% share) and generic tricyclazole (Sapac and others) amounted to [20-30]% of the market. However, as already explained, it is likely that tebuconazole – under regulatory pressure as a candidate for substitution – will leave the market in the coming years (likely 2019).

Figure 88 – [Extract from internal document]

[...]

Source: [Internal document] (ID9304-00016), page 19

6.6.5.7. The Transaction would be likely to strengthen Dow's dominance in rice blast control in the EEA with the addition of DuPont's portfolio and market reach

(1891) Dow currently has large shares of rice disease control: [80-90]% in Greece, [50-60]% in Italy and [40-50]% in Spain.¹⁴⁹⁰ While these are essentially attributable to tricyclazole sales,¹⁴⁹¹ some are also azoxystrobin sales by Dow. Market shares are even larger for rice blast control, where Dow is dominant with [90-100]% of the market in Greece, [70-80]% in Italy and [50-60]% in Spain.

(1892) Therefore, in light of the results of the market investigation and in particular those high market shares, the Commission finds that Dow currently has a dominant position on the markets for rice blast control in Italy, Greece and Spain.

(1893) Moreover, DuPont's recently authorised picoxystrobin would very likely gain market share in the near future in rice blast control since, similarly to azoxystrobin, it controls rice blast.

(1894) Indeed, the mere fact that DuPont committed the required investments to register picoxystrobin for rice blast in the EEA suggests that it anticipates gaining some sales and thus some level of market share. It may already have gained some level of market share in 2016, a year for which the Commission does not have data.

(1895) Accordingly, the Parties own two – perhaps the two best – of overall only three effective approved AIs against rice blast in the EEA. In addition, Dow also sells the third available AI for rice blast control, thereby strengthening the Parties' overall combined rice blast fungicide portfolio.

(1896) It is likely that pre-Transaction the Parties would have competed strongly in rice blast control in the EEA. For instance, [quote from internal document].¹⁴⁹² DuPont would have been a recent entrant looking to capture market share from the incumbents by disrupting markets which are essentially (unbalanced) duopolies between Dow and Syngenta (or Dow and Bayer in Spain).

¹⁴⁸⁹ [Internal document] (ID9304-00016) [internal document].

¹⁴⁹⁰ [...]. Parties' response to the Commission's request for information, RFI 44, supplemental response (ID7282), questions 18 and 20.

¹⁴⁹¹ DuPont estimates [quote from internal document] (ID6150-20876), slide 14.

¹⁴⁹² [Internal document] (ID827-35291), slide 6.

- (1897) It is likely that Dow's dominance in rice blast control in Italy, Greece and Spain would be strengthened post-Transaction. Dow's and DuPont's products would no longer compete head to head for a share in rice blast control. The merged entity would also be able to make mixtures of these effective AIs, thereby potentially gaining a further total market share, in particular by taking part of their market shares away from Syngenta and Bayer.
- (1898) [Information on a company's strategy regarding its portfolio].¹⁴⁹³
- (1899) [Quotes from internal documents].^{1494,1495} [Portfolio strategy]. Their ability to do so post-Transaction would be highly increased, in particular with the possibility of in-house mixtures.

Figure 89 – [Extract from internal document]

[...]

Source: [Internal document] (ID6033-00004), page 162

- (1900) The conclusion that the Transaction would strengthen Dow's dominance in rice blast control is also supported by the likely absence of other competitors that could disrupt the market.¹⁴⁹⁶
- (1901) Conversely, the Parties allege that recent regulatory developments would jeopardise the use of both DuPont's picoxystrobin and Dow's tricyclazole in EEA markets.¹⁴⁹⁷ Regarding picoxystrobin, a draft Regulation dated 6 January 2017 proposes to refuse renewal of its approval. As to tricyclazole, following the Commission's October 2016 decision to refuse approval of the AI, a draft Regulation dated 16 November 2016 proposes to reduce the maximum residue limits – MRLs – to the limit of detection (effectively prohibiting its use even under EUPs in the EEA).
- (1902) However, the draft Regulations are not yet approved. Until they are, the regulatory situation of the Parties' AIs remains as assessed in this Decision, with the resulting competition issues.
- (1903) Moreover, different (groups of) AIs face varying degrees of regulatory pressure, which is assessed on the specific facts of each case. By contrast for instance with neonicotinoids, a number of which were already temporarily banned at EEA level and the permanent ban of which is supported by several stakeholders and even already implemented in a large Member State like France, no such public policy commitment publicly endorsed by Member States seems to exist regarding the ban of tricyclazole and picoxystrobin.

¹⁴⁹³ [Internal document] (ID561-10), [internal document] (Parties' response to the Statement of Objections, paragraph 960). [...].

¹⁴⁹⁴ [Internal document] (ID5588-8); [internal document] (ID7079-298), slide 143; [internal document] (ID3987-126), page 2.

¹⁴⁹⁵ [Internal document] (ID8001), slide 42. See also [internal document] (ID7998), slide 41.

¹⁴⁹⁶ In this regard, [internal document] (ID561-10), [internal document]).

¹⁴⁹⁷ Parties' response to the Statement of Objections, paragraphs 954 and 956; Parties' response to the first Letter of Facts, paragraphs 118-121 and 127-131; Parties' response to the Commission's request for information RFI 59 (ID8827), paragraphs 7.3-7.8 and 7.16; [internal document], page 7; Parties' response to the Commission's request for information RFI 44, supplemental response (ID7282), paragraphs 18.2 and 18.6; Parties' response to the Commission's request for information RFI 64 (ID10449), paragraphs 1-3. See also [internal document], page 3.

- (1904) Accordingly, only once these draft Regulations would be approved and enter into force would they potentially, in light of the specific circumstances, remove the competition concerns identified in this Decision. In addition, while the draft Regulations appear to be scheduled for approval, [...], this timeline may evolve.
- (1905) Furthermore, regarding picoxystrobin, even if the Regulation were approved as scheduled, it foresees a transitional period whereby picoxystrobin would be likely to still be used in 2017 and 2018, thus only being effectively banned from use in 2019.¹⁴⁹⁸ In the meantime, assuming tricyclazole would also remain on the market, the present competition issues would remain.
- (1906) Beyond that, for both AIs, the Parties have the possibility of renewing their respective applications for approval of the AI. This process would likely take three to five years to complete. Nonetheless, in the meantime, it cannot be excluded that these renewed applications – with new data which the Parties at least in part already have¹⁴⁹⁹ – could result in public authorities provisionally changing the regulatory situation of the AIs in the EEA, notably in light of the limited number of effective solutions available to rice growers. This would in particular apply to tricyclazole MRLs.
- (1907) Finally, these developments were known to the Parties ahead of their publication, apparently without straightforwardly entailing in their view that the AIs would effectively be banned from use. [...].¹⁵⁰⁰
- (1908) Similarly, although the draft Regulation on MRLs for tricyclazole – which would effectively prohibit its use on rice even under EUPs, possibly with some limited exceptions – was published in November 2016, [...].¹⁵⁰¹
- (1909) In conclusion, pre-Transaction Dow and DuPont were set to compete against one another on the markets for rice blast control in Greece, Spain and Italy. The Transaction would be likely to strengthen Dow's current dominance by combining Dow's and DuPont's portfolios and accompanying market reach and power, also increasing their ability to make new mixtures. Moreover, the limited number of competing products would likely not be able to countervail this strengthened dominance.

6.6.5.8. Conclusions on non-coordinated effects in rice blast fungicides

(A) Blast in rice in Italy

- (1910) The Commission considers that the Transaction would be likely to lead to a significant impediment to effective competition because Dow's dominant position on the market for rice blast control in Italy would be strengthened post-Transaction.
- (1911) Dow is currently the dominant player in rice blast control in Italy ([70-80]% market share). DuPont has recently launched a promising product in that market. In sum, the Parties are important and close actual competitors.

¹⁴⁹⁸ DuPont's response to the Commission's request for information RFI 64, [Parties' submissions] (ID10451) and RFI 64_1_04 (ID10453).

¹⁴⁹⁹ DuPont's response to the Commission's request for information RFI 64, [Parties' submissions] (ID10451).

¹⁵⁰⁰ DuPont's response to the Commission's request for information RFI 59, [Parties' submissions] (ID8833-000120), pages 3, 9-10, 12, 16-17.

¹⁵⁰¹ Parties' response to the Statement of Objections, paragraphs 897 and 956. [Quote from internal document].

(1912) Moreover, few competing products exist – likely because the Italian rice fungicide market is a relatively minor one – and they appear to have limited efficacy compared to the Parties' products. In particular, Adama's and Syngenta's sales of azoxystrobin face the limitations described in Section V.6.6.5.6. In sum, competitors likely constitute a limited competitive constraint on the Parties.

(1913) Therefore, and also in light of the general features of crop protection markets as described in Section V.6.2, the Commission considers that the Transaction would be likely to lead to a significant impediment to effective competition because Dow's dominant position on the market for rice blast control in Italy would be strengthened post-Transaction.

(B) Blast in rice in Greece

(1914) The Commission considers that the Transaction would be likely to lead to a significant impediment to effective competition because Dow's dominant position on the market for rice blast control in Greece would be strengthened post-Transaction.

(1915) Dow is currently the dominant player in rice blast control in Greece ([90-100]% market share). DuPont has recently launched or will likely soon launch a promising product in that market. In sum, the Parties are important and close actual competitors.

(1916) Moreover, few competing products exist – likely because the Greek rice fungicide market is a relatively minor one – and they appear to have limited efficacy compared to the Parties' products. In particular, Syngenta's sales of azoxystrobin face the limitations described in Section V.6.6.5.6. In sum, competitors likely constitute a limited competitive constraint on the Parties.

(1917) Therefore, and also in light of the general features of crop protection markets as described in Section V.6.2, the Commission considers that the Transaction would be likely to lead to a significant impediment to effective competition because Dow's dominant position on the market for rice blast control in Greece would be strengthened post-Transaction.

(C) Blast in rice in Spain

(1918) The Commission considers that the Transaction would be likely to lead to a significant impediment to effective competition because Dow's dominant position on the market for rice blast control in Spain would be strengthened post-Transaction.

(1919) Dow is currently the dominant player in rice blast control in Spain ([50-60]% market share). DuPont has recently launched a promising product in that market. In sum, the Parties are important and close actual competitors.

(1920) Moreover, few competing products exist – likely because the Spanish rice fungicide market is a relatively minor one – and they appear to have limited efficacy compared to the Parties' products. In particular, Bayer's sales of tebuconazole as well as Adama's and Syngenta's sales face the limitations described in Section V.6.6.5.6. In sum, competitors likely constitute a limited competitive constraint on the Parties.

(1921) Therefore, and also in light of the general features of crop protection markets as described in Section V.6.2, the Commission considers that the Transaction would be likely to lead to a significant impediment to effective competition because Dow's dominant position on the market for rice blast control in Spain would be strengthened post-Transaction.

6.6.6. *Rice sheath blight control in Italy, Spain and Greece*

(1922) Table 47 presents market shares in rice sheath blight control.

Table 47 – Rice sheath blight control market shares in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
EEA	[...]	[0-5]	[0-5]	[0-5]	[10-20]	[0-5]	[70-80]	[10-20]
Greece	[...]	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]	[90-100]	[0-5]
Italy	[...]	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]	[80-90]	[10-20]
Spain	[...]	[0-5]	[0-5]	[0-5]	[60-70]	[0-5]	[0-5]	[30-40]

Source: Agrowin

(1923) The Commission notes that the Parties do not have any market share in those markets, where competitors have dominant positions, namely Bayer in Spain ([60-70]%), Syngenta in Greece ([90-100]%) and Italy ([80-90]%).

(1924) In the Statement of Objections, the Commission preliminarily concluded that the Transaction would be likely to significantly impede effective competition in rice sheath blight control in Italy, Greece and Spain. That finding was based on potential competition from Dow's sales of azoxystrobin and DuPont's recent launch of picoxystrobin.¹⁵⁰² However, the Parties explained in their response to the Statement of Objections, first, that Dow only distributes azoxystrobin formulated products [...] in Italy with low sales, but does not own or procure the AI for use in its own formulations; second, that DuPont's picoxystrobin – in light of insufficient activity – is not approved for use on sheath blight in Italy, Greece or Spain.¹⁵⁰³ Accordingly, there is in fact no overlap in rice sheath blight control in Italy, Greece and Spain. [...]. In addition, no other information has come to the attention of the Commission during the investigation that would suggest that the Parties are potential entrants to the markets and would be capable of constraining the present market participants.

(1925) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not significantly impede effective competition with respect to rice sheath blight control in Italy, Greece and Spain.

¹⁵⁰² Statement of Objections, recitals 1860-1863, 1876, 1884 and 1893.

¹⁵⁰³ Parties' response to the Statement of Objections, paragraphs 835-836, 971, 974 and 978.

6.6.7. *Vegetable and flower fungicides in the Czech Republic and Slovakia*

(1926) Table 48 presents market shares in vegetable and flower disease control affected markets.

Table 48 – Vegetable and flower affected markets in the EEA

	Market size (USD million)	Dow	DuPont	Combine d	Bayer	BASF	Syngent a	Others
LEAFSPOTS - PLEOSPORALES (incl. ALTERNARIA)								
Czech Republic	[...]	[10-20]	[20-30]	[30-40]	[30-40]	[30-40]	[0-5]	[0-5]
Slovakia	[...]	[40-50]	[0-5]	[50-60]	[5-10]	[0-5]	[5-10]	[30-40]
PERONOSPORALES (incl. DOWNY MILDEWS)								
Slovakia	[...]	[20-30]	[0-5]	[20-30]	[5-10]	[0-5]	[50-60]	[10-20]

Source: Agrowin

- (1927) The Commission notes that the Parties' combined market share for *Peronosporales* control in Slovakia amounts to [20-30]%. The merged entity would continue to be challenged by a number of competitors, including Syngenta ([50-60]%), Nufarm ([5-10]%) and Bayer ([5-10]%). [Pipeline information].¹⁵⁰⁴
- (1928) The Commission also notes that the Parties' combined market shares rise to [30-40]% in the Czech Republic and [50-60]% in Slovakia for *Pleosporales* control; however, the market share increments brought about by the Transaction would be limited ([10-20]% -points in the Czech Republic and [0-5]% -points in Slovakia). The merged entity would continue to be challenged by a number of competitors, including Bayer ([30-40]% in the Czech Republic; [5-10]% in Slovakia), BASF ([30-40]% in the Czech Republic), Syngenta ([5-10]% in Slovakia) and Nufarm ([10-20]% in Slovakia). [Pipeline information].
- (1929) The Commission further notes that Dow's mancozeb [Parties' sales estimates]¹⁵⁰⁵ was divested to Indofil in 2012, and sales by Dow are only residual.¹⁵⁰⁶ [Parties' sales estimates].¹⁵⁰⁷
- (1930) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not significantly impede effective competition with respect to vegetable and flower fungicides in the Czech Republic and Slovakia.

¹⁵⁰⁴ See the Form CO, part B.3, paragraph 35 and the table on Zorvec registrations on page 61, [internal document].

¹⁵⁰⁵ See [internal document] (ID1329-484) and Form CO, part B.3, paragraph 114.

¹⁵⁰⁶ Form CO, part B.3, paragraph 25.

¹⁵⁰⁷ See [internal document] (ID1329-484) and Form CO, part B.3, paragraph 115 as well as paragraph 29 and the tables therein. [Product information], the Parties explain in footnote 704 of their response to the Statement of Objections that [quote from internal document], referring to [...] (ID1329-79), page 40.

6.6.8. *Grape/Vine fungicides in Austria, Hungary and the United Kingdom*

(1931) Table 49 presents market shares in grape/vine disease control affected markets.

Table 49 – Grape/Vine affected markets in the EEA

	Market size (USD million)	Dow	DuPont	Combined	Bayer	BASF	Syngenta	Others
ERYSIPHALES/POWDERY MILDEWS (incl. OIDIUM)								
EEA	[...]	[10-20]	[0-5]	[10-20]	[10-20]	[10-20]	[10-20]	[30-40]
Austria	[...]	[10-20]	[5-10]	[20-30]	[5-10]	[20-30]	[20-30]	[30-40]
Hungary	[...]	[10-20]	[10-20]	[20-30]	[0-5]	[10-20]	[20-30]	[20-30]
United Kingdom	[...]	[40-50]	[10-20]	[60-70]	[10-20]	[10-20]	[0-5]	[10-20]

Source: Agrowin

- (1932) The Commission notes that the Parties' combined market shares amount to [20-30]% in Austria and [20-30]% in Hungary. The merged entity would continue to be challenged by a number of competitors, including Bayer ([5-10]% in Austria and [0-5]% in Hungary), BASF ([20-30]% in Austria and [10-20]% in Hungary) and Syngenta ([20-30]% in Austria and [20-30]% in Hungary). [Pipeline information].
- (1933) The Commission also notes that information relating to the Parties' sales in the United Kingdom varies significantly between sources, the highest potential combined market share rising to [60-70]%. It cannot be excluded that this variation is due to the fact that the market is relatively small, which may increase volatility in the market shares. The Parties' data in fact does not show any overlap. In any event, a number of competitors would also remain in the market, such as BASF (likely at least [10-20]%) and Bayer (likely at least [10-20]%). [Pipeline information]. In addition, no other information has come to the attention of the Commission during the investigation that would suggest that Dow or DuPont are potential entrants to the market and would be capable of constraining the present market participants.
- (1934) The Commission further notes that in Austria and Hungary, DuPont sales are [...] attributable to proquinazid, while Dow sales consist of meptyldinocap, myclobutanil and quinoxifen. As explained in recital (1838), Dow's quinoxifen and DuPont's proquinazid are the only two AIs in a given and important mode of action for powdery mildew control, whereas in other MoAs for powdery mildew control several options exist. Quinoxifen currently faces resistance issues [information on regulatory status of existing products].
- (1935) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not significantly impede effective competition with respect to grape/vine fungicides in Austria, Hungary and the United Kingdom.

7. LICENSING AND SUPPLY OF AIs

7.1. The Parties' activities

(1936) Within upstream markets, Dow and DuPont are active through the supply of AIs to competitors. Some of these active ingredients supplied by Dow to competitors are used by competitors for formulated products sold in downstream markets where DuPont is active, and vice-versa.

Table 50 – AIs sold by DuPont to competitors and respective DAS products containing the same AIs

[...]

Source: Form CO

Table 51 – AIs sold by DAS to competitors and respective DuPont products containing the same AIs

[...]

Source: Form CO

(1937) The Commission takes note that, [internal document] Florasulam is also used by DuPont in formulations sold in downstream markets.

7.2. Market definition

(1938) As regards product markets, in past decisional practice¹⁵⁰⁸ the Commission found that each AI constitutes a separate product market, although recently it left open whether for off-patent AIs broader markets exist including all AIs within the same chemical class of molecules.¹⁵⁰⁹ The Parties argue that for the purposes of the Transaction the exact market definition can be left open.

(1939) As regards technical sales of active ingredients the Parties submit that the core of the commercial transaction is the sale of the AIs and that crop protection innovators tend to supply AIs only after their intellectual property has expired, thus the definition of technology market would not be warranted.

(1940) As regards geographic markets, the Parties submit that the geographic scope for AI markets is at least EEA-wide, if not worldwide.

(1941) As explained in Section V.4.3, the Commission finds that the Parties' licensing and technology sales of active ingredients are part of upstream technology markets which may have to be distinguished from the bulk sale of active ingredients which do not encompass the sale of technology. However, for the purposes of this Decision, it is not necessary to conclude on the exact market definition, as the Transaction would not significantly impede effective competition under any plausible market definition.

¹⁵⁰⁸ See Commission Decision in Cases M.6141 – CNAC/Koor Industries/Makhteshim Agan Industries (2011) and M.2547 – Bayer/Aventis Crop Science (2002).

¹⁵⁰⁹ See Commission Decision in Case M.6141 – CNAC/Koor Industries/Makhteshim Agan Industries (2011).

7.3. Competitive assessment

7.3.1. The Parties' views

- (1942) Fluroxypyr and florasulam are used by DuPont in formulations sold in downstream markets as selective cereal herbicides.
- (1943) The Parties submit that Dow does not have upstream market power, as the AIs it sells to competitors are off-patent, and significant competitive pressure is exerted by competitors. Moreover, the Parties argue that the merged entity would not have incentives for input foreclosure, as in the downstream markets the fluroxypyr- and florasulam-based formulated herbicides compete with herbicides based on other AIs. In addition, [information on supply sources].
- (1944) The Parties also submit that chlorpyrifos and 2,4-D [information on supply sources]. As regards 2,4-D, the Parties argue that their chemical class (phenoxies) are commodity products and are commonly used in formulated crop protection products by virtually all crop protection manufacturers.
- (1945) As regards chlorpyrifos, the Parties submit that chlorpyrifos has become largely a commodity product with generic versions having taken over the majority of these sales, while Dow accounts for [...] % of total European supplies of this chemical.

7.3.2. The Commission's assessment

7.3.2.1. Vertical overlaps in the supply of AIs

- (1946) Within the market investigation, one competitor indicated a risk that, as a result of the notified transaction, Dow would have lower incentives to supply AIs in its herbicide portfolio to competitors for use in downstream formulated products, in light of the presence of DuPont in these downstream formulated product markets through mixtures with active ingredients supplied by Dow.
- (1947) The Commission finds that the mere circumstance that AIs have lost patent protection is not relevant to assess whether alternative sources are available and a foreclosure risk exists, in particular in light of the regulatory barriers described above in Section V.6.2.1. Manufacturing AIs requires know how and regulatory requirements (such as registration) which warrant that even after the expiry of patents, the originator of the molecule is the only or one of few sources of supply of the AI.
- (1948) As regards Dow products, however, and in particular florasulam and fluroxypyr, these are not only off patent, but there are multiple sources of supply for the AIs (more than [company's internal assessment of competitive landscape] other companies manufacture florasulam and more than [company's internal assessment of competitive landscape] companies manufacture fluroxypyr).
- (1949) In conclusion, in light of the above and available evidence, the Transaction would not significantly impede effective competition by foreclosing competitors' access to the supply of AIs.

7.3.2.2. Horizontal overlaps in the licensing of AIs

- (1950) Some market participants indicated that the merged entity would have a significant combined portfolio of AIs for certain categories of crop protection products, and would have higher combined sales in downstream markets for formulated products. The Transaction could thus remove one potential source of supply and license of AIs, and increase the ability and incentive of the merged entity not to give access to them

at profitable terms.¹⁵¹⁰ Other market participants highlighted the potential horizontal effects of the Transaction on the availability of technology players which can out-license technology to generic companies.¹⁵¹¹

- (1951) The Parties claims that there are no sales of AIs covered by intellectual property rights. However, the Commission finds that this is not in line with the activities of the Parties. For instance, [information on supply sources] (see Section V.6.4.3.1).
- (1952) The areas of activities of the Parties through their portfolio of AIs broadly correspond to their areas of activities in downstream markets for formulated products. Their strength in upstream technology markets can thus be inferred from their position in given crop-pest combinations.
- (1953) In this respect, the Transaction would not significantly impede effective competition because the problematic overlaps between the activities of the Parties are eliminated by the Final Commitments.

7.4. Conclusion

- (1954) The Commission finds that, in light of recitals (1946) to (1953) and of available evidence, the Transaction would not significantly impede effective competition for the upstream licensing or supply of AIs.

8. COMPETITIVE ASSESSMENT: INNOVATION COMPETITION

- (1955) In Section V.3, the Commission has explained that:
- (1) Pre-Transaction, the Parties hold important lines of research and early pipeline products targeting the same product markets that, if developed and brought to the market, would compete head-to-head against each other. It is also the case that one Party currently pursues important lines of research and early pipeline products that will compete in a market where the other Party is an existing or potential supplier. In so far, the Transaction would reduce innovation competition between the Parties, resulting in the discontinuation, deferment or redirection of competing lines of research and early pipeline products. The Transaction accordingly would raise the question of the likelihood that it could significantly impede effective competition as to the incentives of the Parties to innovate in the spaces where they currently operate.
 - (2) Moreover, the Parties are operating two of only a few competing global R&D-integrated crop protection organisations at the industry level. The Transaction accordingly raises concerns that the discontinuation of one of those organisations would significantly reduce the overall level of innovation competition and thus product innovation in the crop protection industry as a whole.
- (1956) In this section, the impact of the Transaction on innovation competition will be analysed. The assessment will focus both on innovation competition at the level of *innovation spaces* within the crop protection industry and on innovation competition at the *industry level*.

¹⁵¹⁰ Agreed non-confidential minutes of a call with a competitor, 7 May 2016.

¹⁵¹¹ Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 65.1.

- (1957) The Commission will thus focus on the third and fourth overlaps described in Section V.3, namely:
- (1) At the level of innovation spaces, the overlaps between the Parties' lines of research and early pipeline products as well as between lines of research and early pipeline products of a Party that will compete in a market where the other Party is an existing or potential supplier; and
 - (2) At the industry level, the overlap between the Parties' respective global R&D organisations, that is the resources, personnel, facilities, and other tangible and intangible assets dedicated to research, development and registration of new active ingredients (including lines of research, field testing facilities, registration capabilities).
- (1958) In this section, the Commission considers a *line of research* to comprise the set of scientists, patents, assets, equipment and chemical class(es) which are dedicated to a given discovery target whose final output are successive pipeline AIs targeting a given innovation space.
- (1959) The Parties argue in the response to the Statement of Objections that they have integrated discovery platforms far broader than the concept of "lines of research". However, the Commission clarifies that the use of the concept "lines of research" does not imply that those assets and personnel are exclusively dedicated to a given project. They can be dedicated to more than one "line of research" within a given group, like herbicides, fungicides and insecticides. However, the costs of changing from one current line of research to a new line of research would be very high given the expertise involved and investments required at each level of the R&D stage.
- (1960) The Commission will also refer to *early pipeline products*. These correspond to products which are intermediate results of lines of research. These are products which have already been selected among leads, but are still in the discovery or pre-development stage, where most of the innovation costs have still not been incurred, and with a lower likelihood of success than development products. This is in contrast with pipeline products in the development stage whose likelihood of being successfully launched is between 80 to 90%.

8.1. Parties' innovation activities

- (1961) Both Dow and DuPont are integrated companies active in all stages of the R&D process for the introduction of novel AIs on crop protection markets. The Parties are among the five global R&D-integrated players, as it will further be explained in Section V.8.6.

8.1.1. Dow

- (1962) Dow's has [...] Full Time Employees (FTEs) devoted to Crop Protection R&D. Among these, Dow currently employs [...] scientists, of which [...] are Biologists, and [...] are Chemists.¹⁵¹²
- (1963) In 2015, Dow's R&D expenditure on crop protection amounted to approximately USD [...], thus [...] % of its total crop protection revenues.

¹⁵¹² Dow's response to the Commission's request for information RFI 15, [internal document].

(1964) Dow's main R&D centre is based in Indianapolis (US). In March 2010, Dow announced plans for a multi-year expansion of the R&D facilities, with an investment of more than USD 340 million and 550 scientific and commercial jobs.¹⁵¹³

(1965) Figure 90 illustrates Dow's Discovery and Development stages until launch.

Figure 90 – R&D stages at Dow

[...]

Source: *Form CO*

(1966) Over the past 10 years (2006 – 2015), Dow indicated it registered five new AIs globally, one of which with a new MoA.¹⁵¹⁴ Dow has explained that [...].

(1967) In conclusion, Dow has an integrated R&D organisation [...].

8.1.2. DuPont

(1968) DuPont's has [...] FTEs devoted to Crop Protection R&D. Among these, DuPont currently employs [...] scientists, of which [...] are Biologists, and [...] are Chemists.¹⁵¹⁵

(1969) In 2015, DuPont's R&D expenditure on Crop Protection amounted to approximately USD [...], thus around [...] % of its total Crop Protection revenues.

(1970) DuPont has different R&D sites, including Crop Protection-related research activities in Stine, Delaware, and one centre devoted to agriculture in Johnston, Iowa, both in the US.

(1971) Figure 91 illustrates DuPont's discovery and development process, as well as the success rate at any given step.

Figure 91 – Discovery and development of an active ingredient - DuPont

[...]

Source: *[Internal document] (ID1329-155), [internal document], slide 9*

(1972) Over the past 10 years (2006 – 2015), DuPont indicated it registered six new AIs globally, three of which with new MoA.¹⁵¹⁶ [...] ¹⁵¹⁷.

(1973) [...].¹⁵¹⁸

(1974) In conclusion, DuPont has an integrated R&D organisation [...].

8.2. Importance of innovation in crop protection

(1975) In this section, the Commission describes factors which suggest that innovation in crop protection is of crucial importance both from the perspective of farmers and growers as it can ensure effectiveness, and from a public policy perspective in light of the improved profile offered by new AIs

¹⁵¹³ Dow's response to the Commission's request for information RFI 26.

¹⁵¹⁴ Dow's response to the Commission's request for information RFI 15, [internal document].

¹⁵¹⁵ DuPont's response to the Commission's request for information RFI 15, [internal document].

¹⁵¹⁶ DuPont's response to the Commission's request for information RFI 15, [internal document].

¹⁵¹⁷ [Internal document] (ID6825-16551).

¹⁵¹⁸ See Section V.8.7.1 for more details on [...].

- (1976) Crop protection products help farmers and growers protect their yields. From the perspective of growers and farmers, there is a demand for innovation which is driven by several considerations. Pests may develop resistance to AIs. This resistance may determine a loss of efficacy of the products which are already on the market. New AIs, which are able to address the evolving biology of pests, can ensure more effective results and better address the needs of farmers (also in terms of frequency and ease of application). However, as explained at Section V.8.4.2, they may not be demand increasing from the perspective of suppliers.
- (1977) From a general public policy perspective, new AIs can also ensure reduced toxicity address the evolving biology of pests and ensure effective results. Regulation also plays a role in this respect. In light of the growing environmental and food safety requirements, some AIs are prohibited over time or refused renewal of approval. This induces a need for better and safer crop protection chemicals.
- (1978) Global population has been dramatically growing over the past decades, and is expected to further increase in the coming decades, and with it the global food demand. As represented in the following [...] internal document, an increase of population means that the available arable land per capita is bound to decrease. Increasing crop yields and productivity is therefore crucial for securing food security for an increasing world population.

Figure 92 – Evolution of available land per capita

[...]

Source: [Internal document] (ID6696-15850)

- (1979) On top of the general need of crop protection products with increased effectiveness, the importance of innovation in crop protection has to be appreciated also in light of the biological challenges faced by the industry. As living organisms, known pests, which affect crops, tend to develop resistance over time to a given molecule or its MoA. In the short term, the management of resistance can be achieved through combination of different products or rotation of products with different MoAs. However, as over time the effectiveness of existing products tends to decrease due to increasing resistance, innovation plays a fundamental role in delivering to the market new AIs with novel features which can be more effective at defeating resistance and increasing overall crop yields.
- (1980) Effectiveness in securing crop yields is not the only benefit of innovation in the industry. Crop protection products, as chemicals which are used on edible crops and on arable land, may have hazardous toxicity profiles that could harm environmental safety and human health. The reduction in the toxicity of crop protection products and the management of their residues has been a key regulatory concern for decades, resulting in stricter criteria for approval of molecules to be used as AIs in crop protection formulations. The stricter legal framework ensures that new molecules that come to the market are better suited to avoid potentially harmful consequences for human and animal health as well as for the environment. Due to increasing regulatory pressure, older AIs can also be denied a renewal in their registration, and go out of the market. Innovation is crucial to deliver products which meet the more stringent criteria and replace older technology.

- (1981) The potential for innovation to contribute to a technological improvement of active substances available to farmers is recognised in Union legislation. Regulation 1107, for instance, requires the Commission to establish a list of AIs which are 'candidates for substitution', so that Member States can evaluate if they can be replaced by other plant protection products, and crop protection companies have visibility over the molecules for which a further innovation effort could be warranted.
- (1982) The Parties advance the argument that the market investigation, while confirming the role of innovation in the industry, broadly rejected the view that the Transaction may have an impact on innovation and that mergers in the industry may have affected innovation in the past, agreeing in particular with the views expressed by customers in the framework of the market investigation.
- (1983) The Commission observes that, different from market participants' view of the formulated products on the downstream markets (namely in terms of their application, their pricing, and other relevant factors affecting their use and their sales), market participants have less visibility into the crop protection companies R&D process and decision making, as well as into the innovation effort of crop protection companies, particularly at their early stages.
- (1984) First, as regards the views expressed during the market investigation, while the Parties refer in their submission to answers which would point to no concerns as regards innovation competition, the Commission observes that, in reply to other specific questions, a significant number of market participants indicated that the Transaction would result in harm to innovation. In particular, approximately one fourth of customers who replied to the question,¹⁵¹⁹ indicated that, bearing in mind the effects on innovation of previous mergers in the crop protection industry, they expect that the merged entity would bring fewer novel AIs to the market than the total AIs output of DuPont and Dow taken together pre-Transaction. The percentage is higher among responding competitors, as a large number of them (that is to say more than 50%)¹⁵²⁰ expect that the merged entity would bring fewer novel AIs to the market.
- (1985) Second, as regards the impact of the views of market participants and their role within the investigation, the Commission finds that the market investigation is an important means to carry out a predictive assessment but it is only one of several sources of evidence that the Commission has to take into account in its assessment. In the example of crop protection innovation, where decision-making processes are to a large extent confidential, the Commission has analysed in-depth a number of sources of evidence beside the views of market participants. These include, in particular, documents of the Parties prepared in the ordinary course of business, detailed information (including confidential information) about competitors' pipelines, as well as the Parties' integration plans with expected synergies and planned strategies post-Transaction.
- (1986) In conclusion, the Commission considers that there are factors which suggest that innovation is of crucial importance both from the perspective of farmers and growers as it can ensure effectiveness, and from a public policy perspective in light of the improved profile offered by new AIs.

¹⁵¹⁹ Questionnaire to Crop Protection Customers (Q1), question 30.

¹⁵²⁰ Questionnaire to Crop Protection Competitors (Q2), question 39.

8.3. Test under the Merger Regulation and the Horizontal Merger Guidelines and theory of harm in this case

(1987) In this section the Commission will start by describing the legal basis for its assessment of innovation competition as well as by explaining why the analytical framework for the assessment of non-coordinated effects in the Horizontal Merger Guidelines is also applicable to innovation. In addition, the Commission will summarise its theory of harm on innovation competition and argue why the Parties' arguments on the fact that the Commission's theory of harm falls short of the legal standard are not well founded.

8.3.1. Legal basis

(1988) Article 2 of the Merger Regulation establishes that: "*[a] concentration which would significantly impede effective competition, in the common market or in a substantial part of it, in particular as a result of the creation or strengthening of a dominant position, shall be declared incompatible with the common market*". Recital (25) to the Merger Regulation clarifies that the language of Article 2 is meant to encompass the appraisal of the effects of concentrations in oligopolistic markets, and in particular those that may significantly impede effective competition by the elimination of important competitive constraints that the merging parties had exerted upon each other as well as by a reduction of the competitive pressure on the remaining competitors.

(1989) The Merger Regulation sets up a legal framework that is not limited to the assessment of price effects, but under which the Commission is bound to conduct an appraisal of the likely effect of concentration in light of a number of criteria. In that respect, the Union Courts have clarified that the prospective analysis consists of an examination of how a concentration might alter the factors which determine the state of competition on a given market in order to establish whether it would give rise to a serious impediment to effective competition.¹⁵²¹

(1990) Innovation is an important criterion relevant in order to conduct the appraisal. Paragraph 8 of the Horizontal Merger Guidelines clarifies that the merger control system established by the regulation aims at preventing mergers which would be likely to deprive customers of a number of benefits of effective competition, which are not only low prices, but also high quality products, a wide selection of goods and services and innovation.

(1991) A merger may deprive consumers of these benefits through an increase of market power, which under the same paragraph is defined as the ability of one or more firms to profitably increase prices, reduce output, choice or quality of goods and services, diminish innovation or otherwise influence parameters of competition.¹⁵²²

¹⁵²¹ Judgment of 15 February 2005, *Commission v Tetra Laval*, C-12/03 P, EU:C:2005:87, paragraph 43; Judgment of 10 July 2008, *Bertelsmann and Sony v. Impala and Commission*, C-413/06 - P, EU:C:2008:392, paragraph 47. See also Judgment of 9 March 2015, *Deutsche Börse v Commission*, T-175/12, EU:T:2015:148, in particular paragraph 177.

¹⁵²² Paragraph 8 identifies innovation as one of the benefits that mergers may deprive customers of: "*[e]ffective competition brings benefits to consumers, such as low prices, high quality products, a wide selection of goods and services, and innovation.*" Increased market power may consist in the ability of one or more firms to profitably diminish innovation. Pursuant to paragraph 25, "*mergers in oligopolistic markets involving the elimination of important competitive constraints that the merging parties previously exerted upon each other together with a reduction of competitive pressure on the remaining*

- (1992) It is clear from the purpose and wording of the Merger Regulation and the Horizontal Merger Guidelines that the Commission is required to prevent significant impediments to effective competition without limiting its assessment to neither price effects nor product and price competition between existing products. It is also part of the Commission's task to determine whether a transaction is likely to lead to diminished innovation and future competition.
- 8.3.2. *The analytical framework for the assessment of non-coordinated effects in the Horizontal Merger Guidelines is not exclusively restricted to the appraisal of price effects, but is also applicable to innovation*
- (1993) The Commission considers that the framework set out for the assessment of non-coordinated effects is not exclusively restricted to the appraisal of price effects, but is also at least partially applicable to innovation for the following reasons.
- (1994) **First**, the framework which is outlined in paragraphs 24 and following of the Horizontal Merger Guidelines deals with non-coordinated effects of mergers. In line with paragraph 22(a) of the Horizontal Merger Guidelines those are one of the ways in which horizontal mergers may significantly impede effective competition, that is by eliminating important competitive constraints on one or more firms, which consequently would have increased market power.
- (1995) **Second**, in line with paragraph 8 of the Horizontal Merger Guidelines, price increases are one of the ways in which increased market power gained through mergers can harm competition. As such, whenever the section on non-coordinated effects of the Horizontal Merger Guidelines refers to price effects, this is in principle shorthand also for other possible forms of harm. This is not only apparent from the structure of the Horizontal Merger Guidelines, but also from the letter of paragraph 8 thereof, which expressly states that "*[in the guidelines], the expression 'increased prices' is often used as shorthand for these various ways in which a merger may result in competitive harm*".
- (1996) **Third**, paragraph 38 of the Horizontal Merger Guidelines expressly mentions innovation as one of the specific criteria for the assessment of mergers, that is to say whether the merger eliminates an important competitive force. In this context, the Horizontal Merger Guidelines recall that increased incentives to innovate could find their place among the efficiencies stemming from a merger. At the same time, the same paragraph acknowledges that a merger between two important innovators may lead to a significant impediment to effective competition. Innovation competition is thus confirmed as a criterion to assess the likely effects of a merger.
- (1997) **Fourth**, the wording of paragraph 38 makes it also explicit that the assessment of pipelines within a merger between two companies with pipeline products related to a specific product market, is only one example of how harm to innovation competition may occur.
- (1998) **Fifth**, more broadly paragraph 24 et seq. of the Horizontal Merger Guidelines as applied to non-coordinated effects on innovation competition entail that the Commission needs to assess whether the transaction reduces important constraints on one or more sellers and significantly impede effective innovation competition. In line with paragraph 24 of the Horizontal Merger Guidelines and recital (25) of the Merger

competitors may, even where there is little likelihood of coordination between the members of the oligopoly, also result in a significant impediment to competition."

Regulation, the Commission thus considers both the loss of competition between the merging firms, and the reduction of competitive pressure on other non-merging firms. Overall, the loss of product variety brought about by less innovation harms consumers by depriving them of choice, and reducing competition on rival products.

(1999) The assessment of the impact of a merger on innovation competition as part of the analysis on the likely effects of a merger is anchored in economic analysis, as it will further be explained in Annex 4. As such, it is also expressly addressed by other jurisdictions.¹⁵²³

8.3.3. *Theory of harm*

(2000) As discussed in more detail in Section V.8.4, the Commission considers that the market features of the crop protection industry suggest that rivalry (or competition) is likely an important factor driving innovation, and that a merger between important rival innovators is likely to lead to a reduction in innovation.

(2001) This is because: (i) individual crop protection product markets are contestable on the basis of innovation; (ii) given the strong Intellectual Property Rights (IPRs) in the crop protection industry, the original innovator can be expected to reap the benefits from its innovation, by preventing rivals from imitating the successful innovation (that is, appropriability is high); (iii) innovation is mostly based on product innovation; (iv) consolidation between rival innovators is unlikely to be associated with efficiencies ([...]); and (v) the fear of cannibalisation of own existing products is a disincentive to innovate which is likely to be reinforced by a merger between rival innovators.

(2002) Under these circumstances, the economic literature on competition and innovation supports a theory of harm based on the fact that a merger between competing innovators by reducing rivalry in the industry and increasing cannibalisation of existing and future sales is likely to result in a decrease in the incentive to innovate by the merging parties.

(2003) The features of the market described in recital (2001) may also explain the fact that, in the past, concentration in the industry was accompanied by a decrease in innovation. Moreover, because innovation is an important parameter of competition in the crop protection industry, these features also indicate that it is important to analyse innovation-related effects for the purposes of the review of the Transaction, in order to avoid a significant impediment to effective competition in the future.

(2004) In light of the features set out in recital (2001) and (2002), a merger such as the Transaction in review may, as a result of its non-coordinated effects on innovation, significantly impede effective competition within the meaning of Article 2(3) of the Merger Regulation by “*eliminating important competitive constraints on one or more*

¹⁵²³ For instance, the United States Horizontal Merger Guidelines published by the US Department of Justice and the Federal Trade Commission ("US Guidelines") specifically discuss harm to innovation. In section 6.4 the US Guidelines indicate that US Authorities may consider "*whether a merger is likely to diminish innovation competition by encouraging the merged firm to curtail its innovative efforts below the level that would prevail in the absence of the merger. That curtailment of innovation could take the form of reduced incentive to continue with an existing product-development effort or reduced incentive to initiate development of new products*". Both of these aspects will be considered in the assessment of the Transaction.

firms, which consequently would have increased market power, without resorting to coordinated behaviour".¹⁵²⁴ This effect is similar to the case of price competition.

- (2005) The "*most direct effect*" of such a merger is likely to "*be the loss of competition between the merging firms*", attributable in this case to the expected loss of innovation competition between Dow and DuPont. In this respect, the Commission notes that the Horizontal Merger Guidelines clarify that the expected horizontal effects of such a merger can also lead to the reduction of competitive pressure on other competitors: "*[n]on-merging firms in the same market can also benefit from the reduction of competitive pressure that results from the merger.*"¹⁵²⁵
- (2006) According to paragraph 25 of the Horizontal Merger Guidelines, non-coordinated effects result in a significant impediment of effective competition in the case of "*mergers in oligopolistic markets involving the elimination of important competitive constraints that the merging parties previously exerted upon each other together with the reduction of competitive pressure on the remaining competitors.*"
- (2007) As discussed in Section V.8.6, in this Decision, there are a number of elements which indicate that the Transaction would take place in an industry already characterised by oligopolistic innovation competition, as notably indicated by the followings:
- (1) Following successive waves of consolidation, there are now only five global R&D-integrated players.
 - (2) Barriers to entry and expansion are very high at both discovery and development level.
 - (3) Other players such as the Japanese innovators, Monsanto, Sumitomo or FMC do not have similar capabilities and incentives.
- (2008) The Commission further considers that due to differentiated assets, capabilities and strengths, limited capacity and differentiated incentives, the number of innovation players with similar capabilities and incentives at each level of innovation space, as described in Section V.8.6.1, is likely to be even lower than the five global R&D-integrated players. In many innovation spaces in which the Parties compete on innovation there are, pre-Transaction, four or less actual or potential innovation competitors.
- (2009) According to paragraph 37 of the Horizontal Merger Guidelines, "*[s]ome firms have more of an influence on the competitive process than their market shares or similar measures would suggest. A merger involving such a firm may change the competitive dynamics in a significant, anticompetitive way, in particular when the market is already concentrated*".
- (2010) As discussed in Section V.8.7, the investigation shows that pre-Transaction the Parties would be more important competitors as regards innovation competition than the mere analysis of their downstream industry shares and their innovation expenditure shares would suggest. This is even more the case for DuPont. The Commission also notes that the expected effects of the Transaction could be even more harmful to innovation because, [...].

¹⁵²⁴ Horizontal Merger Guidelines, paragraph 22.

¹⁵²⁵ Horizontal Merger Guidelines, paragraph 24.

- (2011) According to paragraph 38 of the Horizontal Merger Guidelines, "*effective competition may be significantly impeded by a merger between two important innovators, for instance between two companies with 'pipeline' products related to a specific product market*".
- (2012) As discussed Section V.8.8, the investigation shows that, in many innovation spaces, the Parties have been in the past, and are likely to continue to be in the future, close and important innovation competitors. There are number of markets in which the Parties have launched or are launching/currently developing competing products to take away revenue from each other. They have also a number of early pipeline products resulting from their lines of research which would likely be taking away revenue from each other in the future. In the innovation spaces targeted by these early pipeline products there are few alternative equally effective competitors present or developing pipeline projects.
- (2013) The investigation suggests that the Transaction would be likely to significantly diminish innovation competition in a number of innovation spaces within the crop protection industry by encouraging the merged entity to curtail its innovative efforts and capabilities below the level that would prevail if the Transaction was not to happen.
- (2014) The Commission considers that the reduced innovation incentives and capabilities are likely to manifest themselves in the form of:
- (1) immediate reduction of incentives to continue with some existing innovation efforts (either by discontinuing, redirecting or deferring early pipeline products or lines of research) in the case of overlapping lines of research and early pipeline products between the Parties, and
 - (2) reduced incentives to develop in the longer term the same number of new products as the combined targets of the Parties before the Transaction.
- (2015) The likely harm to innovation competition is significant on both accounts: the lines of research and early pipeline products at risk in herbicides, insecticides and fungicides are important for the farmers concerned. The [...] would be likely to lead to a further decrease in new AIs brought into development [...].
- (2016) Consumers would be harmed by both the loss of product variety, and the reduced intensity of future product market competition in the markets where the discontinued, deferred or redirected products would have been introduced but for the Transaction.
- (2017) This significant reduction of innovation competition and innovation outputs would be particularly relevant in a context where (i) both Parties currently have [...] competing lines of research and early pipeline products [pipeline information], and (ii) European farmers have in recent years experienced a pronounced decrease in crop protection innovation which implies that any reduction of competition in innovation for key crops in Europe may affect European markets even more than other markets.
- (2018) According to paragraph 31 of the Horizontal Merger Guidelines, "*[w]hen market conditions are such that the competitors of the merging parties are unlikely to increase their supply substantially if prices increase, the merging firms may have an incentive to reduce output below the combined pre-merger levels*". In line with this and transposed to the context of innovation competition, the Commission will analyse whether market conditions are such that the competitors of the Parties would

be likely to increase their innovation efforts substantially if the innovation effort of the Parties decrease.

- (2019) The investigation suggests that the availability of R&D players active at discovery stage and of companies with discovery capabilities would not be likely to offset the reduction of innovation output that would be brought about by the Transaction. As regards the remaining three global R&D-integrated players, the investigation suggests that it is unlikely that they would have the incentive and the ability to significantly increase their innovation efforts so as to profitably offset the reduction of innovation competition from the Parties because (i) they have differentiated assets (patents), capabilities and strengths, (ii) they face capacity limitations at pre-development and development level, (iii) they do not have the incentives to compete aggressively in the market so as to offset a reduction in innovation efforts by the Parties.
- (2020) In the last part of this section, the Commission will discuss the synergies claim raised by the Parties. As discussed in Section V.8.11, the Commission considers that [...].
- 8.3.4. *The Parties' arguments on the fact that the Commission's theory of harm falls short of the legal standard are not well founded*
- (2021) In their response to the Statement of Objections,¹⁵²⁶ the Parties present several arguments on why in their opinion the Commission's theory of harm falls short of the legal standard.
- (2022) **First**, as already argued in their response to the Article 6(1)(c) Decision, the Parties contend that paragraphs 25-37 of the Horizontal Merger Guidelines focus on potential price increases resulting from mergers in already concentrated product markets, and that the 'traditional' product market analysis cannot be simplistically applied in the context of assessing innovation. The Parties refer instead to paragraph 38 of the Horizontal Merger Guidelines, which would acknowledge that mergers may increase incentives to innovate and establish a theory of harm based on a transaction's effects on pipeline overlaps.
- (2023) As explained in Section V.8.3.2, as well as in Section V.8.4.1, the Commission considers that both the Horizontal Merger Guidelines and the economic literature on the relationship between competition and innovation supports the innovation theory of harm set out in this Decision, in light of the salient features of the Transaction.
- (2024) As regards paragraph 38 of the Horizontal Merger Guidelines, the Commission notes that it expressly mentions innovation as one of the specific criteria for the assessment of mergers, that is to say whether the merger eliminates an important competitive force.
- (2025) **Second**, the Parties argue in the response to the Statement of Objections that the Commission's theory of harm ignores the impact of resistance, regulation, and generic competition on the merged entity's incentives to innovate. Moreover, according to the Parties, changes arising from the merger such as potential increases in appropriability must logically be part of the incentives analysis.

¹⁵²⁶ Parties' response to the Statement of Objections, pages 50-58.

- (2026) In this respect, the Parties argue that in the Tetra Laval judgement the Court held that even if the transaction were to reduce the pressure on innovation emanating from competition, the Commission needs to prove why the relevant other factors (in that case consumer demand) would not continue in the future to be the driving force behind innovation.
- (2027) The Commission finds that the argument of the Parties is misplaced. In its judgment in Tetra Laval,¹⁵²⁷ the Court of Justice validated the General Court's assessment that the reduction of potential competition from the merger may be compensated by other factors, with the result that the competitive position of the merged undertaking remains unchanged.
- (2028) In the same case, the Court of Justice also clarified,¹⁵²⁸ as to the standard of proof required, that the prospective analysis necessary in merger control "*consists of an examination of how a concentration might alter the factors determining the state of competition on a given market in order to establish whether it would give rise to a serious impediment to effective competition*".
- (2029) The Commission's arguments rely on the finding that the Transaction would affect the Parties' incentives to compete on innovation as it would reduce (that is to say *alter*) rivalry between firms. The Commission also provides in the present Decision an assessment of the importance of rivalry as an incentive to innovate.
- (2030) As regards other factors such as generic entry, regulation and resistance, the Commission observes that they are not *altered* by the Transaction. The Parties infer from this finding that the Commission would disregard the Tetra Laval judgment, because it needs to weigh all factors impacting the merged entity's post-merger incentives to innovate, and cannot ignore factors that remain unaffected by the merger. However, in the present Decision, the Commission explains the reasons why they are not alone sufficient to justify incentives to innovate. In other words, the Commission finds that, those other factors notwithstanding, rivalry does, in the pre-Transaction scenario, drive innovation incentives (that is to say it establishes a causal relation between rivalry and innovation), and concludes that by reducing rivalry, the Transaction is liable to reduce those incentives.
- (2031) Other factors could *offset* such reduction, insofar as they are *altered* by the Transaction and may thus act as a countervailing incentive, which is brought about by the merger, and thus needs to be affected among the merger-specific effects of the Transaction. In its Tetra Laval judgment, in paragraphs quoted by the Parties in their response to the Statement of Objections, the General Court observed that the Commission had not explained why competitors could not benefit from a decision by the merged entity to innovate less.¹⁵²⁹ The Court of Justice validated this approach,¹⁵³⁰ as the General Court had relied on the potential reactions of Tetra's competitors as a basis for refuting the Commission's view on whether the merged entity would have had an incentive, among others, to innovate less. The Commission's assessment on the likely reaction from competitors is presented in Section V.8.10.6.

¹⁵²⁷ Case C-12/03 P, *Commission v Tetra Laval*, EU:C:2005:87, paragraph 127.

¹⁵²⁸ *Ibid.*, paras 42-43.

¹⁵²⁹ Judgment of 25 October 2002, *Tetra Laval v. Commission*, T-5/02, EU:T:2002:264, paragraph 330.

¹⁵³⁰ Case C-12/03 P, *Commission v Tetra Laval*, EU:C:2005:87, paragraph 129.

- (2032) **Third**, the Parties also argue that a significant lessening of effective competition requires that consumer harm occurs on a relevant market within the pertinent predictive timeframe, which normally does not exceed five years. According to the Parties given that the Commission recognises that innovation as such is not a market, but an input for the upstream technology and downstream formulated product markets, there cannot be a significantly impede effective competition merely due to an alleged reduction of an input, but the Commission must prove output effects on a relevant market. Moreover, according to the Parties, any hypothetical harm on consumer would only take place when these products would have been commercialised, which in the EEA crop protection industry, would occur at a 10 to 15-year time horizon.
- (2033) The Commission considers instead that the theory of harm associated with the Transaction described in Section V.8.3.3 would affect the competitive structure and may result in consumer harm as a consequence of the loss of product variety and the reduced intensity of future product market competition in the downstream crop protection markets where the discontinued, deferred or redirected products would have been introduced but for the Transaction.
- (2034) In addition, the Commission's theory of harm innovation implies an immediate effect of the Transaction on the Parties' behaviour, and not only in a timeframe of 10 to 15 years. In fact, although the reduction on innovation competition would harm consumers directly in the long-term, it would result in effects in the innovation spaces that would take place shortly after the Transaction, namely the immediate discontinuity, redirection or deferment of early pipeline products or lines of research by the merged entity.
- (2035) **Fourth**, the Parties argue that the Commission cannot establish to the requisite legal standard any causal link between the Transaction and the assumption that some new products ultimately would not reach the market. According to the Parties, the Commission must demonstrate to the requisite standard ("balance of probabilities") that a concentration raises antitrust concerns by significantly impeding effective competition.
- (2036) The Commission theory of harm does not constitute simple speculative exercise about the behaviour of the merged entity in the long term but rests on the likelihood of a behaviour adopted by the merged entity shortly after the Transaction, namely the discontinuity, redirection or deferment of early pipeline products or lines of research. Therefore, the requisite standard does not differ from assessing typical price effects that flow directly from structural changes in a market.
- (2037) Moreover, this likely behaviour by the Parties post-Transaction is supported both by economic theory and by the specific features of the crop protection industry, as discussed in Sections V.8.4 and V.8.5. [...].

8.3.5. *Structure of the assessment*

- (2038) In light of the foregoing, the Commission's assessment will be structured as follows. As a preliminary point, Sections V.8.4 will establish that the market features of the crop protection industry suggest that a merger between innovation competitors likely results in a decrease in the incentives to innovate. Section V.8.5 will complement this section by looking at past concentration and conclude that past concentration seems to have harmed innovation competition in the crop protection industry; at least it did not improve it. Section V.8.6 will show that the concentration of R&D players at

industry level led to a narrow industry oligopoly of only five global R&D-integrated players and that concentration at the innovation space level is even higher leading often to even tighter oligopolistic markets. Section V.8.7 will show that the Transaction would bring together two innovation competitors which before the Transaction were more important competitors at industry level than their downstream industry shares and their R&D expenditure shares suggest. Section V.8.8 will show that in a number of identified innovation spaces, the Transaction would bring together two important and closely competing innovation competitors with few other alternatives available. Section V.8.9 will show that post-Transaction the merged entity would likely have lower incentives to continue some overlapping lines of research and early pipeline products. Section V.8.10 will show that post-Transaction the merged entity would likely have lower incentives to achieve the same innovation output levels as the two Parties pre-Transaction and that it is unlikely that there would be sufficiently strong countervailing reaction of competitors. Lastly Section V.8.11 will show that [...].

8.4. The market features of the crop protection industry suggest that a merger between innovation competitors likely results in a decrease in the incentives to innovate

(2039) The Parties argue that resistance, regulation and generic competition are the key drivers of innovation based on their internal documents and the results of the market investigation, while rivalry concerns are not relevant for innovation decisions. According to the Parties' response to the Statement of Objections¹⁵³¹, the Commission draws its conclusions on the importance of rivalry from internal documents but bases itself on general observations.

(2040) The Commission considers that, as described in Section V.8.2, there are factors such as biological resistance (and related effectiveness issues) or regulatory pressure which may act as incentives for innovation. However, the evidence in the file described in Sections V.8.4.1 to V.8.4.4 does support the Commission's conclusion that rivalry is a key element driving innovation. In this context, while the former factors are not affected by the Transaction, rivalry among firms competing on crop protection innovation is affected by the Transaction because of the elimination of innovation competition between the Parties

8.4.1. The economic literature on competition and innovation supports a theory of harm based on the non-coordinated effects of a reduction in innovation from the Transaction

(2041) The Commission considers that the economic literature on the relationship between competition (and mergers in particular) and innovation supports the innovation theory of harm set out in this Decision, in light of the salient features of the Transaction. This literature is described in detail in Annex 4.

(2042) The economic principles laid out in the economic literature and summarised in Annex 4 indicate that a merger between two out of a limited number of significant innovators is likely to reduce product innovation when appropriability is high (that is, when IPRs are effective), and when there no merger-specific efficiencies associated with the merger.

¹⁵³¹ Parties' response to the Statement of Objections, pages 59-60.

- (2043) A merger reduces innovation incentives primarily by suppressing innovation competition between the merging parties. Whilst prior to the merger the merging parties would have an incentive to capture current and future sales from each other when introducing new and improved products, post-merger they would face a reduced incentive to do so. An innovation by a merging party now cannibalises profits of the merging partner firm and that effect is internalised with the merger, adding to the opportunity cost of innovation and thus depressing the innovation incentive. This is a standard unilateral effect from a merger, in line with the treatment of innovation competition under the Horizontal Merger Guidelines. As with other types of non-coordinated effects, this effect is likely to be significant if the merger brings together two out of a limited number of effective innovators, which absent the merger would have been likely to divert significant sales from each other by investing in innovation.
- (2044) The incentives of the merging parties to innovate may also be affected by the change in current and future product market competition brought about by the merger. This second effect is based on the fact that following a merger, the merging parties coordinate the pricing of their products and thus a merger may increase the prices and profits of the merged entity. Less intense competition in the product market can increase the net revenues earned by a product line both when the firms innovate to improve the products in that line and when they do not. As such, the effect of a less intense product market competition on innovation is potentially ambiguous, as is well recognised in the economic literature.
- (2045) While the product market channel in principle generates an ambiguous effect of a merger on innovation incentives, the existing literature suggests that potential countervailing effects of a reduction in product market competition on innovation are unlikely to outweigh the direct adverse effect due to the loss of innovation competition between rivals.
- (2046) Other potential merger-related countervailing effects which offset the incentives to reduce innovation by the merging parties relate to the possible lower risk of imitation by competitors following a merger or to the ability to apply process innovations over a larger scale post-merger. These potential countervailing effects are unlikely to play a significant role in the present Transaction, given that innovation mostly takes the form of *product innovation* that is *protected by effective IPRs*. The economic literature indeed provides support for the proposition that competition generally stimulates innovation in the presence of exclusive rights protecting inventors. Moreover, the Commission considers that possible pro-innovation effects due to greater appropriability and economies of scale should be treated as merger-related efficiencies for which the Parties bear the burden of proof. [...].
- (2047) During the Phase II investigation, the Parties have provided a number of economic submissions on the relationship between competition and innovation. Prior to the issuing of the Statement of Objections, the Parties submitted two economic reports.¹⁵³² These submissions contended that competition analysis of innovation is different than the analysis applicable to price competition, and that there can be no presumption that a merger between competing firms would result in a reduction in innovation.

¹⁵³² Parties' submission entitled [...]; and Parties' submission entitled [...].

- (2048) On the basis of its own analysis and its review of the economic literature set out in Annex 4, the Commission considers that the theoretical arguments raised by the Parties for why innovation competition should be assessed differently than price competition are largely not applicable to the Transaction, [...]. The reasons for this conclusion are set out in detail in Annex 4.
- (2049) In response to the Statement of Objections, the Parties have submitted two further economic reports, criticising the conceptual framework on mergers and innovation set out in the Statement of Objections.¹⁵³³ This critique is briefly summarised and assessed in Section V.8.4.4, and set out more extensively in Annex 4.
- 8.4.2. *Both the market features of the crop protection industry and documentary evidence suggest that rivalry is a significant factor driving innovation*
- (2050) This section starts by describing the main features of the crop protection industry that support the fact that rivalry is a significant factor driving innovation. Secondly this section presents several internal documents from the Parties with evidence about monitoring and benchmarking against rival's early pipeline products.
- (2051) The crop protection industry is characterised by the following features which support that rivalry is a significant factor driving innovation.
- (2052) **First**, markets in crop protection are contestable environments. Customers are not locked-in to a given product. [Quote from internal document].¹⁵³⁴ Customers thus change whenever some developments are available in the market. This implies that the best product tends to win share away from rival suppliers. In some cases, innovations can be drastic and win a very significant share of the market (for example DuPont's Rynaxypyr).
- (2053) High contestability implies that companies, acting independently, each can earn large incremental sales from crop protection product innovation to a large extent at the expense of sales made by the other party.
- (2054) As discussed in Annex 4, the economic literature stresses the importance of competition (or contestability) in driving innovation incentives. A merger between two of a limited number of firms that compete to introduce rival innovative products would lower contestability as the rivalry between the two innovators is lost, thereby reducing the innovation incentives of the two merging parties.
- (2055) Given that the total size of the crop protection industry is typically not related to innovation, as total demand is mainly capped and driven by commodity prices,¹⁵³⁵ competition between rival innovators matters relatively more than when demand is not capped, and hence the likely effects of a merger on innovation are likely to be more pronounced. However, as it is evident from the economic principles and literature set out in Annex 4, this element is not a decisive factor for the theory of harm on innovation.

¹⁵³³ Parties' submission entitled [...]; and Parties' submission entitled [...].

¹⁵³⁴ Section 8.2.c of Form CO.

¹⁵³⁵ As explained in one Parties' submission, even a [...] of the Parties' efforts would not affect total industry revenues, although it would benefit significantly farmers, for instance as a result of improved efficacy.

- (2056) **Second**, there are *strong IPRs* in the crop protection industry and companies are able to successfully protect the value of their innovations against rivals by preventing rivals (including generic suppliers) from imitating the successful innovation or being able to monetise inventions through licensing.
- (2057) As explained in Section V.6.2.1, R&D players can apply for and hold patents not only for new AIs, but also for new formulations, new mixtures of AIs, new process technologies, or new uses of compounds. These patents are generally valid for 20 years, normally starting from the day the patent is filed.
- (2058) The Parties as well as respondents to the market investigation observed that there may be a delay between the moment a new molecule is patented and the moment when it first reaches the market, due to the length of the process for the approval of a new AI. However, the regulatory framework grants other forms of legal protection to the firms introducing new molecules, which help secure the profits from the innovation. The 'mismatch' between the granting of the patent and the marketing authorisation is addressed, in particular, by Union law, under Regulation 1610/96, which establishes a supplementary protection certificate for plant protection products. This enables to extend legal protection and grant exclusivity for a maximum of 15 years from the first approval or authorisation of the new product.
- (2059) Even after the expiry of this period, companies which register new AIs benefit from the supplementary protection due to the rights over the data (dossier) submitted within the registration package (such as tests, study reports). Secondary applicants (such as generic manufacturers) have to either replicate the package or are granted access to the regulatory data by the primary applicant through a letter of access.
- (2060) Moreover, besides even beyond these legal protections, R&D players have at their disposal a number of other tools to prolong the legal or *de facto* exclusivity of their product. In particular, R&D players often pursue commercial strategies to avoid commoditisation and generic competition, for instance by offering the AI in mixtures, sometimes with other patented AIs or by switching their customers to newer AIs still patented. Some R&D players also rely on secret production know-how to achieve continued *de facto* protection.
- (2061) In addition, R&D-integrated players have advantages as compared to generics, namely as regards their knowledge of the product and their scale which results in financial and technical limitations of generics to compete with the originator of the AI. This is particularly relevant for Europe where the regulatory barriers are relatively higher.
- (2062) All these factors imply that whenever an R&D player introduces an innovation it can appropriate the benefits of its innovation for a long period without the risk of other companies free-riding by copying the innovation and competing away the profits.
- (2063) As shown in Section 4.11 of Annex 2, using the data submitted by the Parties in support of their Submissions on generics,¹⁵³⁶ the Commission notes that [...]. This suggests that the level of appropriability is strong and extends far after patent expiry of the straight products or related generic entry, [...].

¹⁵³⁶ Parties' response to the Commission's requests for information RFI 6, question 26 (ID765); Parties' response to the Commission's requests for information RFI 8, question 20 (ID709), reiterated in Commission's request for information RFI 9 question 20 and Commission's request for information

- (2064) The fact that innovators appropriate the profits of their successful innovations limits one of the main mechanisms identified in the economic literature for why less competition (that is to say fewer independent competitors) may foster innovation. Some of the economic literature has noted that more concentration may enhance innovation if a lower number of independent competitors also implies a lower risk of imitation and thus higher appropriability. However, if imitation concerns are properly dealt with effective IPRs and generic defences (as is the case for the Transaction at hand), then this channel is largely irrelevant. This point is further developed in Annex 4.
- (2065) **Third**, a salient feature of innovation in the crop protection industry is that it mostly *relates to product innovation*. This means that innovative effort typically manifest itself in the introduction of new and improved products (for example new AIs). Innovation in the form of improvements in the production process for existing products instead is less relevant than product innovation (particularly for high quality patents, that is to say patents with high number of citations). Process patents are also largely product-specific (for example linked to the production process of a specific active ingredient), and therefore could not be easily transferred to other products following a merger.
- (2066) In the case of process innovation, the economic literature has posited that a reduction in product market competition may result in greater sales by an innovator and may therefore enhance the incentives to engage in process innovation. The argument rests on the assumption that pre-merger the innovator was not able to capture the full benefits of its innovation by virtue of being unable to licence it to other firms. A merger may enhance the ability of an innovator to retain the value of its innovation if the process innovation can be applied also to the sales of the other merging party (assuming that this is technically possible and profitable). For product innovation, the potential positive effect on innovation incentives does not apply. This principle is further developed in Annex 4 of, by reference to some of the observations made by the Parties.
- (2067) Another factor that is relevant to understand the impact of competition on innovation in the crop protection industry is that innovation is stochastic or uncertain – that is, the firms are not certain of the impact of their discovery efforts when they initiate such efforts. In fact, when a project is in the discovery stage its success chance is around [...]%. As discussed in Annex 4, the economic models of uncertain patent races indicate that a merger, modelled simply as a reduction in the number of potential innovators, is likely to reduce overall innovation, contrary to some of the claims made by the Parties.
- (2068) On the basis of the features highlighted in recitals (2052) to (2067), competition between R&D players at the innovation stage is therefore an important driver of innovation in the crop protection industry. An R&D player competes on innovation through the prospect of:
- (1) diverting future profitable sales away from rival innovators and therefore gaining new streams of profits. This diversion of sales may effect both existing rivals products (if rivals are also making current sales in the market) and future

RFI 10, question 6b (ID1376); Parties' response to the Commission's request for information RFI 13, questions 10-12 (ID3653); Parties' response to the Commission's request for information RFI 44, question 2 (ID6789).

rival products (if rivals are also innovating and therefore may be introducing new and improved products in the future); and

(2) protecting its streams of profits by fending off rivals through innovation in markets where it is already present.

(2069) With this in mind, the Parties usually benchmark their pipeline products against rivals' products. [Quote from internal document].¹⁵³⁷

(2070) [Internal document].

(2071) The Parties argue that benchmarking does not demonstrate that rivalry creates any incentive to innovate. However, benchmarking the competitors' innovation activities is [...] of the assessment performed for an innovation decision.

(2072) [...].¹⁵³⁸

Figure 93 – [...]

[...]

(2073) [...].¹⁵³⁹ [...].¹⁵⁴⁰

Figure 94 – [Extract from internal document]

[...]

(2074) [...].

Figure 95 – [Extract from internal document]

[...]

(2075) [Quotes from internal documents].^{1541,1542}

Figure 96 – [...]

[...]

(2076) In Section V.8.8, several documents are described with evidence about the Parties benchmarking their products against competitors in field tests in terms of toxicology and efficacy.

(2077) Other Parties' documents include competitive intelligence analysis also for the purpose of determining the financials of AIs. [...].^{1543,1544}

(2078) [...].¹⁵⁴⁵

(2079) [...].¹⁵⁴⁶

¹⁵³⁷ [Internal document] (ID6825-25698).

¹⁵³⁸ [Internal document] (ID885-13). [Internal document].

¹⁵³⁹ For example, [internal document].

¹⁵⁴⁰ [Internal document] (ID7079-875).

¹⁵⁴¹ [Internal document] (ID6748-18361).

¹⁵⁴² [Internal document] (ID1327-115).

¹⁵⁴³ [Internal document] (ID10456).

¹⁵⁴⁴ [Internal document] (ID8091-4).

¹⁵⁴⁵ [...].

¹⁵⁴⁶ [Internal document] (ID4384-8).

Figure 97 – [...]

[...]

(2080) In the DuPont FORM 10-K Report for 2015 the importance of rivalry in the innovation behaviour of DuPont is confirmed:

"Inability to discover, develop and protect new technologies and enforce the company's intellectual property rights could adversely affect the company's financial results. The company competes with major global companies that have strong intellectual property estates, including intellectual property rights supporting the use of biotechnology to enhance products, particularly agricultural and bio-based products. Speed in discovering, developing and protecting new technologies and bringing related products to market is a significant competitive advantage. Failure to predict and respond effectively to this competition could cause the company's existing or candidate products to become less competitive, adversely affecting sales. Competitors are increasingly challenging intellectual property positions and the outcomes can be highly uncertain. If challenges are resolved adversely, it could negatively impact the company's ability to obtain licenses on competitive terms, commercialize new products and generate sales from existing products" [emphasis added].¹⁵⁴⁷

(2081) One of the economic reports submitted by the Parties confirms the idea that rivalry is important: *"[r]ivals may have introduced improved products, or competing versions of existing products. Innovations are also often driven by the fear that rivals will come up with innovative products in the future"*.¹⁵⁴⁸ [...]. This shows that by engaging in innovation, firms can divert future expected profits from their rivals.

(2082) If the threat from rivalry in innovation is reduced, incumbents are likely to innovate less, and even more so as cannibalisation of own existing products becomes a relatively more important disincentive to innovate. As explained by one market participant: *"[l]ess enterprises is less competition, thus less pressure to develop competing products"*.¹⁵⁴⁹

8.4.3. Cannibalisation effects are relevant for innovation decisions in crop protection

(2083) The Parties argue that cannibalisation is not a relevant factor for investment decisions. According to the Parties, [R&D information].

(2084) Moreover, the Parties argue that the Commission's theory of harm confirms that cannibalisation cannot be a relevant factor since it is based on the fact that the Parties are close competitors targeting innovation spaces where they have been strong innovation competitors in the past.

(2085) The Commission considers that an important element which determines innovation incentives and which is affected by the Transaction is cannibalisation of own sales.

(2086) The gains associated with the launch of a new crop protection product result from the diversion of revenues from existing products marketed by competitors (gain of market share) or by the firm introducing the new product (cannibalisation of its own

¹⁵⁴⁷ <https://www.sec.gov/Archives/edgar/data/30554/000003055416000106/dd-12312015x10k.htm>.

¹⁵⁴⁸ Parties' submission entitled [...] (ID7358).

¹⁵⁴⁹ Questionnaire to Crop Protection Testing Partners (Q3b), question 12.1 (ID3126).

sales). The larger the gain of market share relatively to the cannibalisation of its own sales the higher are the incentives to innovate.

- (2087) The degree of cannibalisation can therefore affect the likelihood with which a merger harms innovation incentives. Cannibalisation tends to depress innovation incentives because the cannibalised sales represent an additional (opportunity) cost of innovation, making it less profitable. A merger may reinforce this effect because the merged entity may have a larger portfolio of existing products whose sales an innovation can cannibalize.
- (2088) [Internal document].¹⁵⁵⁰

Figure 98 – [Extract from internal document]

[...]

- (2089) Also with respect to [internal document].¹⁵⁵¹
- (2090) One of the economic reports submitted by the Parties argues however that [internal document].¹⁵⁵² According to this report, [strategy].
- (2091) The fact that [internal document] is due to the fact that [strategy]. In fact, the Parties make use of their expertise in a given area of investigation, [strategy]. This means that AIs brought to discovery are already unlikely to raise significant cannibalisation risks.
- (2092) In an academic paper by T.C. Sparks, one of Dow's Senior Research scientists, it is stated that "*discovery of next generation chemistries, here defined as a company developing another analog of one of its own existing products, is also not necessarily a shorter path to a product. The issue with next generation chemistries is typically the need to provide a product that addresses market space (different spectrum, crops, utility) that is outside of the company's existing product(s) to minimize market cannibalisation/competing sales.*"¹⁵⁵³ Bayer also stated that "[i]t is rare to have multiple new active ingredients that cover the same key segment in similar timeframe".¹⁵⁵⁴
- (2093) [Internal document].¹⁵⁵⁵
- (2094) [Internal document].
- (2095) [Internal document].¹⁵⁵⁶
- (2096) [Internal document].^{1557,1558}
- (2097) [Internal document].^{1559,1560}

¹⁵⁵⁰ [Internal document] (ID6519-10044), slide 8 and 12. [Internal document]. For instance, [internal document] (ID7081-3193).

¹⁵⁵¹ [Internal document] (ID6696-25459), slides 6 and 12.

¹⁵⁵² Parties' submission entitled [...] (ID7358).

¹⁵⁵³ Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

¹⁵⁵⁴ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

¹⁵⁵⁵ [Internal document] (ID6827-8337).

¹⁵⁵⁶ [Internal document] (ID6827-1084), slide 4 and slide 10.

¹⁵⁵⁷ [Internal document] (ID6825-30153).

¹⁵⁵⁸ [Internal document] (ID6825-30153).

- (2098) As regards Cyazypyr, which is a past innovation by DuPont in insecticides, the Commission also notes that [internal document].¹⁵⁶¹ Moreover, the Commission notes that [internal document].¹⁵⁶²
- (2099) [Internal document].^{1563,1564}
- (2100) [Internal document].¹⁵⁶⁵
- (2101) [Internal document].¹⁵⁶⁶
- (2102) [Internal document].¹⁵⁶⁷
- (2103) In the submission entitled [...], the Parties claim that "*firms have often launched new products in areas in which they already has substantial sales*". In particular, they mention products of Bayer in sucking insecticides and products of DuPont's in chewing insecticides. On that basis, the Parties claim that cannibalisation is not a major driver of the incentives to innovate.
- (2104) As regards Bayer's products in sucking insecticides, the Commission notes that the two main products, Spirotetramat and Thiacloprid, are actually mixture partners, which suggests that Bayer has developed these two insecticides to avoid precisely cannibalisation.¹⁵⁶⁸ The third product of Bayer, called Spiromesifen, does not target Aphids insects, which is targeted by Bayer's Spirotetramat.¹⁵⁶⁹ The fourth product, Ethiprole, actually belongs currently to BASF.¹⁵⁷⁰
- (2105) As regards DuPont's products, the Parties essentially consider DuPont's Chlorantranilipole (Rynaxypyr) and DuPont's Cyantranilipole (Cyazypyr). While these two insecticides are related to the same chemical class (diamide/anthranilamide), DuPont's Chlorantranilipole (Rynaxypyr) is a chewing insecticide while DuPont's Cyantranilipole (Cyazypyr) is mainly a sucking insecticide (see Sections V.6.4 and V.8.8.2).
- (2106) Therefore, the Commission considers that the examples provided by the Parties on Bayer's and DuPont's products suggest that innovation has been done to avoid cannibalisation of existing products.
- (2107) A merger between two innovators is likely to increase the cannibalisation effects. In fact, pre-merger if an innovator is successful in introducing a new product, it would capture profitable sales from its rivals. A merger between two potential innovators internalises this negative externality effect – from the perspective of each innovator, the lost expected profits on the products of the other merging firm becomes an

¹⁵⁵⁹ [Internal document] (ID6825-7406).

¹⁵⁶⁰ [Internal document] slide 9 (ID6825-14043). See also [internal document] slide 15 (ID06827-01084).

¹⁵⁶¹ [Internal document] slide 5 (ID6353-142).

¹⁵⁶² [Internal document] slide 70 (ID5475-114).

¹⁵⁶³ [Internal document] (ID6825-7406).

¹⁵⁶⁴ [Internal document] slide 4 (ID6825-8091). See also [internal document] slide 7 (ID06827-01084).

¹⁵⁶⁵ [Internal document] slide 41 (ID6825-7771).

¹⁵⁶⁶ [Internal document] (ID6827-5922), slide 4.

¹⁵⁶⁷ [Internal document] (ID7079-406), slide 4 and [internal document] (ID8836-145), slide 3.

¹⁵⁶⁸ Phillips McDougall Product Directory 2013 Market, file name "DOC-000000454.pdf" (ID1328-454).

¹⁵⁶⁹ Phillips McDougall Product Directory 2013 Market, file name "DOC-000000454.pdf" (ID1328-454).

¹⁵⁷⁰ Following the acquisition of Aventis, Bayer divested the European rights to the product to BASF. See Phillips McDougall Product Directory 2013 Market, file name "DOC-000000454.pdf" (ID1328-454).

additional cannibalisation effect. Following a merger the additional cannibalisation effect leads to lower incentives to innovate for each of the two merging firms.

(2108) The Commission further notes that its theory of harm rests on the broader notion of innovation competition rather than on the notion of cannibalisation of *existing* products. This is because cannibalisation is often meant to refer to a diversion of sales from one or several *existing* products to an innovative product sold by the same firm. Innovation competition, instead, more broadly refers to the extent to which innovative products of one firm may divert sales and profits from both *existing* and other *innovative future* products of rival firms. Through innovation, rival firms therefore impose a negative externality on each other. Accordingly, the Commission notes that even if innovation were to involve no cannibalisation of the sales of existing products, a merger between two out of a limited number of innovators in a market could reduce innovation incentives, by leading to the partial internalisation of the impact of innovation competition between the merging parties. This would likely be the case if, absent the merger, firms would compete with innovative products in some markets with a sufficient likelihood, diverting existing and future sales from each other.

8.4.4. *The Parties' arguments that the Commission improperly assessed innovation effects are not well founded*

(2109) The economic reports submitted by the Parties in response to the Statement of Objections argue that the Commission's conceptual framework for the analysis of the likely effects of the merger on innovation incentives is not well-developed as it disregards certain important factors and is internally inconsistent.¹⁵⁷¹ Specifically, the reports argue that the Commission: (i) takes a too narrow view of the notion of appropriability, (ii) wrongly separates cannibalisation and appropriability concerns, and (iii) ignores the role of biological resistance and regulatory pressure in its assessment. A similar critique is contained in the Parties' response to the Statement of Objections.

(2110) This section provides a summary of the Commission's assessment of these conceptual/theoretical claims raised by the Parties in the response to the Statement of Objections (see Annex 4 for a detailed assessment).¹⁵⁷²

(2111) As regards the first claim, and irrespectively of the Parties' definition of appropriability, this Decision considers all the relevant mechanisms related to merger-specific changes in product market competition and innovation competition, including in particular the impact on innovation incentives of a reduction in the number of independent innovators and the impact of less intense product market competition.

(2112) The Commission also notes that its use of the appropriability notion is consistent with the one commonly used in the relevant economic literature. The literature distinguishes, for example, between “appropriability” and “contestability” as two key drivers of innovation incentives. Appropriability thus depends on the extent to which a firm can protect the competitive advantage associated with its innovation. If imitation is rapid, so a firm that successfully innovates is unable to differentiate its products or achieve a significant cost advantage over its rivals, ex-post profits

¹⁵⁷¹ Parties' submission entitled [...]; and Parties' submission entitled [...].

¹⁵⁷² Parties' response to the Statement of Objections, pages 42-50.

margins will be low and innovation incentives will be muted. In turn, contestability relates to the extent to which a firm can gain profitable sales from its rivals by offering greater value to customers. Sales are contestable if profitable sales shift toward the successful innovator. According to the Commission's theory of harm (with support from the economic literature) a merger between two of a limited number of firms that compete to introduce rival innovative products would lower contestability (rather than increasing appropriability) as the rivalry between the two innovators is lost, thereby harming innovation incentive. In any event, a discussion on the appropriate notion of appropriability is largely semantic, as the Commission's theory of harm on innovation captures all of the possible effects raised by the Parties (as is discussed in detail in Annex 4).

- (2113) As regards the second claim, the Parties' argue that if appropriability were high and unaffected by the Transaction, it could not have been that the innovative products of the Parties would have competed for sales in the absence of the merger. A key premise of the Commission's theory of harm would thus have to be rejected.
- (2114) This argument by the Parties assumes that the Decision's notion of high appropriability effectively implies the absence of competitive interaction in (future) product markets between rival innovators. This assumption is wrong: strong IPRs (and high pre-merger appropriability more generally) do not imply that innovative products of one of the firms will not divert sales from a related innovative product of another firm. This is only implied in the overly broad concept of high appropriability suggested by the Parties. Intense competition does, however, imply that, in order to generate any profits at all, a firm has to innovate so as to make its product better (or different) from those of its rivals. And when it innovates successfully, it will enjoy (that is to say appropriate) the extra profits – but only until a rival's innovation eradicates its advantage. High appropriability pre-merger is therefore consistent with intense competition in innovation pre-merger. This implies that, if appropriability is high pre-merger (as is the case for the present Transaction), a merger between significant rival innovators would primarily affect competition in innovation, leading to lower incentives to innovate (absent efficiencies).
- (2115) On the basis of their claim that cannibalisation and appropriability effects have not been properly assessed, the Parties make the related claim that the Commission's emphasis on the notion of closeness in innovation competition is also misplaced. According to the Parties, a merger between close innovators may actually be more likely to boost innovation incentives than a merger between distant innovators, by increasing appropriability.¹⁵⁷³ According to the Parties, the logic of paragraph 28 of the Horizontal Merger Guidelines (which relates to closeness of competition between rival products) therefore does not carry over to innovation.
- (2116) The Commission also rejects the Parties' claim on closeness summarised in the previous paragraph. This claim is based on partial and incorrect assessment of the nature of non-coordinated effects resulting from a horizontal merger.

¹⁵⁷³

Parties' submission entitled [...] states as follows: "[t]he closer a rival's competing product, the greater the adverse impact of appropriability considerations on innovation, and the greater the adverse effect on innovation effort. If this risk is reduced as a result of the merger, appropriability will be increased, and so will the positive effect on innovation incentives, to a greater extent than with a merger between two distant competitors".

- (2117) A merger between rival innovators would result in internalisation of the adverse effects of innovation by each merging party on the expected sales and profits of the other merging party. The internalisation of this effect increases the opportunity cost of innovation for each of the merging parties, leading to incentives to invest less in innovation. This innovation competition effect is based on the basic logic of non-coordinated effects, which is equally applicable to product market competition and to innovation competition. This effect is stronger if the merging parties are close competitors, implying that innovation effort by each firm diverts significant expected sales from other firm. As noted by the Parties, less innovation by each of the merging parties also makes innovation by the other merging partner more profitable. However, in standard economic frameworks applicable to oligopoly competition, this indirect countervailing effect is not sufficient to offset the direct effect from the internalisation of the innovation externality, thus leading to lower innovation effort for each of the merging parties. This effect is particularly clear if a merger affects innovation competition without significantly affecting product market competition at the same time. The existing economic literature also suggests that the adverse effect of a horizontal merger on innovation also applies if both innovation competition and product market competition are reduced by a merger at the same time. The reasoning summarised in this recital is set out in detail in Annex 4.
- (2118) As regards the third claim, the Commission considers that the evidence discussed in the Decision shows that additional factors such as regulatory pressure, biological resistance, and competition from generics are unlikely to be sufficiently strong to make the cannibalisation of an existing product irrelevant.¹⁵⁷⁴ First, generic players are only a partial and often not significant constraint for R&D players, even for AIs which are off-patents for a significant time (see Section V.6.2.1). Second, regulatory pressure and biological resistance are unlikely to play a role for the most recent products commercialised by the Parties (for example DuPont's Cyazypyr and Dow's Isoclast in insecticides, which are in the process of being launched). Third, even for products launched many years ago, like Dow's insecticide Spinosad (launched in 1984), DuPont's herbicides SUs, DuPont's Rynaxypyr (launched in 2008), the business plans of the Parties show significant sales in the future. This suggests that biological resistance, regulatory, or generic entry, are not likely to significantly affect the possible cannibalisation effects of innovation by rival firms.
- (2119) Moreover, the Parties' argument loses much of its relevance when one considers that innovation competition (and cannibalisation) takes place in a dynamic setting. Indeed, in crop protection industry firms continuously innovate and keep introducing new AIs in development pipelines. In such a setting, an innovative chemical that is in the initial stages of its development now will in the future be diverting sales from related AIs that may be further advanced in the development pipeline but have not yet been commercialised. In other words, in a dynamic setting competing firms would be selling AIs targeting same pests that have not had been rendered obsolete by biological resistance or regulation by the time any innovative AI is ready for

¹⁵⁷⁴

For example, while the Spinosad insecticide was discovered in 1984 and launched in 1985, it has generated significant sales of USD [product specific turnover] in 2016 with a gross margin of [margin information], it is still considered with the insecticide Spinetoram at "*the forefront of biological chemistry*", with important projected sales of Spinosyns and Spinetoram around USD [sales estimates] in 2018 and around USD [sales estimates] in 2025, [margin information] (see Section V.8.8.4 for further details).

commercialisation. The sales of such AIs will have been cannibalised by the newly introduced AIs and the extent of such cannibalisation is larger for the merged firm. The Commission therefore considers that the fact that the crop protection industry is characterised by factors such as biological resistance, the presence of generics and regulatory pressure does not invalidate its innovation theory of harm.

(2120) To conclude, on the basis of recitals (2109) to (2119), the Commission considers that the conceptual/theoretical claims raised by the Parties in the response to the Statement of Objections are not well-founded. Moreover, as discussed in details in the Decision, the Commission considers that the factual elements confirm and further reinforce the general theoretical prediction that a merger between significant rival innovators is likely to lead to a reduction in innovation. In particular, the factual evidence contained in Sections V.8.4.2, V.8.4.3, V.8.7, and V.8.8 testifies that the Parties are important and rival innovators, with the Parties being in competition for prospective sales between chemicals independently developed in a number of crop protection markets. In addition, [...] further reinforces the actual or potential loss of innovation competition (see Section V.8.10).

8.4.5. *Conclusion on the implications of the market features of the crop protection industry for the incentives to innovate after a merger between innovation competitors*

(2121) The Commission considers that the key factual features of the crop protection industry described in Section V.8.4.2 and the economic principles laid out in the economic literature (see Annex 4), support a theory of harm by which a merger between firms competing in innovation is likely to reduce incentives for the merging firms to innovate.

(2122) The Transaction would bring together two out of a limited number of significant innovators, both at the industry level and in specific innovation spaces in which their innovation activities overlap. Given the high *contestability* of the crop protection industry, absent the merger, the Parties would have been likely to capture sales from each other, as illustrated by the history of past innovation competition between them, resulting in overlaps in/across discovery targets, product pipelines and final products. The Transaction internalises the sales that would have been captured by each Party from the other one – *cannibalisation effects*.

(2123) Finally, innovation in the crop protection industry largely takes place through *product innovation* that is *protected by effective IPRs* and other means to sustain high profit margins. This implies that *appropriability is already high* pre-Transaction, and is would be unlikely to be significantly increased post-Transaction.

8.5. Past concentrations seem to have harmed innovation competition in the crop protection industry; at least it did not improve it

8.5.1. *Concentration in crop protection has increased while innovation effort and output has decreased*

(2124) The R&D part of the crop protection industry has experienced strong consolidation in the last years with the strong reduction of the number of R&D players since 1960 as illustrated by the Figure 99 taken from an academic article of T.C. Sparks.

Figure 99 – Number of companies in the US and Europe involved in crop protection discovery 1950–2010

1950	1960	1970	1980	1990	2000	2010
BASF BAYER DOW DUPONT	BASF BAYER DOW DUPONT	BASF BAYER DOW DUPONT	BASF BAYER DOW DUPONT	BASF BAYER DOW DUPONT	BASF BAYER DOW DUPONT	BASF BAYER DOW DUPONT
Allied Chem. AmCy BF Goodrich Boots Calif Spray Chem Co. Chemagro Chemisches Forsch Indust Ciba Eastman Kodak Geigy Gen Aniline & Film Gulf Hercules Hooker ICI Monsanto Morton Salt Nudias Prod Phillips Petros Rohm & Haas G.D Searle Co. Schering Shell Internat. Socony-Vacuum Oil Co. Solvay & Co. Standard Oil USDA US Industrial Chem US Rubber Velical	Allied Chem. AmCy American Oil Boehinger Boots Chevron Chemagro Ciba Diamond E. Merck Eastman Kodak ESO Flions FMC Geigy Gen Aniline & Film Gulf Hercules Hooker ICI Monsanto Morton Salt Phillips Petros Rohm & Haas G.D Searle Co. Schering MGIK Monsanto Morton Salt Murphy Oil NV Phillips Olin Math. Pannsalt PHILIPS Petro. Rhone Poulanc Rohm & Haas Ruhchemie Roussel UCLAF Sandoz Stauffer Schering Shell Internat. Shell US Spencer Chem. Sterling Union Carbide Universal Oil US Rubber USDA Velical Wyandotte	Allied Chem. AmCy Boehinger Boots Chevron Chevron Ciba-Geigy Diamond Merck & Co Flanco ESSO Flions FMC Gulf Hoechst Hoffman LaRoche Hooker ICI Monsanto Mortin Norwich Murphy Oil NV Phillips Olin Corp Pernsalt Phillips Petro. Rhone Poulanc Rohm & Haas Ruhchemie Roussel UCLAF Sandoz Stauffer Schering Shell Internat. Tenneco Thompson-Hayward Union Carbide Universal Oil Unioyol Upjohn USDA Velical	Abbott AmCy BFC Galamerck Chevron Ciba-Geigy Diamond Duphar Elanco Flanco Gulf Hoechst Hoffman LaRoche Hooker Hercules ICI Maag Merck & Co. Mobile Monsanto Murphy Chem NOR-AM (Schering) Olin Corp Occidental Rhone Poulanc Rohm & Haas Roussel UCLAF Sandoz Stauffer Shell Internat. Shell US Union Carbide Unioyol Upjohn Velical Zeecon	Abbott AmCy Ciba-Geigy FMC Hoechst Merck & Co. Monsanto NOR-AM (Schering) Rhone Poulanc Rohm & Haas Roussel UCLAF Sandoz Shell Internat. ICI Maag Merck & Co. Mobile Monsanto Murphy Chem NOR-AM (Schering) Olin Corp Occidental Rhone Poulanc Rohm & Haas Roussel UCLAF Sandoz Stauffer Shell Internat. Shell US Union Carbide Unioyol Upjohn Velical Zeecon	Aventis AmCy Crompton (Unioyol) FMC Isagro Novartis Rohm Haas Zeneca	Isagro Syngenta

Source: Sparks (2013), "Insecticide discovery: an evaluation and analysis", *Pesticide Biochemistry and Physiology*. See also Form CO, part B.II, annex B.II.17 (ID6748-1267)

(2125) Simultaneously, there was a reduction in the R&D expenditure by the Big 5. Over the last ten years, despite the increasing costs to bring new AIs, the R&D budget for crop protection as a percentage of revenues has decreased for these companies suggesting a reduction in the innovation effort.

Figure 100 – Global R&D-integrated players average R&D spending for crop protection as percentage of revenues

[...]

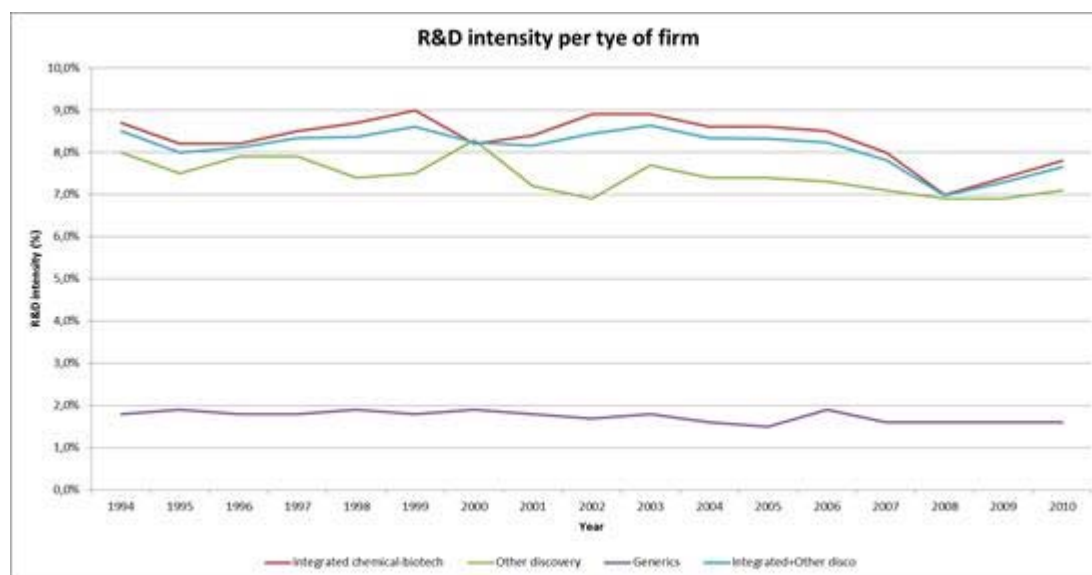
Source: Commission's elaboration of data submitted by the Parties in response to the Commission's request for information RFI 15 and by competitors in response to the Commission's request for information CO1

(2126) The Parties argue that innovation effort has not decreased with the consolidation of the industry. According to the report submitted by the Parties¹⁵⁷⁵, total R&D spending has in fact increased in the last years. Moreover, this submission argues that R&D intensity for all firms has been fairly constant and patent application has increased while concentration has been increasing. Thus, the report concludes that one cannot conclude that changes in R&D intensity are being caused by a general trend upwards in concentration or that they raise any competition concerns.

¹⁵⁷⁵ Parties' submission entitled [...].

- (2127) In that regards the Commission first notes that the original study from which the data is taken to draw the Parties' arguments states that "*R&D spending by the crop protection industry worldwide has increased only slightly in nominal terms (unadjusted for inflation) over the past few decades and fell in real terms (inflation adjusted) over 1994-2010. New agricultural chemical products resulting from R&D have reached the market during this period but at a slower rate of introduction than in previous years*".¹⁵⁷⁶
- (2128) In addition, the conclusions made by the Parties regarding R&D intensity are based on figures of the overall industry spent, including R&D-integrated players but also non-integrated players and generic companies. When disaggregating between these different types of companies, it is possible to conclude also on the basis of the data relied on by the Parties that R&D-integrated players have reduced their R&D intensity, in particular after the merger wave in 1999-2002, from 8.9% in 2002 to 7.8% in 2010.

Figure 101 – R&D intensity per type of firm



Source: Commission's calculations based on the report of the US Department of Agriculture (December 2011), "Research investments and market structure in the food processing, agricultural input, and biofuel industries worldwide". This report is also used in the Parties' submission entitled [...]

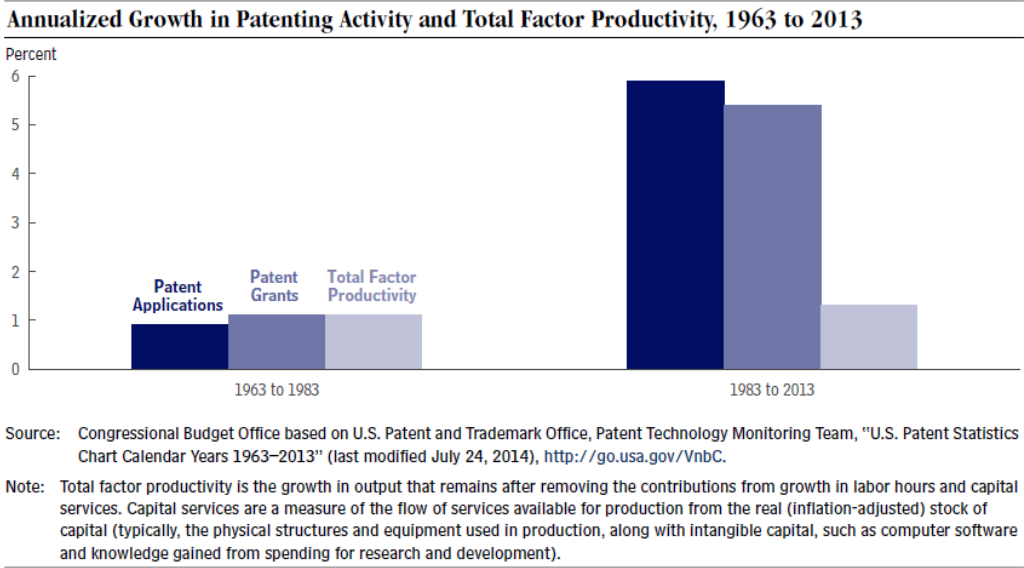
- (2129) The Parties argue that given that the sales of their generics products have increased, R&D spent as percentage of sales would have fallen mechanically even if there was no change in their investment in R&D. However, it is precisely the decrease in product innovation that justifies an increasing share of off-patent products. In addition, it is not only the investment in R&D that has decreased but also the output.
- (2130) The Parties further argue that the increase in patent applications for the period 1995-2015 reflects synergies from previous mergers.¹⁵⁷⁷ The Commission disagrees with the Parties' analysis for the following reasons.

¹⁵⁷⁶ USDA, "Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide", December 2011.

¹⁵⁷⁷ Parties' submission entitled [...].

- (2131) First, there is a general increase in patenting over time. This is discussed for example in a recent report from the US Department of Agriculture for the pesticide industry. This report also mentions that even if there was an increase in patenting for pesticides, the "growth of patent awards has been more rapid in other patent classification areas, and the share of pesticide patents relative to all patent awards in the United States has been declining".¹⁵⁷⁸ Therefore, because of the general increase in patenting, which seems lower in the crop protection industry compared to other areas, the Commission considers that the claim of the Parties that the increase in patent applications for the period 1995-2015 reflects synergies from previous mergers is unfounded.
- (2132) Second, a recent report from the US Congressional Budget Office¹⁵⁷⁹ (Figure 102) shows that increasing patent applications does not lead to an increase in productivity (this report also shows an increase in patenting over time, as discussed in the previous recital). This is also in line with a well-established result in the patent literature, which is that patents differ greatly in their quality, with many patents having a poor quality while only a few patents are of good quality (see Annex 1). The Parties' methodology only uses patent counts, and do not consider at all the quality dimension of patents. This is a major methodological flaw in the analysis provided by the Parties (see Annex 1). As discussed in Annex 1, when patent quality is taken into account, results can be quite different from an analysis using simply patent counts. The Commission notes this methodological flaw applies as well to the patent analysis carried out by the Parties in their submission (Table IV-3 on patent applications in crop protection).¹⁵⁸⁰

Figure 102 – Growth in patent activity and total factor productivity (1963-2013)



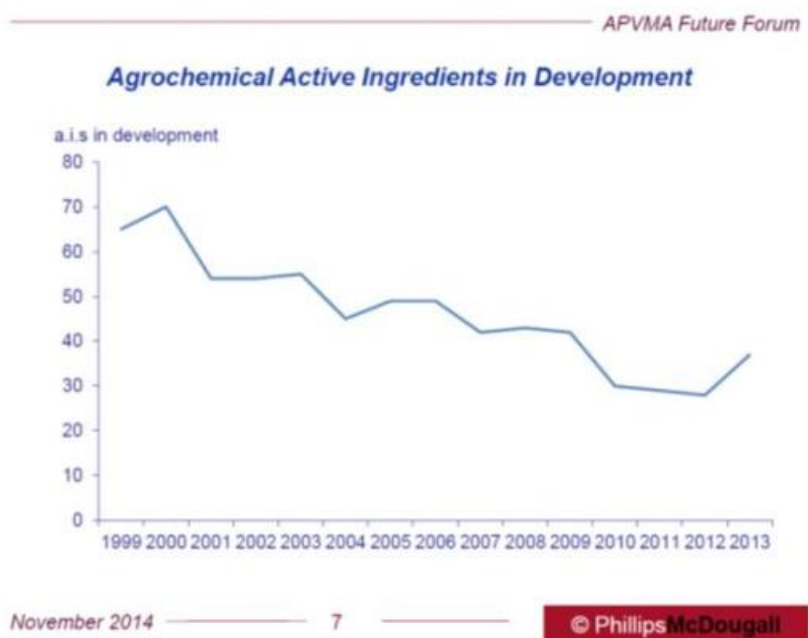
¹⁵⁷⁸ USDA, "Research investments and market structure in the food processing, agricultural input, and biofuel industries worldwide", December 2011.

¹⁵⁷⁹ <https://www.cbo.gov/sites/default/files/113th-congress-2013-2014/reports/49487-Innovation.pdf>.

¹⁵⁸⁰ Parties' submission entitled [...].

(2133) Following the decrease in R&D efforts, innovation output has sharply decreased in the crop protection industry. According to a Phillips McDougall report (Figure 103) there was a reduction in the total number of AIs in development by the agrochemical companies from close to 70 per year in 2000 to less than 40 in 2013.¹⁵⁸¹

Figure 103 – Evolution of the AIs in development

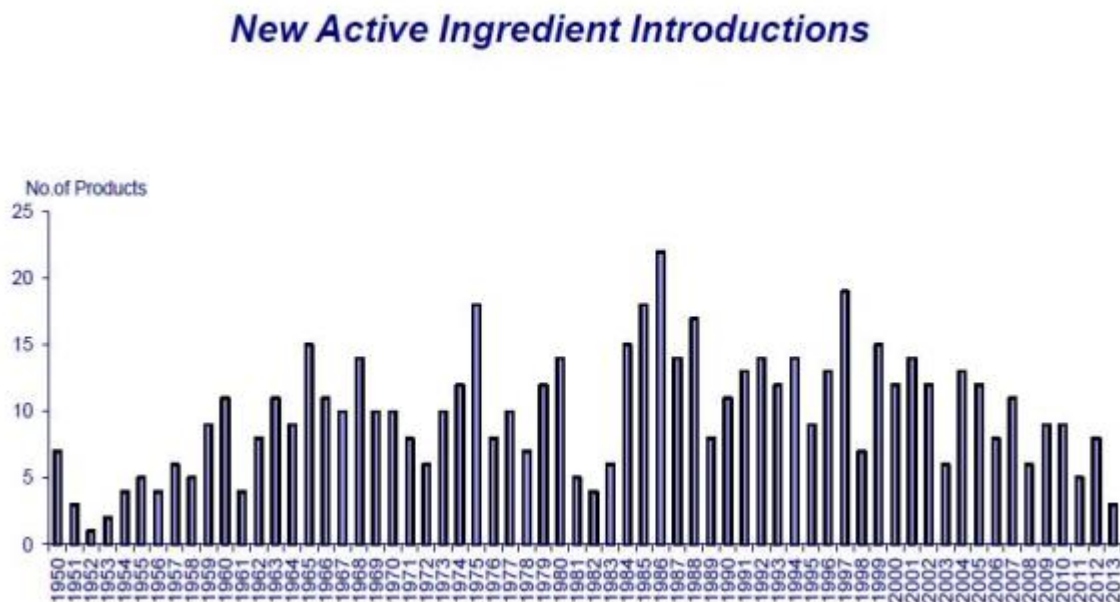


Source: Phillips McDougall, *Directions in Global Research and Development for Crop Protection Products*, 5 November 2014, slide 7

¹⁵⁸¹ Phillips McDougall, "Directions in Global Research and Development for Crop Protection Products", 5 November 2014, slide 15.

(2134) According to the same Phillips McDougall industry report, the average number of AIs introduced per year was 12.3 between 1980 and 1989, 12.7 between 1990 and 1999, 10.3 between 2000 and 2009, and 6.3 between 2010 and 2013 (see Figure 104).

Figure 104 – New active ingredients introductions



Source: Phillips McDougall, *Directions in Global Research and Development for Crop Protection Products*, 5 November 2014, slide 6

(2135) A wide majority of respondents to the market investigation, both within customers¹⁵⁸² and competitors¹⁵⁸³, confirmed that there are fewer less novel AIs coming to the market today compared to 20 years ago. Some also suggested that there is more incremental rather than disruptive innovation. In the words of one customer "[t]he last years there are few real new products. Most of the time it is about making new mixtures of existing active materials our reformulating products. It is very hard to find and to get an authorisation for new products".¹⁵⁸⁴

(2136) The current rate of innovation is such that there are several needs of farmers and growers (expressed as crop/pests combinations) for which there are currently no effective solutions.

(2137) A majority of respondents to the Commission's questionnaire stated that there are crops/pests for which there are no or a limited number of effective crop protection products available on the market for growers. This view was widely held among customers,¹⁵⁸⁵ competitors¹⁵⁸⁶ and stakeholders.¹⁵⁸⁷ Competitors and stakeholders

¹⁵⁸² Questionnaire to Crop Protection Customers (Q1), question 25.

¹⁵⁸³ Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 33.1.

¹⁵⁸⁴ Questionnaire to Crop Protection Customers (Q1), question 25.1 (ID3005). Other responses to the same questions include "[t]here is less and less new modes of action and due to the regulations of the EU plant protection interventions in the crops with small sown area are unavoidable." (ID4318); "same amount of different products but with similar or the same active ingredience [sic]. Hard to choose between them" (ID9301); "No revolutionary active ingredient came in the last few years, only small innovations. For the moment, farmer's needs are well covered." (ID4454).

¹⁵⁸⁵ Questionnaire to Crop Protection Customers (Q1), questions 17 and 28.

also clarified that the availability of products which satisfy customers' needs depends on the category of products (herbicides, insecticides, fungicides).¹⁵⁸⁸ More specifically, for some "orphan" crops, some market participants stated that no crop protections exist since they represent a marginal business. For instance, a company explained that "[t]here are also hundreds of minor crops for which there may not be any specific product that has been registered for use in Italy e.g. lettuce."¹⁵⁸⁹ Respondent stakeholders that view the availability of crop protection products as insufficient point to the fact that specifically small volume crops do not have enough protection products. A market player underlined that "*many of these crops do not have enough plant protection products (PPP) available as the cost of registration and maintenance of registration of the PPP would be not worth its sales.*"¹⁵⁹⁰ Moreover, some stakeholders that see the current availability of crop protection products as sufficient worry about the development of resistances. This is due to a decreasing pool of products as well as an increasing reliance on the tools currently available.

8.5.2. *Innovation effort and output have decreased with particular incidence in the EEA*

(2138) This negative trend in innovation in the crop protection industry has particularly affected the EEA. Industry sources document that European crop protection markets are less and less the primary target of R&D expenditure by industry players.

(2139) According to a study by Phillips McDougall (Figure 105), between the 1980 and 2014, the number of AIs introduced and in development worldwide has fallen by 40.7% (namely from 123 in the period 1980-1989 to 73 in the period 2005-2014). This drop was even larger in Europe where the number of AIs introduced and in development declined by more than 70% (namely from 41 in the period 1980-1989 to 12 in the period 2005-2014). The proportion AIs focussed on the European market have fallen from 33.3% to only 16.4% between these two periods.¹⁵⁹¹

¹⁵⁸⁶ Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 27.

¹⁵⁸⁷ Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 11.

¹⁵⁸⁸ Questionnaire to Crop Protection Stakeholders and Testing Partners (Q3a and Q3b), question 9.

¹⁵⁸⁹ Agreed non-confidential minutes of a call with a customer, 21 March 2016 (ID8263).

¹⁵⁹⁰ Questionnaire to Crop Protection Stakeholders (Q3a), question 11.1 (ID4531).

¹⁵⁹¹ Phillips McDougall, "R&D trends for chemical crop protection products and the position of the European Market", September 2013.

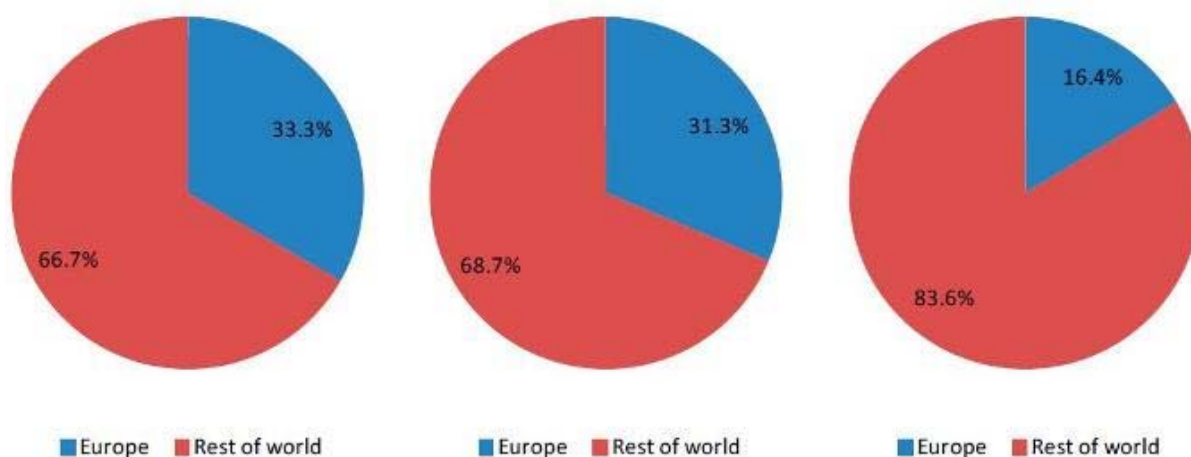
Figure 105 – Regional focus of active ingredients introduced and those in development

Region	1980 - 1989	1990 - 1999	2005 - 2014
Worldwide	123	128	73
Europe	41	40	12
Share Europe (%)	33.3	31.3	16.4

1980 - 1989
Total = 123 Active Ingredients

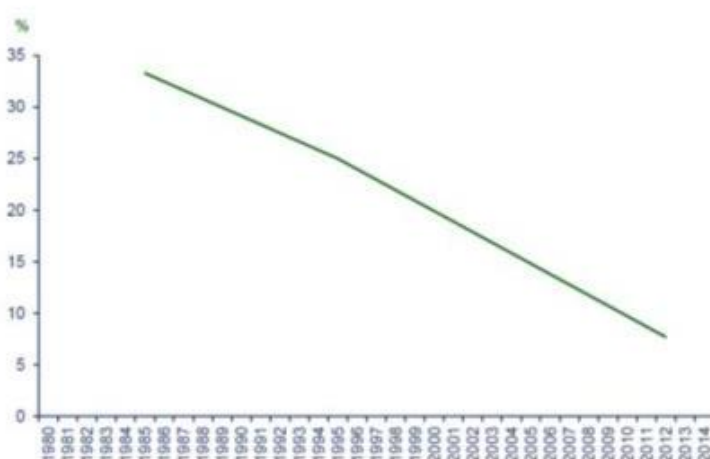
1990 - 1999
Total = 128 Active Ingredients

2005 - 2014
Total = 73 Active Ingredients



(2140) This evolution is consistent with the decrease in the share of R&D investment focussed on Europe. In the beginning of the 1980s, Europe represented around one third of the investment of R&D crop protection companies, while in 2012, it represented already less than 10%.

Figure 106 – Share of R&D investment due to agrochemicals for Europe



Source: Phillips McDougall – Directions in Global Research and Development for Crop Protection Products, November 2014, slide 13

(2141) [Content of internal document].¹⁵⁹²

Figure 107 – [Extract from internal document]

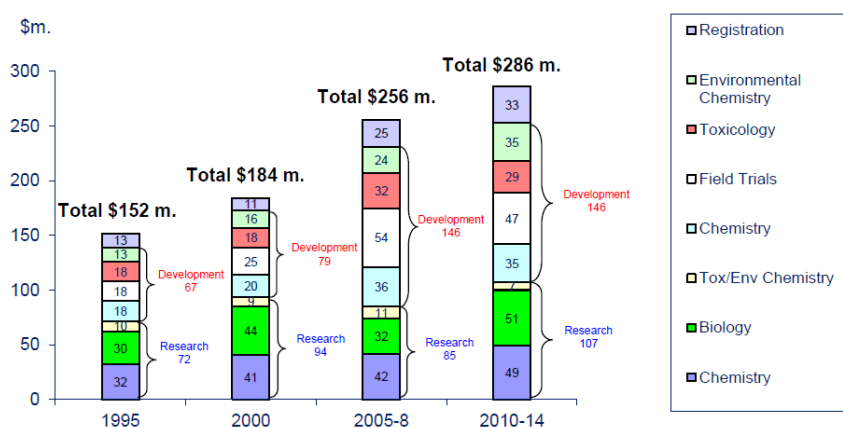
[...]

(2142) In conclusion, European farmers have less new technology to drive agricultural production than their competitors in other regions of the world. Therefore, any further reduction of competition on innovation may more significantly affect European markets.

8.5.3. *Factual elements and statements from industry experts point in the direction that past consolidation has contributed to the reduction of R&D outputs of the crop protection industry*

(2143) In the response to the Statement of Objections, the Parties argue that the evolution of innovation output is not justified by the consolidation in the industry.¹⁵⁹³ Instead, they justify the reduction in the number of AIs by the fact that R&D costs for crop protection have risen sharply over time, the largest increases being related to regulatory changes. According to a Phillips McDougall report, the costs for discovery and development of a new AI has been increasing in the last years, from a total of USD 152 million in 1995 to USD 286 million in 2010-2014. In real terms this corresponds to an increase of around 30% in R&D costs.¹⁵⁹⁴

Figure 108 – Discovery and development costs of a new active ingredient



Source: Phillips McDougall, "The Cost of New Agrochemical Product Discovery, Development and Registration in 1995, 2000, 2005-8 and 2010 to 2014. R&D expenditure in 2014 and expectations for 2019", March 2016

(2144) According to the Parties there was also a reduction in the numbers of new AIs as it became increasingly difficult to develop new products that are both superior to existing products and comply with increasingly stringent regulation. Therefore, the reduction in the number of new AIs coming to market does not mean there has been any decrease in innovation efforts or innovation competition. In addition, the Parties argue that there was a shift of investment from crop protection to the seeds platform following biotechnology developments.

¹⁵⁹² [Internal document] (ID7064-339), slide 8.

¹⁵⁹³ Parties' response to the Statement of Objections, page 168.

¹⁵⁹⁴ Using the Consumer price index inflation calculator provided by the US Department of Labour.

(2145) Although the previous factors may justify in part the reduction on the number of new AIs introduced, they do not explain why the Big 5 reduced their innovation efforts, as measured by the R&D spent, in particular in a context where their crop protection business profitability, as measured by EBITDA as percentage of revenues, has increased significantly in the last years. The Parties did not present any justification for this behaviour in the response to the Statement of Objections.

(2146) When looking to the Parties' crop protection business profitability evolution in the last 15 years and comparing with the evolution of R&D expenditure in crop protection [...].

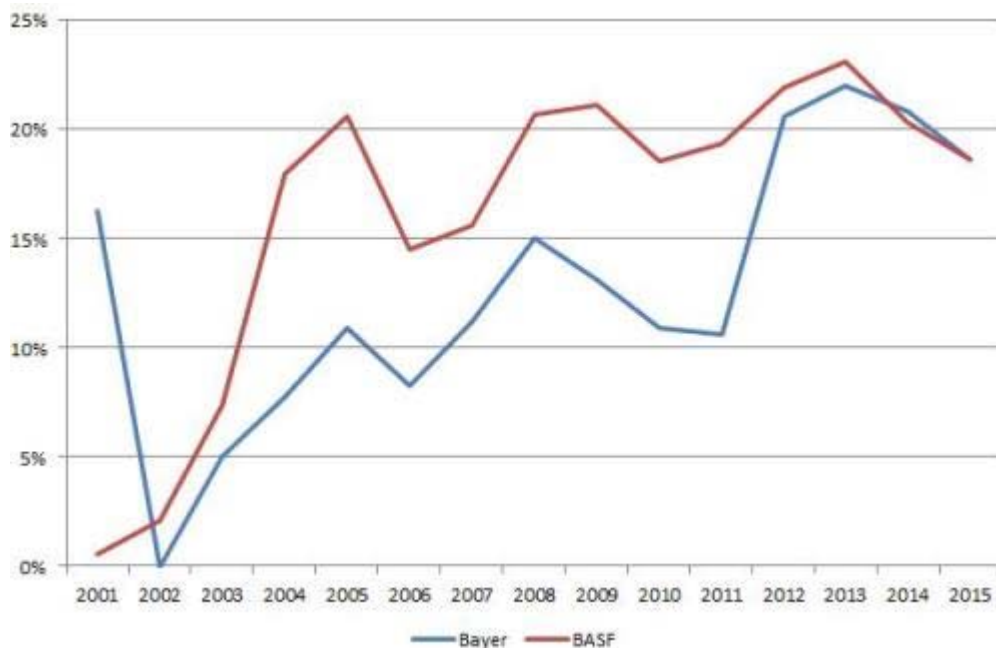
Figure 109 – [...]

[...]

Source: Commission analysis based on the Parties' response to the Commission's requests for information RFI 15 and RFI 38

(2147) As regards two of the three other Big 5 players, it is also true that the crop protection business profitability as measured by EBIT as a percentage of crop protection revenues has been increasing in the last 15 years.

Figure 110 – EBIT as percentage of crop protection revenues for BASF and Bayer



Source: Competitors' response to the Commission's requests for information on R&D Capabilities (ID8336) and (ID8352)

(2148) In addition, as regards the argument about the shift of investment from crop protection to the seeds platform, this would not be valid for all the companies, as not all of them are active in both areas (for example BASF is only active in crop protection). Moreover, the EBITDA in crop protection is higher than the EBITDA of the seeds business, which would favour the incentives for companies to invest more in crop protection.

(2149) According to a Phillips McDougall report, "*the number of agrochemicals in development is falling, primarily due to fewer companies being involved, a greater focus by these companies on the seeds and traits area and a greater share of R&D*

investment being spent on defending products as they come off patent, including seed treatment and formulation technologies" [emphasis added].¹⁵⁹⁵

- (2150) In the particular case of Europe, Phillips McDougall report points as additional factors justifying the relative reduction of innovation focussed in Europe as compared to other regions: (i) the severe regulatory requirements in Europe, which now include an initial evaluation of hazard, and (ii) the relatively weak commercial environment, resulting from lower growth in sales in Europe. As a consequence, most of the European markets are not a priority for R&D players.
- (2151) Moreover, various market participants, including the Parties, say that consolidation has contributed to fewer AIs being launched.
- (2152) [Internal document].¹⁵⁹⁶
- (2153) In an article by T.C. Sparks it is stated that "*because there are fewer companies involved in insecticide discovery coupled with the increasing costs of development and more intensive/comprehensive patenting, the size of the classes of chemistry since 1990 have been smaller and, within limits, are likely to remain so.*"¹⁵⁹⁷
- (2154) This is confirmed by other players in the industry. For instance, a leading researcher at Bayer, Dr Stübler (head of Weed Control Research) observed that in the past 25 years no new economically important herbicides with new modes of actions were brought to market, partly as a result of consolidation in the industry.¹⁵⁹⁸
- (2155) As observed also by a competitor, "[t]he existence of medium sized R&D companies ensured more innovation in the industry. When there were some 25 R&D companies active on the European market that invented new molecules, they used to each bring 1-2 molecules to the market every year. Now, there will be only a handful of very large companies which will only manage to bring 1 or 2 molecules per year at best. This proves how innovation in the industry has declined as a result of consolidation."¹⁵⁹⁹
- (2156) According to the market investigation results, approximately more than one fourth of responding customers identified consolidation in the industry among other reasons explaining the fact that fewer novel AIs are currently coming on the market compared to 20 years ago, although a clear majority indicated (or also indicated) the demanding regulatory environment in Europe.¹⁶⁰⁰

¹⁵⁹⁵ Phillips McDougall, "R&D trends for chemical crop protection products and the position of the European market", September 2013.

¹⁵⁹⁶ [Internal document] (ID1329-961).

¹⁵⁹⁷ Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

¹⁵⁹⁸ Courtesy translation from German: "*Seit über 25 Jahren hat die weltweite Pflanzenschutzindustrie kein wirtschaftlich bedeutendes Herbizid mit neuem Wirkmechanismus mehr für Flächenkulturen entwickelt und auf den Markt gebracht – unter anderem eine Folge der Konsolidierung der Industrie, die mit einer deutlichen Reduktion der Forschungsaufwendungen für neue Herbizide einherging*" at http://www.bayercropscience.ch/Symposium_zu_neuen_Wegen_in_der_Unkrautbekaempfung_cms.

¹⁵⁹⁹ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

¹⁶⁰⁰ Questionnaire to Crop Protection Customers (Q1), question 26.

8.5.4. *Conclusion on the effects of past concentrations on innovation in the crop protection industry*

(2157) The Commission concludes that there are a significant number factual elements and statements from industry experts pointing in the direction that past industry consolidation has contributed to the reduction of R&D efforts and outputs of the crop protection industry. This is despite the factors such as biological resistance (and related effectiveness issues) or regulatory pressure which may act as incentives for innovation being unchanged during this same period.

(2158) However, and in any event, irrespective of whether a general causal link can be established between concentration and the other industry trends, the evidence gathered does at the very least not offer any evidence that R&D expenditure and innovative output has increased following past consolidation. In fact, as stated in a United States Department of Agriculture ("USDA") study, "[g]reater concentration was not associated with a permanent rise in R&D intensity in these input industries".¹⁶⁰¹ In addition, the Commission considers that the negative trend in innovation in the crop protection industry has particularly affected the EEA, which is an aggravating factor in the assessment of the impact of loss of innovation competition, in particular given that Dow and DuPont are two of the few companies innovating with focus in Europe (as described in Section V.8.8).

8.6. Concentration as regards innovation at industry level is very high and at the level of innovation spaces it is often even higher

8.6.1. *In order to assess innovation competition, the analysis should not only focus on innovation competition at industry level, but also at the level of the innovation spaces within the crop protection industry*

(2159) In its assessment of innovation competition the Commission has to bear in mind the spaces in which such competition takes place. R&D companies compete in these spaces through their lines of research, which generate early pipeline products.

(2160) At the level of products, competition takes place in relevant markets which have been defined, in light of demand and supply side considerations, as crop/pest combinations at national level. At the upstream level, competition takes place through the licensing and sale of technology (AIs) addressing the crop/pest combination. As discussed in Section V.4.3, these upstream technology markets are likely to be at least EEA wide, though the exact geographic dimension of these markets has been left open.

(2161) When considering both the downstream product markets and the upstream technology markets, innovation should not be understood as a market in its own right, but as an input activity for these markets. While innovation eventually results in products which compete on these markets, the assessment of innovation competition cannot be directly conflated neither with the relevant downstream product markets, nor with the relevant technology markets.

(2162) However, the R&D players do not innovate for all the product markets composing the entire crop protection industry at the same time. They also do not innovate randomly without targeting specific spaces within that industry. When setting up

¹⁶⁰¹ USDA, "Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide", December 2011.

their innovation capabilities and conducting their research, they target specific innovation spaces which are upstream of lucrative product markets and product markets which are of strategic interest for the R&D player in question.¹⁶⁰² In order to assess innovation competition, it is thus important to consider the spaces in which this innovation competition occurs.

- (2163) The assessment of the effects on innovation competition of a merger in the crop protection industry such as the present one requires thus first of all the identification of those companies which, at an industry level, have the assets and capabilities to discover and develop new products which, as a result of the R&D effort, can be brought to the market. This analysis would identify the industry players who are capable to bring innovation to the crop protection markets overall. Against this background, it is possible to assess whether, through increased concentration and in light of high barriers to entry, the Transaction would be likely to reduce innovation output in the crop protection industry overall.
- (2164) Secondly, and at another level, however, it is also relevant to identify and analyse those spaces in which innovation competition occurs in the crop protection industry, so as to assess whether the Transaction would significantly impede innovation competition in such spaces.
- (2165) The innovation efforts of R&D companies are targeted based on discovery concepts based on lead crops and lead pests and on profitability calculations. This may vary across crop protection indications, as for instance in insecticides the pest seems to be the leading target for innovation, whereas in herbicides the selectivity by crop is also an important element.
- (2166) In light of the increasing regulatory hurdles, which require crop protection products to be ever more selective, the innovation spaces in the crop protection industry are getting ever smaller: the innovation output tends to be confined to ever narrower spaces from which it is more difficult to adapt the innovation to other purposes. In comparison, in the past when the regulatory framework was less stringent, innovation targeted broader spaces as there were fewer limitations on the uses of AIs brought about by the innovation effort.
- (2167) An article by T.C. Sparks confirms that there is the requirement for crop protection products to be more selective, implying that innovation spaces in the crop protection industry are getting smaller: "*[o]ne of the key themes during the evolution of integrated pest management (IPM) was the need for more selective insecticides. Initially the selectivity was focused on insect versus mammalian toxicity, the desire being for insecticides that were less toxic to mammals, especially compared to some of the insecticides then in wide use. The development of the pyrethroid insecticides saw the introduction of insecticides that possessed overall improved mammalian toxicological profiles on a per gram active ingredient/kg basis coupled with an increase in overall insecticidal efficacy. These improvements led to insecticidal products that were much more selective than many of the prior DDT, cyclodiene, organophosphorus or carbamate insecticides*".¹⁶⁰³

¹⁶⁰² Questionnaire to Crop Protection Competitors, (Q2a and Q2b), questions 9 and 9.1.

¹⁶⁰³ Sparks (2013), "Insecticide discovery: an evaluation and analysis", *Pesticide Biochemistry and Physiology* 107 (2013) 8-17, page 15.

- (2168) While the spaces where innovation competition takes place, which correspond to the discovery targets of those innovation efforts, are not necessarily identical to individual downstream crop protection markets, these concern an input that will eventually affect competition on downstream product markets as explained in Section V.4.
- (2169) In Section V.8.8, for instance, the Commission will analyse specific innovation spaces where the Parties have overlapping lines of research and early pipeline products (for example [pipeline information]). An anticompetitive effect of the Transaction on any such innovation space may ultimately result in harm in more than one specific downstream product market (for example chewing insects pome fruit and other fruits in more Member States).
- (2170) The Parties argue in the response to the Statement of Objections that crop protection innovation (in particular discovery) decisions are not taken in relation to such small “innovation spaces.” According to the Parties, crop protection companies do not innovate randomly, but the uncertainty inherent in crop protection discovery means that it would make no sense to target innovation objectives so narrowly.¹⁶⁰⁴
- (2171) Despite the criticism on a narrow focus of the innovation effort, the Parties, however, have also argued¹⁶⁰⁵ that, compared to upstream technology markets, the Commission's key focus when considering innovation should be the relevant product markets. The only alternative to this approach at relevant market level would be the assessment of innovation in the industry in general.
- (2172) Innovation taking place at industry level, as discussed in recital (2163), is a relevant space for the assessment of innovation competition, and the Commission will further base its assessment by looking at metrics which are capable of capturing the significance of the competitive efforts of the Parties as compared to other industry players.
- (2173) As regards the assessment of innovation on the basis of downstream markets, the Parties themselves seem to argue¹⁶⁰⁶ that innovation competition takes place on a broader level than narrowly defined downstream markets. According to the Parties, the early leads pursued do not indicate clearly what specific type of downstream product will materialise with the final AI. Only at a more advanced stage in the pipeline candidate AIs would be tested against the full range of crop/pest combinations.
- (2174) Although the Parties argue that both of them have broader discovery goals (Dow) or visions (DuPont) that guide their respective discovery processes, the [pipeline information].
- (2175) [...].¹⁶⁰⁷
- (2176) [...].¹⁶⁰⁸
- (2177) [...].¹⁶⁰⁹

¹⁶⁰⁴ Parties' response to the Statement of Objections, pages 33-38.

¹⁶⁰⁵ Parties' submission entitled [...].

¹⁶⁰⁶ Parties' response to the Article 6(1)(c) Decision, paragraphs 24-25.

¹⁶⁰⁷ [Internal document] (ID8001).

¹⁶⁰⁸ [Internal document] (ID6825-25698).

¹⁶⁰⁹ [Internal document] (ID3665-23).

(2178) [...].

Figure 111 – [...]

[...]

(2179) [...].¹⁶¹⁰

Figure 112 – [...]

[...]

(2180) Similarly [...].¹⁶¹¹

Figure 113 – [Extract from internal document]

[...]

(2181) [...].¹⁶¹²

Figure 114 – [Extract from internal document]

[...]

(2182) [...].

(2183) [...].¹⁶¹³

(2184) Contrary to the claim of the Parties, [...] an article by the T.C. Sparks indicate that the discovery process of crop protection AIs involves the *building* of a molecule with a given target and not a random process of discovering a molecule.

(2185) According to an article by T.C. Sparks, "*[t]he time and number of molecules involved in building and identifying the molecule that ultimately becomes a product can vary considerably. There are several instances where the molecule that became the product almost literally fell out of a screening program, while others where more than decade in the making, involving the synthesis and evaluation of hundreds or even thousands of compounds before the molecule that ultimately became the product was identified*" and "*[r]egardless, the time required for the discovery, or more accurately the building, of a new insecticide has, on average, always taken several years*".¹⁶¹⁴

(2186) [...].¹⁶¹⁵

(2187) The Parties in the Form CO provide descriptions of their R&D process. These descriptions [...].

(2188) [...] describes Stage B and C of its discovery process as [pipeline information].

(2189) [...].

(2190) [...].

¹⁶¹⁰ [Internal document] (ID885-13).

¹⁶¹¹ [Internal document] (ID885-9).

¹⁶¹² [Internal document] (ID7999).

¹⁶¹³ [Internal document] (ID7973-12).

¹⁶¹⁴ Sparks (2013), "Insecticide discovery: an evaluation and analysis", *Pesticide Biochemistry and Physiology* 107 (2013) 8-17, page 15.

¹⁶¹⁵ [Internal document] (ID7829-10226).

(2191) In conclusion, in order to assess innovation competition, the Commission will both consider metrics of innovation competition taking place at industry level, as well as innovation competition taking place in innovation spaces, corresponding to small groupings of crop/pest combinations.

8.6.2. *Consolidation of R&D players at industry level led to a narrow industry oligopoly of only five global R&D-integrated players*

(2192) An industry report estimate that, between 1995 and 2012, the number of crop protection R&D players dropped by half.¹⁶¹⁶ The Big 5 have been active players of this consolidation, with a number of mergers and acquisitions the largest of which are the creation of Syngenta from the Zeneca and Novartis Crop Protection activities, and Bayer's acquisition of Aventis.¹⁶¹⁷ As indicated by a competitor, "[t]here used to be numerous small and medium sized companies until 20 years ago that performed activities in the R&D segment. Even until 10 years ago there were still numerous medium sized companies active in the industry, which have now disappeared because of the concentration in the market and because of the increasing regulatory barriers that play into the hands of multinationals".¹⁶¹⁸

Figure 115 – [...]

[...]

Source: [Internal document] (ID963), [date of internal document], slide 31

(2193) In order to be able to launch new AIs, crop protection companies need a complex R&D organisation and specific assets, equipped not only to discover new AIs (discovery) but also to perform the necessary field tests and studies required to obtain the approval of a new AI in different world regions, and which typically requires years (development).

(2194) It is appropriate to briefly recall the different steps required from the discovery of a new molecule (AI) and its launch to the market.

(2195) The initial stage of the broader innovation pipeline is discovery, where companies perform research within existing or new chemistries in order to find new molecules or analogs which show interesting activity. Due to increasing costs of development and higher regulatory requirements, there has been a tendency of crop protection companies to perform studies and tests on the molecules already at the discovery stage, so as to be able to determine with more likelihood at an earlier stage whether a given molecule will have chances of success in the desired spaces before significant investment is committed.

(2196) The next broad stage is the development of the molecule, which consists of all the activities including toxicology studies, field testing, regulatory activities required in order to obtain registration of a new molecule. This phase is typically lengthy and it requires significant investment on the part of the crop protection company. The investment required is higher in case registration is sought for more geographies.

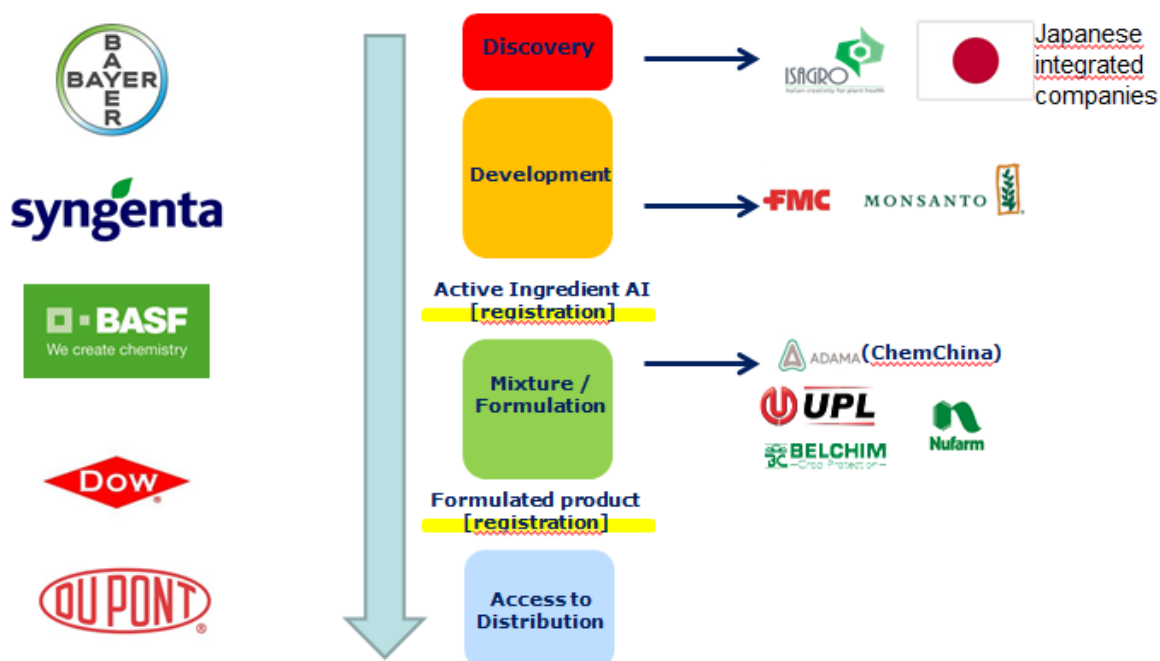
¹⁶¹⁶ Phillips McDougall, "R&D trends for chemical crop protection products and the position of the European Market, A consultancy study undertaken for ECPA", September 2013.

¹⁶¹⁷ Commission Decision in Cases M.1806 – AstraZeneca/Novartis (2000) and M.2547 – Bayer/Aventis Crop Science (2002).

¹⁶¹⁸ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

- (2197) Europe has been identified by respondents to the Commission's market investigation as the most demanding geography from a regulatory perspective. This depends not only on the requirements established for the crop protection products themselves, but also on the structure of the authorisation process.
- (2198) The approval required in Europe is twofold. On the one hand, crop protection companies have to obtain annex I registration, that is to say the registration of an AI for the entirety of the Union (lasting 10 years). Once the registration is obtained, further testing is necessary to obtain the approval (also called registration) of a final formulated product at national level. While there is to some extent mutual recognition within three broad geographic areas within the Union, the process still requires regulatory filings at national level.
- (2199) In light of the technical regulatory requirements, the two-tier regulatory system (that is to say the registration of the AI at Union level and the registration of the formulated product at national level), the process to be able to market a new product in Europe is more lengthy and costly than in other jurisdictions.
- (2200) The final step in light of the launch of a new product requires access to distribution channels, which differ at national level, to market the new crop protection product.
- (2201) The market investigation revealed that there is a clear link between the footprint of a company at distribution level and its R&D efforts. This link is due, in particular, to a number of factors.
- (2202) First, as it will further be explained in Section 8.6.5, crop protection companies have different capabilities which in principle enable them to focus their efforts on certain innovation spaces and not others. The capabilities that the companies develop are generally related to their streams of revenues.
- (2203) Second, while certain applications depend on the chemical properties of the molecule, throughout the discovery and development process the molecule can be optimised (for instance through analogs at discovery level, or through development and testing on certain specific purposes) depending on the needs of the end-target markets, which a crop protection company has expertise of thanks to its footprint.
- (2204) Third, the investment required to sustain the pipeline is significant, and needs to be sustained by streams of revenues. The revenues of a crop protection company thus affect the resources it can invest in R&D. This factor can be related to the footprint of a company in the sense that, in principle, only the companies with global streams of revenues can sustain the costs associated with pipelines encompassing products targeting crop protection markets globally.
- (2205) As a result of consolidation in the crop protection industry, there are currently five global R&D-integrated companies which have the scale, assets, capabilities and access to markets to pursue R&D globally. Aside from the Parties, whose R&D capabilities were described in Section V.8.1, these companies are BASF, Syngenta and Bayer.

Figure 116 – Companies active at each stage of the innovation process



- (2206) Syngenta is a Switzerland-based company which was formed out of the merger of Zeneca and Novartis' agrochemical businesses. According to Phillips McDougall, Syngenta was the 2014 global crop protection leader by sales.
- (2207) Bayer is a life science company based in Germany, whose CropScience business unit focuses on R&D driven seeds and crop protection products. According to Phillips McDougall, Bayer was the second largest global crop protection company by sales in 2014.
- (2208) BASF is the largest chemical company in the world, also active in the Crop Protection segment. In 2014 BASF had the largest share of R&D expenditure as a percentage of revenues in the industry, and was the third largest crop protection company by sales in 2014.

Figure 117 – Company ranking by sales and R&D expenditure (2014)

[...]

Source: Phillips McDougall

- (2209) These five companies are integrated throughout the entire R&D pipeline and have broad access to global markets. Their integration enables them, compared to other players in the industry, to direct their R&D effort,¹⁶¹⁹ set and pursue their discovery in order to target areas where new AIs would have the highest profitability chances, also in light of the market expertise gained downstream; and at the same time deploy global development abilities and access to markets which enable them to maximise the revenues that can be obtained through these molecules. Their integrated effort is sustained by the R&D budgets they can afford in light of the size of their turnover.

¹⁶¹⁹ See for instance [internal document]" (ID6082-26).

(2210) Those findings on the commercial impact of innovation brought by the leading players are in line with the Parties' own perception of who the innovation players are in the crop protection industry, [...].

Figure 118 – [...]

[...]

Source: [Internal document] (ID576)

(2211) [...].¹⁶²⁰

(2212) The R&D capabilities of other companies mentioned by the Parties will be discussed in the next section.

(2213) Not only there are few global R&D-integrated companies, the innovation effort in crop protection is characterised by ever higher barriers to entry and expansion.

(2214) First, as discussed at Section V.8.5, the costs of discovering, developing and registering a new molecule are extremely high, and, as argued by the Parties, R&D costs for new crop protection products have risen sharply over time, the largest increases being related to regulatory changes.

(2215) Second, the stricter regulatory environment also means that the time required to perform the necessary tests and studies prior to the launch of a new product have increased over time.

Figure 119 – Crop Protection product discovery and development lead time¹⁶²¹

	1995	2000	2005-8	2010-14
Number of years between the first synthesis and the first sale of the product	8.3	9.1	9.8	11.3

(2216) These two factors combined mean that, while the investment required to bring a new crop protection product to the market is high, the returns on the innovation can only be reaped several years after the investment. As noted by a stakeholder, "*[c]urrent timeline and costs for approval for new AIs is such that new companies or start-ups cannot take products to the market as they would require extraordinarily high levels of funding in order to survive the duration of the approval process.*"¹⁶²²

(2217) Third, in order to maximise these returns, companies also need to achieve a sufficient scale and access to market in several different geographic regions (globally). The Parties themselves acknowledge, when describing reasons for the decline of new AIs, "*[t]he significant increase in regulatory requirements, particularly in the EU,*

¹⁶²⁰ Parties' submission entitled [...].

¹⁶²¹ Phillips McDougall, "The cost of new agrochemical product discovery, Development and Registration in 1995, 2000, 2005-2008, 2010-2014. R&D expenditure in 2014 and expectations for 2019," a consultancy study for CropLife International, CropLife America and the European Crop Protection Association, March 2016.

¹⁶²² Questionnaire to Crop Protection Stakeholders (Q3a), question 6 (ID2623).

*resulting in higher costs, longer development cycles, and resultant financial hurdles involved in bringing a new AI to market".*¹⁶²³

- (2218) Customers who responded to the Commission's questionnaire indicated that the increasing cost of bringing a new AI on the market, mostly due to regulatory pressure, is the main barrier to entry,¹⁶²⁴ with several respondents confirming that barriers have been increasing over time.¹⁶²⁵ Because of these barriers, while there are examples of companies which left the market,¹⁶²⁶ competitors do not expect new entry in the near future.¹⁶²⁷
- (2219) While the overall factors affecting barriers to entry and expansion are similar globally, there was consensus among respondents to the market investigation that the regulatory environment is most challenging in Europe, due to stricter regulatory requirements and to the elaborate approval process across Union and national level.
- (2220) The Parties contend that the assessment of innovation competition does not need to take into account only global integrated players, as there are successful competitors which can be active in either. This would mean that, at the discovery level, innovation competition would take place with other companies active at discovery level, whereas at the development level, the assessment should focus also on companies with development capabilities but not active on discovery.
- (2221) The Commission describes in Section V.8.6.3 the capabilities and limitations of companies that the Parties have listed as their main competitors on innovation. On a general level, the Commission finds that it is not appropriate to distinguish competition in discovery from competition in development. The identification of companies which are effectively able to discover new molecules (and in particular discover new molecules with applications globally or at least including Europe) has to be assessed together with the capability to ultimately bring these molecules to market and exert a constraint on other companies.
- (2222) This does not mean that the R&D activities of crop protection players are only relevant for innovation competition if they reach the market (typically discovery takes place several years before market access and with lower chances of success than in development). This would however mean that, if a company is active in discovery only, but in order to reach the market has to rely on one of the integrated players, from the perspective of the Parties the relevant constraint would still only be represented by those integrated players.
- (2223) Crop protection R&D is characterised by bottlenecks both at discovery level and at development level, but these all have to be taken into account when assessing innovation competition.

¹⁶²³ Form CO, part D Annex.

¹⁶²⁴ Questionnaire to Crop Protection Customers (Q1), question 91.1.

¹⁶²⁵ Questionnaire to Crop Protection Customers (Q1), question 93; Questionnaire to Crop Protection Competitors (Q2), question 46.

¹⁶²⁶ See for example Phillips McDougall, Agrochemical Research and development report (2016): "[a] number of mid-sized companies reduced basic research capabilities to focus on inward licencing of product leads for commercialisation".

¹⁶²⁷ Questionnaire to Crop Protection Competitors (Q2), questions 47 and 48: a majority of responding competitors does not expect new entry and does not expect that generics will have the ability and incentive to expand and become R&D-integrated players.

- (2224) The Parties also claim that, even against this background, to the extent that there are companies that have discovery capabilities and companies with global development capabilities, the possibility for the latter to develop molecules discovered by the former means that they have to be assessed jointly as a competitive constraint on the Parties. Alternatively, companies with development capabilities should be considered equivalent to integrated players in light of their possibility to replace an in-house discovery capability through in-licensing of molecules discovered by third parties.¹⁶²⁸
- (2225) The Commission assesses in Section V.8.6.3 the capabilities of other crop protection players than global integrated players, and explain why discovery capabilities of companies without global development capabilities and market access are not comparable to the activities of global integrated players, and why players with development capabilities but without the possibility to direct an own discovery effort cannot be effective innovation competitors. The specific question on whether the combination of the two could constrain the merged entity post-transaction is addressed in Section V.8.10.6.
- (2226) In conclusion, the Commission considers that innovation in the crop protection industry is characterised by a predominant role of the five global R&D-integrated companies, as they are the only companies with scale assets and capabilities to perform all the stages of innovation at global level, as well as a global footprint and better access to distribution globally (including in Europe) which enables them to sustain the necessary R&D effort. The Commission also finds that barriers to entry and expansion in R&D in crop protection are very high.
- 8.6.3. *Other companies are active to some extent in R&D but they are not comparable to the five global R&D-integrated players as regards innovation competition*
- (2227) The Parties argued that the crop protection innovation market, however defined, is not concentrated given that there are other companies active in the crop protection markets which can compete on innovation, develop and register new AIs. In particular, in a number of submissions, and notably in [...],¹⁶²⁹ the Parties argue that a number of other companies have R&D capabilities and do compete with them in bringing new AIs.
- (2228) From a general point of view, other companies besides the Big 5 are active in some stages of the innovation process, but do not have the capabilities to engage in all the stages of innovation. In particular, several Japanese companies and Isagro are present at discovery level, but target their discovery often not at the European market or are very weak at development and registration in Europe. Some other companies are present at development stage but do not have discovery activities in crop protection (like FMC and Monsanto). Some generics are present at the stage of mixture and formulation but do not have the capabilities to engage in discovery and development of new AIs (for example Adama, Nufarm, Belchim, etc).
- (2229) In the following sub-sections, these companies will be addressed in more detail.

¹⁶²⁸ Parties' response to the Statement of Objections, pages 69-73.

¹⁶²⁹ Parties' submission entitled [...].

8.6.3.1. Monsanto

- (2230) The first example offered in the [...] is Monsanto. Monsanto is a US-based agricultural company active in seeds and crop protection. The Parties argue that, when considering the crop protection revenues (USD 4.8 billion in 2015), Monsanto is the fifth largest crop protection company in the industry, and ahead of DuPont. The Parties also argue that Monsanto played the role of a major innovator in the crop protection field, also introducing 'game-changing' crop protection products like the Roundup herbicide (glyphosate). The Parties stress that Monsanto is still a player which seeks to deliver innovation through multiple methods, including partnerships with strategic partners such as Sumitomo and Novozymes.
- (2231) In a subsequent submission specifically focussed on Monsanto, the Parties offer additional recent elements on the R&D capabilities of this company.¹⁶³⁰ The Parties provided Monsanto's documents related to recent investor presentations which would show Monsanto's focus on R&D and innovation in crop protection.
- (2232) **First**, the Commission observes that Monsanto's most significant activity as regards crop protection innovation has been the introduction of one extremely successful AI (Glyphosate) more than thirty years ago. This decades old innovation is still the core of its crop protection revenues. In Monsanto's own words, "*a major part of Monsanto's activities concern the glyphosate herbicide*".¹⁶³¹ As regards R&D at present, Monsanto's activities are almost exclusively focused on seeds, with only a limited part of the R&D budget spent on crop protection (see for instance Figure 117), as it is apparent from industry reports on R&D expenditure, and the Parties' own ordinary course monitoring of competitors' activities. Monsanto itself indicated that "*Monsanto has had only limited R&D expenditures in the area of discovery of new synthetic chemistry for crop protection AIs in the past decade. Monsanto has instead decided to focus on the development of seeds and traits*".¹⁶³²
- (2233) **Second**, Monsanto's R&D activities over the recent past did not concern the launch of new AIs on the crop protection markets. It is clear from documents provided by the Parties, for instance, that over the last 15 years, Monsanto has not registered any new AI.¹⁶³³
- (2234) **Third**, this limited role of Monsanto for research in crop protection is also confirmed with the analysis of patent data (see Annex 1). The Commission presents in recitals (2235) and (2236) the results of its analysis, showing the limited role of Monsanto for innovations related to new AIs in crop protection.
- (2235) In particular, Monsanto has a patent share in the range of [0-5]% for crop protection for the period 2000-2015, with a [0-5]% patent share in insecticides and fungicides, suggesting that it did not bring any good quality innovation in insecticides and fungicides during this time period.¹⁶³⁴

¹⁶³⁰ Parties' submission entitled [...].

¹⁶³¹ Agreed non-confidential minutes of a call with Monsanto, 21 April 2016 (ID8908).

¹⁶³² Agreed non-confidential minutes of a call with Monsanto, 23 September 2016 (ID9319).

¹⁶³³ See list of AIs provided in Parties' response to the Commission's request for information RFI 26, Annex 2.1.

¹⁶³⁴ See [...] of Annex 1.

(2236) As regards herbicides:

- (1) When considering the R&D-integrated companies and Monsanto, Monsanto has [...] patent share, in the range of [0-5]% for innovations related to new AIs.¹⁶³⁵ Its patent share is [...] in the range of [0-5]% when considering innovations based on patents with a higher number of citations.¹⁶³⁶
- (2) In comparison, in the same period, Dow's herbicides patent share for new AIs is in the range of [30-40]%, Syngenta's patent share is in the range of [20-30]%, Bayer's patent share is in the range of [10-20] to [20-30]%, and DuPont's patent share is in the range of [5-10] to [10-20]%.¹⁶³⁷
- (3) Moreover, Monsanto is historically present for innovations related to pre-emergence applications (mainly Glyphosate-related). In particular, among the [...] patents of Monsanto in the highest quality group ([...]), which are the main determinants for the patent share of Monsanto, the first [...] patents in terms of quality concern explicitly pre-plant or pre-emergence applications, which are related mainly to its AI Glyphosate introduced more than thirty years ago.¹⁶³⁸ The Commission also notes that the Parties do not have a significant presence for pre-plant or pre-emergence applications, suggesting that Monsanto is a distant competitor to Dow and DuPont.

(2237) **Fourth**, respondents to the Commission's market investigation confirmed that, after the launch of new AIs decades ago, which generate significant revenues to this date, Monsanto has not focused on launching new AIs and has not done so over the last decades. The key strategy of Monsanto instead related in crop protection-seed combinations. As observed by a competitor, "*Monsanto in particular is no longer active in chemical discovery and focuses on GMOs*".¹⁶³⁹ This is consistent with the Parties' own assessment of Monsanto in ordinary course documents. [Internal document].¹⁶⁴⁰

(2238) **Fifth**, as regards the renewed interest of Monsanto in crop protection R&D alleged by the Parties, only two of these concern the launch of new AIs, and these have not been discovered by Monsanto but the result of "*acquisitions and collaborative investments in third party innovations*".¹⁶⁴¹

(2239) **Sixth**, Monsanto's example, contrary to the Parties' claim, is an example of the barriers to expansion to become an integrated player in the crop protection R&D space, which appear to be particularly high if even a player like Monsanto, which has the fifth largest crop protection revenues in the industry, resorts to collaborations to acquire new chemistries in light of the costs to build in-house innovation capabilities. As Monsanto indicated, it is "*not conducting any non-collaborative discovery work to identify new synthetic chemistry active ingredients [...] it considered whether it could develop a substantial innovation capability in crop protection, but this would have required significant time and resources.*"¹⁶⁴²

¹⁶³⁵ See [...] of Annex 1, columns Top 50%, Top 25%, Top 10%.

¹⁶³⁶ See [...] of Annex 1, columns Top 25% and Top 10%.

¹⁶³⁷ See [...] of Annex 1, columns Top 50%, Top 25%, Top 10%.

¹⁶³⁸ See Annex 1.

¹⁶³⁹ Agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7111).

¹⁶⁴⁰ Form CO, Annex 337.

¹⁶⁴¹ Agreed non-confidential minutes of a call with Monsanto, 23 September 2016 (ID9319).

¹⁶⁴² Agreed non-confidential minutes of a call with Monsanto, 23 September 2016 (ID9319).

- (2240) **Seventh**, as regards the cooperations indicated by the Parties in their submissions, the Commission observes that the scope of the cooperation with Novozymes, as also described by the Parties, does not encompass discovery and development of new crop protection AIs. As regards the collaboration with Sumitomo, this appears aimed at a crop protection – trait combination, whereby Sumitomo, and not Monsanto, is responsible for the chemistry R&D work.¹⁶⁴³
- (2241) **Eighth**, as regards the alleged renewed interest in new crop protection chemistry of Monsanto, this has not marked the re-entry of Monsanto to the R&D crop protection space as an integrated player, as it is currently only working on molecules acquired from third parties, and, in Monsanto's own words, "[o]ver the next five years, Monsanto expects to be able to register few novel chemicals", and particularly a Nematicide (*Nemastrike*), while "all remaining chemistries are still in the very early stage of development".¹⁶⁴⁴
- (2242) In conclusion, while the Commission will consider the activities of Monsanto where relevant for the assessment, the Commission finds that Monsanto is a distant competitor of the Parties and the other global R&D-integrated players as regards innovation competition.

8.6.3.2. FMC

- (2243) The second example offered by the Parties [...] is FMC. The FMC Corporation is a US based chemical company, whose Agricultural Solutions division is active in crop protection products. FMC used to be active in the discovery and development of new AIs, but over the last decade it moved to a different model whereby it did not introduce new AIs on the crop protection markets. In 2015, the company closed its acquisition of Cheminova, a Danish company with a portfolio of AIs and a pipeline, with assets in Europe.
- (2244) [...], the Parties contend that FMC has transformed itself into a technology company with a strong agricultural focus and emphasis on growth through innovation. The Parties suggest that the acquisition of Cheminova has granted FMC a better access to European channels to the market. Moreover, the Parties indicate investor presentations where FMC lays down a pipeline of new products, with potential sales of USD 1.5 billion.
- (2245) The Parties also identify FMC as an example of company that, through its resources, can offer both its products and those that it helps others develop. In particular, according to the Parties, FMC is an important path to commercialisation for smaller AI companies, who originally discovered several of the AIs FMC is currently developing. This would be one of the ways in which FMC has pursued its R&D strategy and goals to bring new products and technologies to the market.
- (2246) **First**, the Parties, in their submission, appear to underestimate the most important element which differentiates FMC from the Big 5, which is the absence of activities at chemistry research (discovery) stage consisting in the discovery of new AIs. It is common knowledge, and FMC has confirmed, that FMC exited the active R&D discovery approximately ten years ago due to increasing costs. As indicated by a respondent in the market investigation, "*FMC also no longer does discovery, but*

¹⁶⁴³ Agreed non-confidential minutes of a call with Monsanto, 23 September 2016 (ID9319).

¹⁶⁴⁴ Agreed non-confidential minutes of a call with Monsanto, 23 September 2016 (ID9319).

works on processes, formulations, etc."¹⁶⁴⁵ More specifically, "FMC is not in the business of discovering new AIs, having exited that business in 2005. Its business model is to acquire new patented products directly or license them / use them in co-developments". FMC also confirmed that barriers to entry for R&D, specifically dedicated to the Union, have increased "R&D becomes extremely expensive and risky investment in EU due to increasing regulatory hurdles".¹⁶⁴⁶

- (2247) **Second**, according to data provided by the Parties,¹⁶⁴⁷ since then FMC launched only few products developed by other companies. This explains why, in response to the Commission's market investigation, a number of respondents identified FMC as a generic player. For instance, respondents indicated that: "[b]esides Adama, the most significant players in the generics market are FMC (Cheminova) [...]"¹⁶⁴⁸
- (2248) **Third**, FMC confirmed that (since 2012) it is notably pursuing a strategy of developing new AIs, and that it has done so in some jurisdictions. However, this model is different from the integrated approach of the Parties and other global R&D-integrated players, as FMC has not re-entered the discovery space. In particular, as part of the strategy, "FMC currently secures new active ingredients through in-licenses, acquisitions and co-development agreements".¹⁶⁴⁹
- (2249) FMC also indicated that the absence of capabilities for the discovery of new AIs is not an occurrence, but a specific constraint in light of the costs and risks associated with such activities. In particular, "[o]ne of the reasons why FMC decided to go out of active discovery has to do with this. By spending less on discovery, FMC could focus on building more development capabilities. However, the two go hand in hand: the more critical mass one company has (such as the large global R&D companies) the more it can afford to lose molecules at development stage. FMC cannot afford to lose molecules, thus it selects and in-licenses molecules for which it is more confident."¹⁶⁵⁰
- (2250) **Fourth**, the acquisition of Cheminova, as indicated by the Parties, granted FMC better access to European markets. FMC also acquired assets that may enable it to develop and register AIs in Europe, as it has pipeline molecules aimed at Europe. FMC has not yet developed and registered any new AI in Europe under this new strategy.
- (2251) **Fifth**, respondents to the market investigation clearly indicated that there is a difference in capabilities between the Big 5 and other companies like FMC. In particular, as regards its current activities, FMC is often referred to as a company mainly performing the activities of a successful generic company. For instance, a competitor stated that "[b]esides the Big-5 R&D companies (Bayer, BASF, Syngenta, Dow, DuPont), there are a number of other players like Adama, FMC, Platorm / Adama who try to build a similarly integrated organisation but may be less strong innovators / less active in AI discovery".¹⁶⁵¹ Other respondents indicated that "[i]n

¹⁶⁴⁵ Agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7111).

¹⁶⁴⁶ Agreed non-confidential minutes of a call with FMC, 8 April 2016 (ID8907).

¹⁶⁴⁷ See list of AIs provided in Parties' response to the Commission's request for information RFI 26, Annex 2.1.

¹⁶⁴⁸ Agreed non-confidential minutes of a call with a customer, 18 March 2016 (ID8249).

¹⁶⁴⁹ Agreed non-confidential minutes of a call with FMC, 10 October 2016 (ID8898).

¹⁶⁵⁰ Agreed non-confidential minutes of a call with FMC, 10 October 2016 (ID8898).

¹⁶⁵¹ Agreed non-confidential minutes of a call with a customer, 2 June 2016 (ID9323).

*the generics market, Adama and DMC have been active competitors for a long time",*¹⁶⁵² or that "[g]eneric + R&D producers (e.g. Adama, FMC), who are trying to create innovation by mixing older ('off-patent') ingredients."¹⁶⁵³

- (2252) **Sixth**, the Parties, submitted that, despite the current activities of FMC and the lack of introductions of new AIs so far, as a result of the recent change of strategy, FMC could advance products in the future, as proven by its current pipeline of products. This argument will be also discussed within the section discussing the likely reaction of competitors within Section V.8.10.6.
- (2253) The Commission finds that there is a qualitative and quantitative difference between its R&D effort of FMC and the effort of the large global players, which have integrated activities throughout the whole R&D process as well as broad access to markets (qualitative element), and have more resources to dedicate to R&D (quantitative element).
- (2254) This difference has been acknowledged also by FMC, which observed in particular that "[w]hen it comes to the development of a new active ingredient [...] there is a critical mass restriction. A number of companies work on this, but it is the large global companies that have such critical mass [...]. Critical mass means the capability to run projects from inception all the way to Annex I registration: this does not only mean downstream sales." As regards the integrated approach of global integrated players, FMC observed that "[t]he large global R&D companies (Bayer, Syngenta, BASF, Dow and DuPont) have both discovery capabilities and the critical mass to develop many of the molecules they discover. [...] The other main difference is in the size of the critical mass – with a similar R&D expenditure as a percentage of turnover, these companies have much more budget, and they have a sizeable organisation. [...]. One of the reasons why FMC decided to go out of active discovery has to do with this. By spending less on discovery, FMC could focus on building more development capabilities".¹⁶⁵⁴
- (2255) Other respondents to the market investigation confirmed the qualitative gap between integrated players and players which are not active throughout the whole R&D pipeline. For instance, Sumitomo indicated that "*Monsanto and FMC are not seen as true competitors from the new product development point of view as Monsanto is not active in molecule screening and FMC does not have a discovery screening team*".¹⁶⁵⁵
- (2256) More specifically, as to the reasons why a player not active at discovery level like FMC cannot play the same role as integrated players, besides the size of the investment in R&D, these are related to the fact that these companies cannot independently direct their R&D effort as they have to rely exclusively on the discovery output of other companies.
- (2257) In particular, while FMC can develop molecules it in-licenses from other companies, it cannot target its R&D effort autonomously to innovation spaces. It can of course pursue a given strategy by deciding which AIs it wants to in-license. However, this strategy is limited by whichever AIs are available for in-licensing through the

¹⁶⁵² Agreed non-confidential minutes of a call with a competitor, 7 April 2016 (ID8260).

¹⁶⁵³ Agreed non-confidential minutes of a call with an adviser, 17 March 2016 (ID8246).

¹⁶⁵⁴ Agreed non-confidential minutes of a call with FMC, 10 October 2016 (ID8898).

¹⁶⁵⁵ Agreed non-confidential minutes of a call with Sumitomo, 27 September 2016 (ID8581).

discovery output of other companies. As described by an R&D-integrated competitor, "FMC does not conduct discovery but focuses on formulation development. In particular, the R&D budget they have is more limited [...] While it is a medium sized player in crop protection business, its efforts and ability as an R&D player hence have limitations. [...] Companies with discovery capabilities can focus their R&D priorities on segments which are relevant to the market and not covered by other solutions. The absence of discovery means there is no such possibility. Companies without own discovery, like FMC, can at best bring molecules discovered by other companies".¹⁶⁵⁶

(2258) In conclusion, while the Commission will consider FMC's activities where relevant for the assessment, the Commission finds that FMC does not currently have integrated R&D capabilities at any comparable level as the Parties and the other three global R&D-integrated players and thus considers that FMC is a distant competitor of the Parties and the other global R&D-integrated players as regards innovation competition.

8.6.3.3. Other possible innovation players (such as Isagro and generics)

(2259) The third example offered by the Parties [...] is UPL. The Parties indicate that UPL engages in collaborative innovation and commercialisation agreements to bring products developed by smaller companies to the market. As an example, the Parties quote a partnership with ISK of Japan, which was expanded in 2012, aimed at the launch of two new insecticides of ISK in India, and UPL plans to ramp up its manufacturing capacities to produce ISK products for global sales.

(2260) The Commission observes firstly that the agreement between ISK and UPL does not cover Europe. Secondly, as confirmed by UPL, this company never developed any patented AI in Europe, not even through cooperation with third parties.¹⁶⁵⁷

(2261) In presentations and submissions concerning R&D, the Parties also identified Isagro as a company active in crop protection R&D.

(2262) Isagro considers itself to be the only non-Japan based crop protection company besides the Big 5 with activities and capabilities in the discovery of new AIs. However, when considering its revenues and financial capabilities, Isagro is far behind the leading crop protection players. Phillips McDougall reports that, in 2014, Isagro was the [...] crop protection company by revenues, with agrochemical sales of USD [...] (see Figure 117). When assessing the considerable costs associated with the development of new AIs, Isagro cannot be considered a player capable to compete with the Big 5 in its capabilities to discover, develop and register new AIs.

(2263) The data submitted by the Parties confirm that, over the past decade, Isagro accounted for very few ([...]) new AI launches, thanks to cooperations with other companies.¹⁶⁵⁸

(2264) Isagro itself acknowledged that "*is not able to develop active ingredients on its own. 16 years ago, Isagro tried to develop two molecules on its own, but this was a strategic mistake and failed for inadequate scale both financial and organisational.*

¹⁶⁵⁶ Agreed non-confidential minutes of a meeting with a competitor, 7 November 2016 (ID9399).

¹⁶⁵⁷ Agreed non-confidential minutes of a call with UPL, 29 November 2016 (ID9615).

¹⁶⁵⁸ See list of AIs provided in Parties' response to the Commission's request for information RFI 26, Annex 2.1.

*Consequently, Isagro decided not to develop molecules on its own: co-development is now used as a strategy".*¹⁶⁵⁹

- (2265) In their submissions, including the response to the Article 6(1)(c) Decision, the Parties argue that there also are generic companies such as Arysta and Adama who have R&D expenditure towards the crop protection markets.
- (2266) The Parties themselves acknowledge, however, that the expenditure of these companies is aimed at "*investing significantly in modern formulation technologies*".¹⁶⁶⁰ As explained in Section 8.2, new product formulations may be relevant in meeting the demand and needs of farmers and growers, however they are not themselves activities that can be compared to the introduction of new AIs to crop protection markets as regards the assessment of crop protection competition.
- (2267) Moreover, when describing the difference in the approach to product development of generic companies, Arysta highlights that "*[u]nlike the big 5 multinational companies, which make their own active ingredients (AIs), Arysta starts from the identification of market needs through distribution channels, and builds a portfolio to meet these. Arysta is this market driven, not molecule driven*".¹⁶⁶¹
- (2268) In conclusion, the Commission finds that other crop protection players are either not active in the discovery and development of new AIs, or are distant competitors of the Parties and the other global R&D-integrated players as regards innovation competition.

8.6.3.4. Japanese Companies

(A) Introduction

- (2269) The Parties submit that Sumitomo is a competitor which has an R&D engine. Besides Sumitomo, the Parties indicate a number of other companies based in Japan as competitors in innovation, with particular regard to discovery. For instance, in a letter addressed to the Commission,¹⁶⁶² the Parties submit that "*there are a large number of players in the discovery space. The parties have provided evidence that over 30 innovators are active in discovery. This number also includes many Japanese innovators, who tend to either develop and launch their innovations themselves outside Japan (for example, Sumitomo) or license them to other companies active in development. There is clearly intense discovery competition today, and there will continue to be a sufficient number of independent discovery players post-merger*".
- (2270) The role of Japanese companies is further discussed in more detail, among others, in a report submitted by the Parties¹⁶⁶³ and in the Parties' response to the Statement of Objections.¹⁶⁶⁴ In one presentation, the Parties represent a large number of firms, most of which Japanese, having introduced new AIs.

Figure 120 – [...]

[...]

¹⁶⁵⁹ Agreed non-confidential minutes of a call with a competitor, 6 September 2016 (ID7111).

¹⁶⁶⁰ See for instance Parties' response to the Article 6(1)(c) Decision, paragraph 32.

¹⁶⁶¹ Agreed non-confidential minutes of a call with Arysta, 27 September 2016 (ID8568).

¹⁶⁶² Parties' letter to DG Competition of [date].

¹⁶⁶³ Parties' submission entitled [...].

¹⁶⁶⁴ Parties' response to the Statement of Objections, pages 80-101.

(2271) When looking at the players within the crop protection industry, there appears to be a large number of companies based in Japan with some R&D activities. Industry reports, such as Phillips McDougall Agriservice,¹⁶⁶⁵ report activities of ten or more companies based in Japan, such as Sumitomo Chemical, Agro-Kanesho, Hokko, Ishihara Sangyo Kaisha (ISK), Kumiai, Kyoyu Agri, Mitsui Chemicals, Nihon Nohyaku, Nippon Soda, Nissan Chemical.

(2272) This landscape of a plurality of Japanese companies active in crop protection is in contrast with the high concentration of companies with R&D assets in the rest of the world. There are different possible explanations due to historical evolution, market features and technological outlook for such a different market structure of the crop protection markets in Japan as opposed to the rest of the global crop protection markets. It is, however, relevant to assess the capabilities of those Japanese companies and the constraint they exert on the Big 5 as regards innovation competition, in particular for Europe.

(B) Companies have different regional focus

(2273) As already explained in Section V.4.2.2, a number of regional factors justify the different geographical focus of companies' innovation efforts namely the specificities of different regions of the world as regards (i) the main crop and pests, (ii) the weather and soil conditions (companies that want to have a strong presence in a given region need to have assets for testing in those regions), and (iii) the regulatory requirements (in particular, in the Union the registration requirements are tougher than in most of the other regions).

(2274) The Parties claim that Japanese innovators are expanding their focus and are no longer only focussing on their own market. However, on the basis of the results of the market investigation, the Commission finds that Japanese companies target the domestic market, and have an expertise focused on domestic crop and pest combinations.

(2275) The primary target of the R&D effort of Japanese companies is the Japanese market. In particular, Japanese companies target domestic crops and pests. As explained by a competitor who co-operates with a number of Japan-based R&D companies, "*[t]heir research is predominantly focused on the needs of the Japanese agricultural market*".¹⁶⁶⁶ In terms of crops, the Japanese market is dominated by rice, which alone consistently accounted for more than one third of crop protection sales in Japan every year for the past six years.¹⁶⁶⁷ These do not include important crops for Europe such as cereals and oilseed rape.¹⁶⁶⁸ As indicated by another competitor, "*Japanese companies mainly focus on local crops, particularly rice*".¹⁶⁶⁹ As stated by Bayer, "*[t]he experience of Japanese companies is generally considered to be lower for the important European crops like cereals, oilseed rape, corn, sugarbeet*".¹⁶⁷⁰

¹⁶⁶⁵ For instance, the Phillips McDougall Agriservice – Companies – Sections of October 2015.

¹⁶⁶⁶ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹⁶⁶⁷ See for instance Agrow Informa Report – Japan Pesticides Market 2015, Table 3 (data 2009-2014).

¹⁶⁶⁸ [Internal document] (ID7081-2774).

¹⁶⁶⁹ Agreed non-confidential minutes of a call with a competitor, 10 October 2016 (ID8898). See also to Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

¹⁶⁷⁰ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

- (2276) The market investigation suggested that the discovery targets of the Japanese companies are mostly domestic crop/pest combinations, and that in case a new active has promising applications in other markets it is often developed by or in cooperation with one of the largest R&D-integrated players.¹⁶⁷¹ An exception to this may be Sumitomo, which brought to the broader market globally a few AIs. However, the analysis of patent data shows that Sumitomo brought in the past good quality innovations mainly in herbicides, and among the [...] highest quality innovations developed by Sumitomo one innovation is particularly focused on the rice crop, which is the main crop in Japan, contrary to the EEA (see Annex 1).
- (2277) As one competitor indicated, molecules discovered by Japanese companies "*are very selective or specialized molecules focusing on niche markets*".¹⁶⁷²
- (2278) Because of the domestic focus of R&D of Japanese companies, the relevance of AIs discovered by Japanese companies for other geographies is normally ancillary, that is to say they are introduced in markets other than Japan for similar crop/pest combinations when they meet the necessary regulatory standards. As regards applications for other crop/pest combinations which are not specific to Japan, these are typically not the main target of the R&D efforts. As described by one of the five global R&D-integrated players, "*Japanese companies have discovery capabilities, but their focus is domestic. With regard to crops, this means they focus particularly on R&D for domestic crops, mainly rice and fruits and vegetables, but not cereals. The Japanese compounds are brought elsewhere to the extent that they have applications which are relevant in other parts of the world, but these are not the main focus in their R&D efforts*".¹⁶⁷³
- (C) Each of the Japanese firms is, on its own, of a much smaller size than the Big 5 both in terms of turnover and R&D expenditure
- (2279) While there are several Japan-based companies active in R&D crop protection, when looking at crop protection sales at global level, their turnover is not comparable with sales by the Big 5. The result of this analysis does not change when looking for robustness at European sale.
- (2280) In the Figure 121, it is possible to see the Global and European sales of crop protection of the Big 5, as well as the sales of Japan based companies with sales reported in Agrowin.

Figure 121 – Sales of R&D players in 2015 – Big 5 and Japan - Global

[...]

Source: Commission's analysis of Agrowin

¹⁶⁷¹ For instance, Bayer developed and registered Flubendiamide discovered by Nihon Noyaku. As observed by a competitor responding to Questionnaire to Crop Protection Competitors (Q2), question 43.2: "*many Japanese R&D companies have limited market access outside Japan, so such companies need to collaborate with other companies. So the collaboration between multinational companies and Japanese company is quite common*" (ID9444). Of the customers responding to Questionnaire to Crop Protection Customers (Q1), question 63, more than half indicated they did not know whether Japanese companies are active in Europe.

¹⁶⁷² Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

¹⁶⁷³ Agreed non-confidential minutes of a meeting with BASF, 7 November 2016 (ID9399).

Figure 122 – Sales of R&D players in 2015 – Big 5 and Japan – Europe

[...]

Source: Commission's analysis of Agrowin

- (2281) As results evident from the two charts, the Japanese companies individually are much smaller than the Big 5 as concerns sales both when considering global sales and when considering European sales.
- (2282) The smaller turnover also results in significantly lower R&D budgets for Japan-based companies as compared to the large global R&D-integrated players, as it is clear from Figure 117. For instance, in 2014, Sumitomo had a budget (USD [...]) that was approximately half of the R&D budget of DuPont in the same year (USD [...], DuPont being the smaller of the Parties). The next Japanese company by R&D expenditure is ISK, with USD [...], approximately [...] % of DuPont's budget. All the other ones are below USD [...], below [...] % of the budget of DuPont.
- (D) Different from the Big 5, Japanese companies generate a significant part of their turnover in Japan
- (2283) The domestic focus of Japanese companies is confirmed by the analysis of the proportion of their sales generated in Japan as opposed to countries different than Japan. While Japan is a very small proportion of sales of global R&D-integrated companies, it alone represents [...] % of the turnover of almost all Japanese companies.
- (2284) Comparing the value of the sales worldwide with and without Japan it is possible to conclude that, compared to the Big 5, a large portion of these companies' sales takes place in Japan.

Figure 123 – Sales worldwide with and without Japan per company (2015)

[...]

Source: Commission's analysis of Agrowin

- (2285) The largest of these companies by sales is Sumitomo. While this company intends to develop more AIs for Europe,¹⁶⁷⁴ it acknowledges that it *"lacks of global geographic coverage in the test of field trials. For instance, the biggest footprints in registration capabilities, R&D and marketing are in USA, France and Italy. Most specifically on the European zone, in Germany the company does not own a proper footprint; in the UK the size of the footprint is minimal and has not a full capability; in Spain there is a Joint Venture footprint and there is a lack of footprints in East Europe. Local footprint is necessary for the registration of product formulations."*¹⁶⁷⁵
- (E) The domestic focus of Japanese companies is confirmed by the number of AIs originating in Japan and then launched worldwide or in the EEA
- (2286) The Parties contend that the importance of Japanese innovators cannot be dismissed because of their limited sales outside of Japan. In particular, they insist on the argument that also smaller companies are important and sales of active ingredients of Japanese origin are not indicative of the significance of Japanese companies.

¹⁶⁷⁴ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8219).

¹⁶⁷⁵ Agreed non-confidential minutes of a call with Sumitomo, 27 September 2016 (ID8581).

- (2287) The Commission will discuss more broadly the commercial impact of Japanese innovations when assessing the shares in the turnover of new AIs, and in particular in Section V.8.6.3.5.
- (2288) As regards the Parties' argument, however, the Commission finds that also different indicators confirm that Japanese companies are not significant innovators for markets outside of their domestic market. Aside from the evidence on regional focus, and consistently with the findings on the low turnover outside of Japan, the Commission finds that while Japanese companies are responsible for a number of new AI launches at global level, these AIs may not be registered in any other geography.
- (2289) When looking merely at the number of AIs introduced in Europe, based on the list of new AIs provided by the Parties,¹⁶⁷⁶ between 1995 and 2015, there were [...] AIs developed by Japanese companies either alone or in co-developments. Of these, [...] AIs (representing [...]%) have not been launched in the EEA. Between 2005 and 2015, the ratio of the number of AIs developed by Japanese companies but not launched in the EEA [...], as Japanese companies (co-)developed [...] AIs out of which [...] ([...])% have not been launched in the EEA.
- (2290) Moreover, the number of AIs developed by Japanese companies represents a smaller proportion of the AIs launched in the EEA compared to global launches. For example, although the number of AIs developed between 2005 and 2015 by Japanese companies represents around [30-40]% of total global launches and [30-40]% if one considers also AIs co-developed by Japanese companies, as regards the EEA, the number of AIs developed by Japanese companies and launched between 2005 and 2015 and further introduced in the EEA represents only [10-20]% of AIs launched in the EEA, or [20-30]% if one takes into account the co-developments.¹⁶⁷⁷ As it will be further explained below, however, even those that have applications for the EEA do not achieve a comparable turnover as AIs developed by the Big 5.
- (2291) Finally, in recent years, the Japanese firms tend to introduce in the EEA fewer of the number of AIs they launch. Table 52 shows that the average number of AIs developed worldwide by Japanese firms, including co-developments, fell from 4.0 during the period 1995-2000 to 2.0 during the period 2010-2015.¹⁶⁷⁸ Amongst those, the ones further introduced in the EEA also fell from 1.8 to 0.3. Therefore, the current impact of the inventions from Japanese firms is more limited than it used to be in the past.

¹⁶⁷⁶ Parties' response to the Commission's request for information RFI 38, question 5 (see Annex 3 for more details on the data).

¹⁶⁷⁷ The Japanese firms developed on their own [...] AIs which have been launched on a global basis between 2005 and 2015, as well as [...] in co-development with the Big 5, out of [...] AIs overall in the same period. Amongst these AIs, [...] were further launched in the EEA, from which [...] were developed by Japanese firms on their own and [...] in co-development with the Big 5.

¹⁶⁷⁸ In order to provide a comparable statistics for both active ingredients eventually launched in the EEA and those not launched in the EEA, each period refers to the year in which the active ingredient was reported by the Parties to be first launched, irrespective of the region in which it was first launched.

Table 52 – Evolution of the average number of AIs launched, by different groups of R&D players in charge of the development of these AIs, between 1995 and 2015

	Average number of AIs launched worldwide				Average number of AIs further introduced in the EEA			
	1995-2000	2000-2005	2005-2010	2010-2015	1995-2000	2000-2005	2005-2010	2010-2015
Big 5	5.7	5.0	3.8	3.0	4.2	3.8	2.8	1.8
Big 5 / JP	0.8	0.3	0.5	0.0	0.5	0.2	0.5	0.0
Big 5 / Other	0.2	0.2	0.2	0.0	0.0	0.2	0.2	0.0
JP	3.0	3.2	2.2	2.0	1.2	1.2	0.7	0.3
JP / Other	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Other	2.2	0.8	1.5	0.3	1.0	0.2	0.5	0.2
<i>All JP</i>	4.0	3.5	2.7	2.0	1.8	1.3	1.2	0.3
<i>All firms</i>	12.0	9.5	8.2	5.3	7.0	5.5	4.7	2.3

Source: Commission's analysis of Parties' response to the Commission's request for information RFI 38 (see Annex 3 for more details on the data)

Note: The table on the left averages the number of AIs which have been launched on a worldwide basis during the period indicated

The table on the right averages the number of AIs which have been launched on a worldwide basis during the period indicated and further introduced in the EEA

"Big 5" stands for BASF, Bayer, Dow, DuPont and Syngenta; "JP" stands for all Japanese firms identified as solely in charge of the development of the AI; "Big 5 / JP" stands for identified instances of co-developments between Japanese firms and the Big 5; "Other" stands for firms that are not reported in neither "Big 5" nor "JP", developing on their own or in co-development with the Big 5 or with a JP

(2292) As observed by a competitor, "Japanese companies are not comparable to big 6 (or 4 as we anticipate) R&D companies. They create new molecules focusing primarily on their own domestic market, which is not peculiar because they have not invested heavily in European marketing channels. Their focus is on their home market, first and foremost [...]. They do not target the European market. They primarily seek herbicides, fungicides, and insecticides for rice and other crops present in their geographic area. Occasionally their molecules have also application in European agriculture. Such molecules are then licensed by the large multinationals to be developed in Europe".¹⁶⁷⁹

(F) Japanese firms have limited capabilities to develop products for other geographies, and in particular for the EEA

(2293) The limited constraint exerted by Japanese companies on global integrated players is corroborated by the fact that, even in those cases where molecules that they discover turn out to have interesting applications in other markets, particularly in Europe, Japanese companies have limited development capabilities outside of Japan and more specifically in Europe. This is due to a number of factors, which explain why Japanese companies are distant competitors compared to global R&D-integrated companies.

(2294) **First**, there is a financial factor, which is a result of what has been described in recitals (2279) to (2282). In particular, Japanese companies (both individually

¹⁶⁷⁹ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

considered and overall) have much more limited turnover and financial resources to invest in development. When considering their global footprint, moreover, the proportion of turnover they generate outside of Japan is considerably less than that generated by the global R&D-integrated companies. As described by BASF, "[t]he main driver for the Japanese companies to co-develop active ingredients was the lack or reduced scope of their own R&D, sales and marketing organizations outside of Japan. It is unlikely that development without the collaboration could have been completed."¹⁶⁸⁰

- (2295) **Second**, the limited availability of these resources is a constraint on their capabilities particularly in Europe, in light of a very challenging regulatory environment that requires more significant financial investment. Nihon Nohyaku, for instance, has been indicated by the Parties as an example of a successful innovator based in Japan, despite the fact that the leading new AI by sales of this company was co-developed globally with Bayer. As regards development capabilities in Europe, the company observed that "[o]n a global basis, the current R&D goal of [...] is to develop a new active ingredient every 3 years. Nevertheless, this target cannot be achieved in Europe due to regulatory issues. Indeed, even if the company discovers a new active ingredient, it may not be able to develop it in Europe as there are severe data requirements and a strict European regulation".¹⁶⁸¹
- (2296) Another competitor stated that "Japanese R&D companies are sometimes hesitant to enter the markets in Europe or they do not focus on Europe as a first priority market due to the existing regulatory challenges and limited financial resources available (eg: due to uncertainties regarding registrability and relatively higher regulatory costs, they predict a higher expected return on investment elsewhere eg in Americas, as a result of which it will be more difficult to justify an investment in Europe)". This competitor added that "[Japanese company] active ingredients are not being specifically developed for the European market, but more for the Asian or American markets".¹⁶⁸²
- (2297) **Third**, another factor is the non-availability of development assets in Europe. The Japanese companies with a more international footprint have to some extent tried to overcome this lack of assets through a strategy of acquisition of assets in Europe.
- (2298) The Parties claimed that there are third-party providers of services (Contract Research Organisations) which offer some of the services required to perform the necessary regulatory studies and field trials. However, third party organisation cannot entirely replace the availability of in-house development and in particular registration capabilities.
- (2299) While Contract Research Organisation may provide some flexibility they cannot replace a company's own resources and capability. For instance, BASF stated:¹⁶⁸³
"[t]he use of contract research organization has major limitations (...) cases of complete outsourcing of the whole development and registration process are not known to BASF. (...) Own company knowledge and experience with similar projects

¹⁶⁸⁰ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

¹⁶⁸¹ Agreed non-confidential minutes of a call with Nihon Nohyaku, 27 September 2016 (ID8659).

¹⁶⁸² Agreed non-confidential minutes of a call with competitor, 2 June 2016 (ID9323).

¹⁶⁸³ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

is of paramount importance to the success of the development process and such competencies are normally found only internally".

- (2300) Even one of these Contract Research Organisations, responding to the market investigation, confirmed that the services offered to third parties cannot replace internal capabilities, and does not enable Japanese companies to overcome their limitations. In particular, "*[t]he need to perform activities in house explains why it is not possible for a company to simply discover a molecule and try to bring it to market relying on third parties, beyond the costs involved. There are development activities that need to be performed in-house. Once a molecule is discovered, to make such discovery a commercial success within a foreseeable timeframe, companies need to have a proper understanding of their molecule and know how to 'oil' the development process, taking into consideration the market and the market field, the production cost, the regulatory process, the needs of the farmers etc. Developing the molecule in line with the knowledge acquired via the commercial expertise is fundamental for its commercialisation. These are the core activities of a crop protection company and are very complex. If a player with no development capabilities were to ask services from [CONFIDENTIAL], these could be performed to have a better picture of the molecule, but the commercialisation would have to happen through companies that have development activities and can distribute and commercialise the molecule.*"¹⁶⁸⁴
- (2301) **Fourth**, on top of the limited resources, the lack of track-record in development of products for Europe means the Japanese companies have generally not built regulatory expertise for Europe. As indicated by Bayer, "*[f]urthermore, Japanese companies are usually less experienced with the specific EU regulatory requirements and often co-operate with European partners to obtain product registrations*".¹⁶⁸⁵
- (G) Because of the constraints on their budget and development abilities, even when AIs have promising applications outside of Japan, Japanese firms co-develop them with the Big 5
- (2302) The combination of the domestic research focus, predominantly domestic sales, and limited development abilities overseas has as a consequence that, even in those cases where a new AI discovered by a Japanese company has promising applications for wider use and commercialisation, the most credible route to development and sale of these AIs is through co-development normally involving one of the five global R&D-integrated players.
- (2303) The Big 5 have the resources, ability and route to market to bring new AIs from the discovery stage to launch, thus they are the main channel for the launch of Japan-based AIs to the market. The need and opportunities of cooperation with the five global R&D-integrated players was broadly confirmed by the market investigation.

¹⁶⁸⁴ Agreed non-confidential minutes of a call with a Contract Research Organisation, 7 November 2016 (ID9574). The same respondent stressed that "*[t]he reason however why in most cases they do not go the full lengths and launch in the EU markets themselves after the CROs have carried out the necessary studies for them is due to their lack of embeddedness in the EU markets. Scientific tests and studies in themselves are insufficient without the proper understanding of fit to farmers' needs and distribution realities. CROs cannot help them in that regard. Distribution, technical services, sales, know-how on the market, are amongst the most important elements in making a molecule a success and these are not available neither for the Japanese companies Japanese companies nor for the CROs*".

¹⁶⁸⁵ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

As explained by a competitor: "[o]ften these molecules end up being introduced by the Big R&D players as they are perceived as far more attractive partners due to their domination of marketing and sales channels and product / registration development prowess".¹⁶⁸⁶ Bayer observed that this is a common issue for all Japan-based companies, with the only possible exception of Sumitomo: "Japanese companies typically use the large players to sell in Europe, and cooperate with licences. Sumitomo is an exception, as it has also built up a distribution network".¹⁶⁸⁷

- (2304) [R&D information].
- (2305) Similarly, DuPont further developed two important chemical classes discovered by Japanese companies: sodium channel blockers and diamides. In fact, DuPont – and not the original Japanese discoverers of the chemical classes – owns the patents to the globally successful products related to these two chemical classes: Indoxacarb, Rynaxypyr, and Cyazypyr. This suggests that the Japanese companies were not able to make the additional development steps necessary to develop further these chemical classes to bring their discoveries to the market. This is consistent with their limited development capabilities.
- (2306) This business model is seen as mutually beneficial by the companies involved, as leading R&D companies can increase their portfolio, while the Japanese companies can benefit from their superior capabilities. As explained by Syngenta "[t]he rationale of a cooperation would be to develop the products in countries or crops where we have better development capability or better market access than the Japanese company. The company which discovered the molecule would have found it difficult to proceed the development alone due to inexperience in crops, markets or specific regulatory requirements and lack of an organizational footprint".¹⁶⁸⁸
- (2307) Even in cases where a Japanese company may have capabilities to bring a molecule to Europe, leading R&D-integrated companies offer better prospects of success. Bayer for instance indicated that "an important business rationale for Japanese companies has often been the broad market access (through existing business, understanding of customer needs, customer / channel relationships, local sales force, etc.) which e.g. Bayer can provide as a development and marketing partner, in order to provide sufficient value generation".¹⁶⁸⁹ Another relevant element is the risk-sharing in light of the significant investment required to develop for Europe.¹⁶⁹⁰
- (2308) As indicated by a competitor, "their impact is different from the global crop protection company[ies]. What has ultimately impact is both the quality of the molecules, and also the company's presence and its access to the market. Dow and DuPont, like other global R&D companies, have a very strong market presence, including Europe, thus they have an advantage in launching new active ingredients".¹⁶⁹¹ Another competitor also stressed that "[o]ften these molecules end up being introduced by the Big R&D players as they are perceived as far more

¹⁶⁸⁶ Agreed non-confidential minutes of a call with competitor, 15 July 2016 (ID8259).

¹⁶⁸⁷ Agreed non-confidential minutes of a call with Bayer, 5 April 2016 (ID8248).

¹⁶⁸⁸ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

¹⁶⁸⁹ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

¹⁶⁹⁰ See for instance Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8416).

¹⁶⁹¹ Agreed non-confidential minutes of a call with a competitor, 29 November 2016 (ID9615).

attractive partners due to their domination of marketing and sales channels and product / registration development prowess".¹⁶⁹²

- (2309) When looking at revenues generated by new AIs launched in the EEA during 2006-2015, with the exception of one AI co-developed by a Japanese company with Bayer, none of the twenty new AIs which generated the highest revenues in the EEA in 2015 has been developed by a Japanese company. The first AI developed by a Japanese firm ranks [...] in terms of turnovers generated in the EEA.¹⁶⁹³

Figure 124 – Turnover generated in the EEA in 2015 by AIs launched during 2006-2015 in the EEA, ordered decreasingly and identified by the type of R&D players which (co-)developed these AIs

[...]

Source: Commission's analysis of Parties' response to the Commission's request for information RFI 38 (see Annex 3 for more details on the data)

Note: Each bar measures the turnover generated in the year 2015 by one product launched between 2006 and 2015 in the EEA, and the value attached to the first bar is USD [...] million

The horizontal axis indicates the type of companies which (co)developed the products generating this turnover: "Big 5" (BASF, Bayer, Dow, DuPont and Syngenta), "JP" (Japanese companies, for example Sumitomo) or "Other"

- (2310) Moreover, Table 54 shows the relative importance of sales of products related to AIs launched in the EEA during 1996-2015. Most of the sales in the EEA (of AIs launched in the EEA during 1996-2015) result from AIs introduced by the Big 5 either on their own ([...]%) or in co-development with Japanese firms ([...]%) or with other firms ([...]%), while Japanese firms collectively generate [...]% of these sales. This further confirms that the Japanese firms do not achieve significant levels of sales in the EEA with products they launch in the EEA.
- (2311) The Commission notes that the sales outside the EEA of AIs introduced in the EEA exhibit different patterns. The AIs co-developed between the Big 5 and Japanese firms have more important sales than in the EEA, in relative terms ([...]% in Japan), than those of the AIs developed by the Big 5 on their own ([...]% in Japan), and the AIs developed by Japanese firms take a share of [...]% of the sales. The situation outside the EEA and Japan is in between the situation in the EEA and Japan.
- (2312) In other words, the success of products launched in the EEA and co-developed by the Big 5 and the Japanese firms, as well as those developed by Japanese firms, is higher, in relative terms, outside the EEA than in the EEA, which confirms that Japanese companies do not focus in Europe, but mostly in Japan.

¹⁶⁹² Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

¹⁶⁹³ The same conclusions hold when looking at revenues generated in 2015 by new AIs launched during 2006-2015 and further introduced in the EEA. Amongst the [...] such AIs, the ten AIs which generated the highest revenues in the EEA in 2015 have been exclusively developed by the Big 5, and the first AI (co-)developed by a Japanese firm ranks [...].

Table 53 – Share of 2015 sales value related to AIs launched in the EEA over 1996-2015 by different groups of R&D players in charge of the development of these AIs, in each of the EEA, Japan and worldwide outside EEA and Japan

	Big 5	Big 5/JP	Big 5/Other	JP	JP/Other	Other
EEA	[80-90]%	[5-10]%	[0-5]%	[5-10]%	[0-5]%	[5-10]%
Japan	[50-60]%	[20-30]%		[10-20]%		[5-10]%
Global outside Japan and EEA	[70-80]%	[10-20]%	[0-5]%	[5-10]%	[0-5]%	[10-20]%

Source: Commission's analysis of Parties' response to the Commission's request for information RFI 38 (see Annex 3 for more details on the data)

(2313) In Section V.8.6.3.5, the Commission analyses the turnover generated by AIs launched during 2006-2015 and further introduced in the EEA (Table 56). The results therewith presented corroborates the conclusions about the relative importance of sales of products related to AIs launched during 2006-2015 and further introduced in the EEA (see Table 54). Moreover, consistently with what is shown in Figure 124, most of the sales in the EEA (of AIs launched during 2006-2015 and further introduced in the EEA) result from AIs introduced by the Big 5 either on their own ([...])% or in co-development with Japanese firms ([...])% or with other firms ([...])%, while Japanese firms collectively generate [...]% of these sales.

Table 54 – Share of turnover generated in 2015 by AIs launched during 2006-2015 and further introduced in the EEA, for different types of R&D players which (co-)developed these AIs, in each of the EEA, Japan and worldwide outside EEA and Japan

	Big 5	Big 5/JP	Big 5/Other	JP	Other
EEA	[90-100]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Japan	[70-80]%	[10-20]%		[10-20]%	
Global outside Japan and EEA	[80-90]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%

Source: Commission's analysis of Parties' response to the Commission's request for information RFI 38 (see Annex 3 for more details on the data)

(2314) The need to cooperate to launch new AIs has also been offered by market participants as an explanation for why Japanese companies, though numerous and active in R&D, have not gained scale on the global stage at a level comparable with Bayer, BASF, Dow, DuPont and Syngenta. As acknowledged by Syngenta, "Japanese companies are very innovative however tend not to have the global reach that would allow them to occupy large market shares outside of Japan".¹⁶⁹⁴

(2315) The methodology used to calculate these revenue shares may also overestimate the importance of AIs developed by other players. This is due to the fact that, in the absence of more specific data, the revenues of active ingredients co-developed by a Japanese company together with one of the large companies has been equally shared between the co-developing companies. This may overestimate the share of the value obtained by Japanese companies compared to the Big 5. The most significant example of co-development, for instance, is the co-development of Flubendiamide by Bayer and Nihon Nohyaku. The share allocation does not keep into account that Bayer brings Flubendiamide to market in most geographies globally (including in the

¹⁶⁹⁴ Agreed non-confidential minutes of a call with Syngenta, 6 September 2016 (ID7383).

EEA), so that even the Parties in their submission mostly refer to Flubendiamide as "*Bayer's Flubendiamide*".

(H) Japanese companies' ambitions to expand face significant challenges, and may be aimed at reaching better terms in negotiations with other companies

- (2316) In their response to the Statement of Objections, the Parties submit that respondents within the market investigation confirmed a trend under which Japanese companies would be increasingly interested in market opportunities outside of Japan, and have acquired assets overseas so as to enhance their capabilities. Some players have indeed indicated that, particularly in light of possible changes in the domestic market, Japanese companies may be increasingly looking for revenues outside of Japan, and their focus on domestic crops "*may change in the future as Japanese firms will increasingly take US and European crops/needs into account in their discovery process*".¹⁶⁹⁵
- (2317) These findings, however, are not corroborated by the broader results of the market investigation, which instead confirmed persistent limitations for Japanese companies. The alleged shift in focus has not been met so far by an increase in size or capabilities enabling them to change their strategy.
- (2318) The Parties themselves seem to estimate that, despite their ambition to expand elsewhere, they may still face considerable challenges. [Internal document].¹⁶⁹⁶
- (2319) As previously explained in this section, Japanese companies cannot fully solely rely on Contract Research Organisation to bridge gaps in their development capabilities outside of Japan. Moreover, a Contract Research Organisation explained that the perceived increasing effort of Japanese companies through Contract Research Organisations could be motivated by a strategic decision to have more information about the molecule's potential application in Europe in order to retain more value when negotiating co-developments with leading players. In particular, "*[o]ver the last decade, Japanese companies have pushed the interface with their global companies further down the process, i.e. they run more and more tests before licensing. They first carry out testing in Europe and subsequently, at a later stage, interface themselves with the global companies which further the process of development and distribution. This is because Japanese companies realised they may lose part of the value share in the agreements if they do not know well the profile of their product, the strengths, and the applications. Knowledge is power in this respect, thus the better they know the molecule through testing before the negotiations, the better position they will be in when they negotiate licenses or co-developments.*"¹⁶⁹⁷
- (2320) Japanese companies also tried to explore different models than cooperations with the global five R&D-integrated companies to expand in Europe. For instance, some Japanese companies (among which Mitsui & Co) has a 65% interest in Certis, a company which is meant to offer an alternative route to distribution in European markets for Japanese companies. This model, which is mainly aimed at distribution of products, has not however enabled companies to overcome their general

¹⁶⁹⁵ Agreed non-confidential minutes of a call with a competitor, 8 September 2016 (ID9312).

¹⁶⁹⁶ [Internal document] (ID6748-10585).

¹⁶⁹⁷ Agreed non-confidential minutes of a call with a Contract Research Organisation, 7 November 2016 (ID9574).

limitations as described in this section. Certis itself, for instance, acknowledged that "*[p]rofitability of patented AIs in Europe by Japanese companies is lower than those patented by multinationals. Considering the number of patented AIs, Japanese companies generate disproportionately little revenue. This is because the R&D of Japanese companies is still largely influenced by the needs of the Japanese market, which differ considerably from the European market. Japanese products are not focused on the main crops in Europe*".¹⁶⁹⁸

(2321) In conclusion, while the Commission will consider the activities of Japanese companies where relevant for the assessment, and in particular those of Sumitomo, the Commission finds that Japanese companies are distant competitors of the Parties and the other global R&D-integrated players as regards innovation competition.

8.6.3.5. Quantitative metrics confirm that the five global R&D-integrated players play a predominant role in crop protection innovation

(2322) In the previous section, the main arguments have been set out explaining why other players are not significant competitors of the Parties at industry level in crop protection innovation. It is, however, relevant to complement the assessment with the findings of a quantitative analysis based on different metrics for innovation competition in the industry.

(2323) The Parties proposed to rely on the total number of patent applications as a metric. According to their submission, there would be a number of alternative companies, mostly based in Japan, displaying patent applications for crop protection, thus testifying their capabilities at the discovery level.

(2324) As regards patent applications in crop protection for the period 2000-2015, the Big 5 own more than [70-80]% of the patent applications filed in any EEA country and active on 31 December 2015.¹⁶⁹⁹ The HHI associated to this indicator is equal to [1000-1500] suggesting a concentrated industry structure. Moreover, Annex 1 on patents explains in more detail why the number of patent applications as such may not give an accurate overview of the companies' activities at discovery level.

(2325) As regards Japanese companies in particular, the Commission notes that no Japanese company is bigger than Bayer, Dow, DuPont, or Syngenta, when one considers innovations in crop protection in general.¹⁷⁰⁰ Moreover, contrary to these four R&D-integrated players who have good quality patents in herbicides, insecticides, and fungicides, each of the Japanese companies has a smaller scope of activity with good quality patents essentially in only one discipline (see Section 3. 4 of Annex 1).

(2326) In the response to the Statement of Objections, the Parties mention that this statement is incorrect, in particular by mentioning that Sumitomo's patent share in herbicides is [...] than Bayer, DuPont, Syngenta, and [...] to Dow's, that Nissan Chemical's patent share in the top 5% patents is number [...], and that Kumiai and Ihara in fungicides has a patent share [...] than Dow's and [...] to BASF.¹⁷⁰¹

¹⁶⁹⁸ Agreed non-confidential minutes of a call with Certis, 8 September 2016 (ID9312).

¹⁶⁹⁹ The five global R&D-integrated companies own [...] patent applications over [...] patent applications active in any EEA countries on 31 December 2015. The Commission considers patents filed in the EEA to focus on the innovations that can reach potentially the EEA. See Annex 1.

¹⁷⁰⁰ See [...] of Annex 1.

¹⁷⁰¹ The additional argument of the Parties on the allocation of patents co-owned by a global R&D-integrated player and a Japanese company to the global R&D-integrated player is already discussed in

- (2327) The Commission disagrees with the methodology used by the Parties to disaggregate by specific area since the objective of the Commission's analysis was to assess specifically the scope of Japanese companies against the main five global R&D-integrated players for crop protection innovation.
- (2328) As regards Herbicides, the Commission also notes when considering the highest quality patents of Japanese companies (consisting of [...] patents), which are the main drivers of the patent shares of the Japanese companies, [...] of these patents are particularly related to the rice crop, which is not the main crop in the EEA. The main crops in the EEA are cereals ([...] % of total production), maize, fruits and vegetables, vine, oilseed rape and potatoes (see Section V.1.1).¹⁷⁰² The Commission notes that the Parties did not comment on this evidence in the response to the Statement of Objections.
- (2329) Even the figures provided by the Parties themselves, based on AgChem Patent Applications 2006 – 2015, indicate a picture of an even more concentrated market (HHI of [1500-2000]), where few other companies than the Big 5 have a meaningful share of patent applications (for instance, only Sumitomo, ISK and Monsanto equal or exceed [0-5] %).¹⁷⁰³
- (2330) Another metric of relevance concerns the output of the Parties in terms of new AIs launched on the market. For instance, in a presentation provided at a meeting held on [...], the Parties provided the following overview of launches of new AIs in the period 2005-2016, showing that, while the Big 5 launched [...] new AIs, there are other companies which together launched [...] new AIs in the period 2005-2016.¹⁷⁰⁴

Figure 125 – Parties' view on AIs launched over 2005-2016

[...]

Source: *Presentation from the Parties of [...]*

- (2331) In the analysis just quoted, the Parties listed AIs with a launch date going as far back as 1945. The Commission, as explained in Section V.5.2.2, finds that an appropriate measure of the success of crop protection companies' innovation efforts at the development stage would be the calculation of the turnover of AIs recently developed and launched.
- (2332) In the Article 6(1)(c) Decision, the Commission applied this analysis to the AIs underpinning the Parties' submission represented in Figure 125 (thus launched between 2005-2016), and assessed their commercial success by their turnover generated in 2015. The list of AIs provided by the Parties encompassed AIs launched in 2016, which could not generate turnover in 2015. Moreover, one of the Parties' experts suggested that the turnover of AIs issued from co-development should be equally split between companies participating to the development effort. While the Commission observes this may not capture that the development capabilities being measured are, in line with the findings described in this section, to be attributed to

Annex 1. In summary, the Commission finds that this allocation is unlikely to affect significantly the patent shares in innovation for crop protection, in particular given that it does not concern any of the companies mentioned by the Parties in the response to the Statement of Objections.

¹⁷⁰² [...].

¹⁷⁰³ AgChem Patent Applications 2006-2015 [Parties' submission].

¹⁷⁰⁴ Parties' submission entitled [...], slide 4.

the leading crop protection company with such capabilities, the Commission has applied a 0.5 factor for each of the co-developing companies to test for a robustness of the analysis.

- (2333) In the Section V.8.7, the Commission will consider the outcome of this analysis for individual companies and provide different relevant measures to account for the evolution of the innovation effort over time. For the purposes of the present section, however, it is relevant to compare the shares of new AIs launched over 2006-2015 by the Big 5 against the turnover of AIs launched by other companies.
- (2334) When looking at the 2015 global downstream turnover of products that include new AIs launched over 2006-2015, around [...] % of the 2015 turnover is accounted by AIs launched by the Big 5.¹⁷⁰⁵ The HHI associated to this indicator is equal to [1500-2000] suggesting a concentrated industry structure.

Table 55 – Number of AIs launched during 2006-2015, identified by the type of R&D players which (co-)developed these AIs, and their worldwide turnover generated in 2015

	AIs developed by		Total
	Big 5	Other players	
Number of new AIs (#)	[...]	[...]	[...]
Number of new AIs (%)	[50-60]%	[40-50]%	[90-100]%
Global turnover in 2015 (million USD)	[...]	[...]	[...]
Global turnover in 2015 (%)	[80-90]%	[10-20]%	100%

Source: Commission's calculations based on data provided by the Parties in response to the Commission's request for information RFI 38, question 5 (see Annex 3 for more details on the data)

Notes: When an AI has been co-developed by two companies, the turnover associated to that AI was divided equally between the companies

The column Total might differ from the sum of the other columns due to number rounding

In order to provide a comparable statistics for both Table 55 and Table 56, the period refers to the year in which the active ingredient was reported by the Parties to be first launched, irrespective of the region in which it was first launched

- (2335) If one considers instead turnover in the EEA generated by AIs launched during 2006-2015 and further introduced in the EEA, around [...] % of the 2015 downstream turnover in the EEA is accounted by AIs launched by the Big 5. The HHI associated to this indicator is even higher than globally, corresponding to [2000-2500], suggesting an even more concentrated industry structure.

¹⁷⁰⁵ When an AI has been co-developed by two companies, the turnover associated to that AI was divided equally between the companies.

Table 56 – Number of AIs launched during 2006-2015 and further introduced in the EEA, identified by the type of R&D players which (co-)developed these AIs, and their EEA turnover generated in 2015

	AIs developed by		Total
	Big 5	Other players	
Number of new AIs (#)	[...]	[...]	[...]
Number of new AIs (%)	[60-70]%	[30-40]%	[90-100]%
EEA turnover in 2015 (million USD)	[...]	[...]	[...]
EEA turnover in 2015 (%)	[90-100]%	[5-10]%	100%

Source: Commission's calculations based on data provided by the Parties in response to the Commission's request for information RFI 38, question 5 (see Annex 3 for more details on the data)

Notes: When an AI has been co-developed by two companies, the turnover associated to that AI was divided equally between the companies

The column Total might differ from the sum of the other columns due to number rounding

In order to provide a comparable statistics for both Table 55 and Table 56, the period refers to the year in which the active ingredient was reported by the Parties to be first launched, irrespective of the region in which it was first launched

(2336) In conclusion, the findings based on the analysis of quantitative metrics support the conclusions of the present section as to the predominance of the Big 5 in crop protection innovation at industry level. The Commission will however include other crop protection players in its assessment, when relevant in light of their capabilities as described in the present section, in order to test for the robustness of its findings.

8.6.4. *Industry shares tend to underestimate the expected non-coordinated effects of the Transaction given the significant cross shareholding between the main players*

(2337) Section V.1.5.5 provides a list of shareholders with equity in any of BASF, Bayer, Dow, DuPont, Monsanto or Syngenta, supporting the fact that the agrochemical industry is characterised by common shareholding. This section intends to characterise the significance of common shareholding.¹⁷⁰⁶

8.6.4.1. The agrochemical industry is characterised by a concentrated shareholders structure

(2338) The Commission's requested information from the Parties on common shareholders amongst BASF, Bayer, Dow, DuPont, Monsanto and Syngenta.¹⁷⁰⁷ [...].^{1708,1709}

(2339) The level of shareholders' concentration can be seen from Table 57 which counts the number of shareholders reported which have specific levels of shares, or which are necessary to reach certain equity share levels. All firms share the fact that, for each of them, [...] shareholders control 20% of the equity shares, and less than [...] reach collectively 30%. Dow, DuPont and Monsanto have more concentrated

¹⁷⁰⁶ A more detailed analysis is provided in Annex 5. This annex provides further factual evidence on the significant level of common shareholding in the agrochemical industry and on the involvement of large minority shareholders which, despite some being labelled "passive investors" are as in fact "active owners". The annex also reviews the economic literature, both theoretical and empirical, which provides guidance on the effects of common shareholding on competition between firms in industries subject to such feature, and it discussed how the HHI can be modified to account for common shareholding in the industry.

¹⁷⁰⁷ Commission's request for information RFI 2, questions 4-7 (ID243).

¹⁷⁰⁸ Parties' response to the Commission's requests for information RFI 2, question 4 (ID753 and ID1159-257).

¹⁷⁰⁹ Note that the Parties' response to the Commission's requests for information RFI 2, question 5 (ID753 and ID1159-257) [...]. Annex 5 provides more detail on this.

shareholdings, as only [...] shareholders are necessary to reach 30% equity shares, and [...] to [...] to reach 50%.

- (2340) All firms also have a tail of atomistic shareholders. Most of the listed shareholders have less than 0.01% equity share. If it is assumed that non-listed shareholders also have equity shares lower than those reported, then the tail of equity holders with less than 0.01% shares amounts to [...]% for BASF, [...]% for Bayer, [...]% for Dow, [...]% for DuPont, [...]% for Monsanto and [...]% for Syngenta.

Table 57 – Number of reported equity holders with shares in any of BASF, Bayer, Dow, DuPont, Monsanto and Syngenta

[...]

Source: Commission's analysis of RFI 2 data

8.6.4.2. The agrochemical industry is characterised by significant common shareholding

- (2341) In order to get a sense of both the number of common shareholders and their importance, Section V.1.5.5 lists the reported equity holders with the ten highest portfolio of shares across BASF, Bayer, Dow, DuPont, Monsanto and Syngenta. The lowest portfolio value is more than EUR 3000 million. The ranking of each shareholder within each firm is indicated between brackets (Section V.1.5.5 reports a similar table, for reported shareholders with a total portfolio value of more than EUR 1000 million).
- (2342) For example, [name of shareholder] is the shareholder with the highest overall investment in the six firms. [Name of shareholder] is also the most important shareholder of BASF with a [...]% equity share, as well as of Bayer with [...]% and of Syngenta with [...]%. It is the second most important shareholder of DuPont with [...]% and the third most important shareholder of Dow with [...]% and of Monsanto with [...]%.

Table 58 – Reported equity holders with shares in any of BASF, Bayer, Dow, DuPont, Monsanto or Syngenta, with a total portfolio value in all these companies of EUR 3 000 million or more

[...]

Source: Commission's analysis of RFI 2 data

- (2343) Table 59 provides a more systematic assessment of common equity holders between each of the six firms, by computing how much equity share all reported holders in one company have in each of their competitors. For example, the first row indicates that all reported equity holders of BASF own, collectively, [...]% of Bayer, [...]% of Dow [...]% of DuPont, [...]% of Monsanto and [...]% of Syngenta. The figure reported in the column "BASF" measures how much shares the reported equity holders of BASF hold, here [...]%, meaning that equity holders representing [...]% of BASF are not reported in the data provided by the Parties.
- (2344) On the basis of the reported equity holders, Dow, DuPont and Monsanto seem to be the most "consanguine" agrochemical firms, as they share a significant number of equity holders with, overall, large positions on all of these three firms. Dow's reported equity holders own [...]% of DuPont and [...]% of Monsanto, while they own [...]% of the other firms. For DuPont, its reported holders hold [...]% of Dow

and [...] % of Monsanto, and [...] % of the other firms. Finally, Monsanto's reported holders represent [...] % of Dow and [...] % of DuPont, and [...] % of the others.

Table 59 – Collective shares of reported equity holders of each of BASF, Bayer, Dow, DuPont, Monsanto and Syngenta, in their competitors

[...]

Source: Commission's analysis of RFI 2 data

Note: Values in the diagonal measure the total equity shares in a given firm from all its reported equity holders

(2345) Table 60 reports several measures providing a complementary view on the extent of common shareholding in the agro-chemical industry. While there are numerous common shareholders, between two specific firms and also across the six firms, the industry is also characterised by the fact that only few common shareholders control, collectively, a significant share of each of the six competitors. In particular, [...] common shareholders are enough to reach, collectively, between [...] % and [...] % shares in all six firms, and in particular [...] % of Dow and [...] % of DuPont.

Table 60 – Collective shares of reported equity holders with shares in any of BASF, Bayer, Dow, DuPont, Monsanto or Syngenta

[...]

Source: Commission's analysis of RFI 2 data

(2346) The Parties are well aware of this reality. For example, in the process of the preparation of the Transaction as well as in its promotion, the Parties emphasised that [...].^{1710,1711}

(2347) On the basis of these factual elements, the Commission concludes that the agrochemical industry is characterised by (i) a concentrated shareholder structure, (ii) a significant level of common shareholdings across the BASF, Bayer, Dow, DuPont, Monsanto and Syngenta, and by the fact that (iii) a limited number of shareholders, namely [...], represent, collectively, a significant share of each single firm, namely between [...] % and [...] %.

8.6.4.3. The presence of significant level of common shareholding tends to lower rivalry

(2348) The economic literature on cross-shareholding, which extends to common shareholding, tends to show that common shareholding of competitors reduces incentives to compete as the benefits of competing aggressively to one firm come at the expense of firms that belong to the same investors' portfolio.¹⁷¹²

(2349) Moreover, some recent empirical studies provide indications that the presence of significant common shareholding in an industry is likely to have material consequences on the behaviour of the firms in such industries, in particular that prices are likely to be higher¹⁷¹³ and that common shareholders tend to shape the

¹⁷¹⁰ Parties' submission entitled [...], slide 14.

¹⁷¹¹ Parties' submission entitled [...], slide 14.

¹⁷¹² More details on the economic literature on this issue are provided in Annex 5.

¹⁷¹³ Azar, Schmalz and Tecu (2016), "Anti-competitive effects of common ownership", Ross School of Business working paper 1235.

monetary incentives of firms' executives in order to align them with industry performance, and not only their firm's specific performance.¹⁷¹⁴

- (2350) While the economic literature has, to the best of the Commission's knowledge, focused on the effects of cross shareholding and common shareholding on price competition, the economic rationale of such effects applies to innovation competition.¹⁷¹⁵
- (2351) In a nutshell, by increasing its efforts in R&D, a firm incurs a cost that decreases its current profits in expectation of future benefits brought by the resulting products of its innovation. Such future benefits would necessarily materialise through price competition of future products which, given the specificities of the agrochemical industry, in particular the fact that the total size of the crop protection industry is typically not related to innovation,¹⁷¹⁶ is likely to be mainly at the expense of its competitors. In other words, the decision taken by one firm, today, to increase innovation competition has a downward impact on its current profits and is also likely to have a downward impact on the (expected future) profits of its competitors. This, in turn, will negatively affect the value of the portfolio of shareholders who hold positions in this firm and in its competitors. Therefore, as for current price competition, the presence of significant common shareholding is likely to negatively affect the benefits of innovation competition for firms subject to this common shareholding.
- (2352) In conclusion, the Commission is of the view that (i) a number of large agrochemical companies have a significant level of common shareholding, and that (ii) in the context of innovation competition, such findings provide indications that innovation competition in crop protection should be less intense as compared with an industry with no common shareholding.
- 8.6.5. *Concentration of R&D-integrated players at innovation space is even higher leading to tighter oligopolistic markets*
- (2353) As described in Section V.8.6.1, innovation competition in crop protection takes place in small innovation spaces. From early stages of an R&D project, companies define their targets at groupings of specific crop/pest combinations. At this level, the Commission findings are that concentration is even higher as not all the R&D-integrated players are present in each innovation space.
- (2354) In Section V.8.8, the Commission will analyse the particular innovation spaces where the Parties have currently overlapping lines of research and early pipeline products as well as the innovation spaces where one of the Parties has lines of research and early pipeline products, and where the other is already present or about to be present.
- (2355) Nevertheless, and in order to determine the ability and incentives of the Big 5 to compete in all possible innovation spaces, the Commission will start by analysing in this section the presence of the Big 5 in each of the downstream markets for formulated products.

¹⁷¹⁴ Anton, Ederer, Gine and Schmalz (2016), "Common ownership, competition, and top management incentives", Ross School of Business working paper 1328.

¹⁷¹⁵ See Annex 4 for more detailed explanations.

¹⁷¹⁶ See Section V.8.4.1 for more detailed explanations.

- (2356) The fact that in a given market for formulated products not all the R&D-integrated players are active constitutes a first strong indication that not all the R&D-integrated players are able and have the incentives to innovate for a space that comprises products targeting that particular market.
- (2357) In this exercise, in order not to overestimate the number of players in the event of marginal sales in a given segment, the Commission considers that a given player is active in one market for formulated products if its market share in that market is above 2%. Under this assumption and taking into account the presence of the Big 5, the Commission notes that in the large majority of markets not all the Big 5 are active.
- (2358) The results of this exercise are summarised in Table 61. The percentages in the Table correspond to the proportion of the total sales in the markets where there is a given number of players of the Big 5 present as compared to total value of sales in a given geographic area. For instance, in the EEA there are three players of the Big 5 in markets representing [...] % of the total sales of crop protection.
- (2359) The Commission recognises that this exercise may understate the future position of a given player which may be currently developing a new product in an area where it is still not present. However, the Commission also considers that this exercise may overstate the innovation capabilities of players in a given market in the case the value of those players' sales refer to products introduced several decades ago. Above all, the exercise intends to illustrate that the Big 5 are not able to innovate in order to be present in all the downstream markets for formulated products.

Table 61 – Share of 2015 sales revenues in a given country corresponding to markets where a given number of global R&D-integrated suppliers (amongst the Big 5) is present (with a market share above 2%)

[...]

Source: Commission's analysis of Agrowin

- (2360) According to Table 61, at the EEA level, for the large majority of the markets for formulated products, measured by their value, there are four or less global R&D-integrated players present. Indeed, the total sales in markets where there are four or less players of the Big 5 present correspond to [...] % of the total sales in the EEA. Even more striking, for almost [...] % of the sales of crop protection in the EEA there are three or less global R&D-integrated players present.
- (2361) The scenario becomes even more concentrated when one looks at a country level. For almost all the countries analysed (including Germany, France, Italy, the United Kingdom and Spain), it is rarely the case that a market of formulated products has the five global R&D-integrated players present (for 16 out of 21 countries considered there are four or less players in markets representing more than [...] % of the total sales in that country).
- (2362) Even if, for robustness, one considers instead the presence of the Big 5 plus Monsanto, FMC and Sumitomo, it is still the case that for the majority of the markets for formulated products (that is those representing [50-60] % of the total value of sales in the EEA) there are four or less of these eight players present. At a country level, it is only in one country (namely the Czech Republic) there are more than six players present in some small markets. For almost all the countries there are four or

fewer players in markets representing more than [70-80]% of the total sales in the respective country.

Table 62 – Share of 2015 sales revenues in a given country corresponding to markets where a given number of R&D-integrated suppliers (amongst the Big 5, Monsanto, FMC and Sumitomo) is present (with a market share above 2%)

[...]

Source: Commission's analysis of Agrowin

- (2363) These results show that each R&D player, despite being active at an industry level, only has products competing for some markets for formulated products. Transposing these results to the level of innovation spaces, this suggests that each R&D player is likely to be only developing innovation efforts aiming at introducing new products in downstream markets for formulated products in some innovation spaces, contrary to what the Parties argue in the response to the Statement of Objections that competitors invent across all areas of crop protection. Otherwise, they would be present with a product in all the downstream markets. This implies that at each innovation space level fewer than the Big 5 players are competing, and thus concentration is likely to be higher than at the overall industry level.
- (2364) There are several reasons that can justify the higher concentration at the innovation spaces level as described in recitals (2365) to (2393).
- (2365) **First**, although the innovation may be used in several national markets, the total value of revenues associated to each crop/pest combination in the EEA is relatively small. For instance, despite total sales of crop protection products in the EEA are above USD [sales estimates] per year, the largest of the crop/pest combination in the EEA is valued only slightly above USD [sales estimates] of sales per year in the EEA, being the majority of the crop/pest combinations valued less than USD [sales estimates] of sales per year in the EEA.
- (2366) Given this, the award from an innovation that targets a grouping of these markets is likely to be relatively low as compared to the cost of discovery and development (which corresponds to USD 286 million for each AI). This entails that the number of innovators targeting a given market is likely to be small.
- (2367) **Second**, the Big 5 have differentiated innovation assets and capabilities, and are thus not equally able to innovate in the same innovation spaces.
- (2368) For instance, BASF is less strong in insecticides and herbicides compared to the other global integrated companies, as it is evidenced by its shares of patent quality.
- (2369) In herbicides, the importance of BASF is [...] for high quality patents, which are the patents that represent the most valuable innovations. Table 9 of Annex 1 shows that BASF's patent share [...] when one considers high quality patents: from [5-10]% among all patents to [0-5]% for the highest quality patents (excluding mixtures) during the period 2000-2015. In insecticides, BASF also represents a [...] share of the high quality patents, with a patent share around [0-5]%, excluding mixtures (Table 10 of Annex 1).
- (2370) These findings suggest that BASF had in the past a lower importance compared to the other global R&D-integrated companies in bringing good quality innovations in herbicides and in particular in insecticides. Moreover, given that the analysis of patent data captures the technological significance of recent patents which did not

lead to commercial products yet, the relatively low patent share of BASF is likely not to be completely reflected in current turnover figures. In other words, given the limited patent share of BASF today, it is likely that BASF's market presence will decrease in the future. [Internal documents].

(2371) [Internal document].

(2372) [Internal document].¹⁷¹⁷

Figure 126 – [...]

[...]

(2373) [Internal document].

(2374) [Internal document].¹⁷¹⁸

Figure 127 – [...]

[...]

(2375) **Third**, the global R&D-integrated players have limited capacity to compete in all innovation spaces, mainly due to financial constraints as well as capacity limitation in discovery and in development.

(2376) Syngenta stated that the key constraints to achieve a given number of new AI per year are "*[f]inancial constraints: Internal CP portfolio investment targets linked to an overall target of 6-7% of sales*" and "*[f]unctional constraints: Field biology capacity (internal & external); increasing product safety / regulatory costs driven by re-registration and product maintenance*".¹⁷¹⁹ According to this company, "*[b]ottleneck resources include: field biology capacity, product safety and regulatory capacity, formulation, production and supply capacity*".

(2377) Bayer confirmed that "*[t]he regulatory constraints and the economic constraints to enter development are very extensive and limit strongly the number of viable candidates*".¹⁷²⁰

(2378) BASF stated that "*has to fit the bottom-up plan into the allocated top-down R&D budget. Within this budget projects are prioritized based on strategic fit and financial KPIs*".¹⁷²¹

(2379) The global R&D-integrated players are thus limited in terms of the number of new AIs they can have at development simultaneously and thus can only cover a limited number of innovation spaces.

(2380) In addition, the cost of increasing capacity is highly costly. The cost of bringing an additional AI to the market is around USD 286 million according to a study by Phillips McDougall (see Figure 108), which corresponds to an annual cost of around USD 25 million.

¹⁷¹⁷ [Internal document] (ID3665-22), slide 12.

¹⁷¹⁸ [Internal document] (ID3657), slide 10. [internal document].

¹⁷¹⁹ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

¹⁷²⁰ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

¹⁷²¹ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

- (2381) The Commission also assessed whether it is possible to increase the number of AIs under development with the use of third party research organisations which would perform some of the steps for the development of a new product.
- (2382) The global R&D-integrated players confirmed that within the development process for new AI avail themselves of third party research organisations. However, Syngenta stated "*[c]urrently, there are sufficient third party organizations to meet market needs for most development activities, but it is close to maximum capacity. Some research outsourcing is limited in both capability and capacity e.g. research biology and new technologies*"¹⁷²² According to Syngenta, the use "*of third party research organisations does not allow us to move more active ingredients into development. The resources available (financial or functional) and the total capacity of our commercial operations to manage the new AI pipeline are internally constrained. Third parties allow greater year-to-year flexibility by allowing use of financial resources instead of investing in fixed cost capability*".¹⁷²³
- (2383) Bayer stated that "*[t]he availability of CROs does not affect the number of active ingredients we plan to develop in any given year. As said earlier the limiting factor is the number of viable candidates coming from research into development*".¹⁷²⁴
- (2384) Finally, BASF stated that "*[t]he use of Contract Research Organization has major limitations. Similarly to other R&D companies, BASF would rely on partner CRO with demonstrated track record rather than selecting random CROs based on cost or other criteria. Additionally, CROs are not always an option when the study set up require specific experience or expertise, which BASF has developed over years. Risk of knowledge or information loss can also be a barrier to the use of CROs*" and therefore "*[t]he availability of third party research organizations is not in itself a means to move more active ingredients into development*".¹⁷²⁵ According to this competitor, "*[t]he regulatory expertise that is built by a company is essential, and not something that can be outsourced*".¹⁷²⁶
- (2385) The Commission therefore considers that the presence of third party research organisations does not allow companies to increase their innovation capacity.
- (2386) The capacity restrictions as regards innovation justify why companies have to prioritise the AIs they bring to development. [Internal document].
- (2387) Syngenta stated that "*[a] prioritization takes place within the portfolio management framework*".¹⁷²⁷ Bayer confirmed that it "*focusses its new active ingredient Research on key global segments that are large enough to financially support the cost of R&D. Other smaller segments can be covered opportunistically mostly through the spectrum of some active ingredients developed for key segments or through*

¹⁷²² Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

¹⁷²³ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

¹⁷²⁴ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

¹⁷²⁵ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

¹⁷²⁶ Agreed non-confidential minutes of a meeting with a competitor, 7 November 2016 (ID9399).

¹⁷²⁷ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

mixtures".¹⁷²⁸ Finally, BASF stated that "[d]ue to resource constraints though, it is not possible to promote an unlimited number of new molecules, therefore prioritization is normally applied".¹⁷²⁹

- (2388) The global R&D-integrated players thus cannot innovate to cover the whole industry given these capacity constraints and the fact that innovations cover only narrow innovation spaces from which it is more difficult to adapt the innovation to other purposes.
- (2389) **Fourth**, the strength of current competition on innovation is also affected by a number of links between the Parties and their main competitors. Within the Commission's market investigation, the majority of competitors indicated that cooperation within the industry is frequent or very frequent.¹⁷³⁰
- (2390) There are numerous forms of cooperation between the various companies active in the crop protection industry. Cooperation agreements between R&D-integrated players often entail research (licensing technology in/out), joint or co-development, or co-distribution. Examples of cooperation include DuPont/Syngenta on Rynaxypyr as well as Cyazypyr, [internal document].¹⁷³¹ While cooperation already exists at the R&D level, it does so in particular at the levels further downstream, that is composition of formulations and distribution.
- (2391) Each of the Parties has several agreements with other competitors concerning several aspects of the crop protection supply chain. [...] concern licensing and supply of AIs, as well as distribution and sale of formulated products. Some of these agreements, [...], cover certain aspects of R&D activities. [...].¹⁷³²
- (2392) In the areas where these agreements take place the incentives to innovate by the party that has access to the innovation via the contractual position are reduced given that in case of an introduction of a new product it would not only cannibalise its own sales but also potentially jeopardise the relationship with the other party. In addition, these agreements allow companies to specialise their innovation efforts in different segments and then negotiate cross-licenses among themselves.
- (2393) The Commission thus considers that the strategic alliances between the Big 5 likely limit the incentives of these players to innovate in the same innovation spaces where they already have agreements with another party.

8.6.6. *Conclusion on concentration at industry level and at the level of innovation spaces*

- (2394) A number of elements indicate that the Transaction takes place in an industry already characterised by oligopolistic innovation competition:
- (1) Following successive waves of consolidation there are now only five global R&D-integrated players.
 - (2) Barriers to entry and expansion are very high at both discovery and development level.

¹⁷²⁸ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

¹⁷²⁹ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

¹⁷³⁰ Questionnaire to Crop Protection Competitors (Q2), question 43.1.

¹⁷³¹ [Internal document] (ID6825-30259).

¹⁷³² Form CO, Annex B.II.29.

(3) Other players such as the Japanese innovators, Monsanto, Sumitomo or FMC do not have similar capabilities and incentives.

(2395) The Commission further considers that due to differentiated assets, capabilities and strengths, limited capacity and differentiated incentives, the number of innovation players with similar capabilities and incentives at each level of innovation spaces is likely to be even lower. In many innovation spaces in which the Parties compete on innovation there are, pre-Transaction, four or less actual or potential innovation competitors.

8.7. The Transaction would bring together two competitors which pre-Transaction were more important innovation competitors at industry level than their downstream market shares and their R&D expenditure shares suggest

(2396) According to paragraph 37 of the Horizontal Merger Guidelines, "*[s]ome firms have more of an influence on the competitive process than their market shares or similar measures would suggest. A merger involving such a firm may change the competitive dynamics in a significant, anticompetitive way, in particular when the market is already concentrated*". The Commission considers that the influence referred to in the said paragraph 37 would result, in the case of the Transaction in review, from the Parties' importance as innovators, and needs to be considered in the assessment of non-coordinated effects on innovation competition, particularly as to the likelihood that they could be brought about because of overlapping lines of research and early pipeline products in innovation spaces and by the expected reduction in R&D expenditure and innovation output targets.

(2397) In addition, according to paragraph 38 of the Horizontal Merger Guidelines, "*effective competition may be significantly impeded by a merger between two important innovators, for instance between two companies with 'pipeline' products related to a specific product market. Similarly, a firm with a relatively small market share may nevertheless be an important competitive force if it has promising pipeline products*".

8.7.1. *The Parties are important innovators in the crop protection industry with ambitious targets in terms the number and quality of new AIs*

(2398) [R&D information].

(2399) [R&D information].^{1733,1734}

(2400) Despite its spending being lower than that of other competitors in the industry in absolute terms, DuPont was capable of achieving significant pipeline productivity (Pipeline Products compared to R&D expenditure) in several consecutive years.

Figure 128 – [Extract from internal document]

[...]

Source: [Internal document] (ID6825-27621)

(2401) [R&D information].

¹⁷³³ [Internal document] (ID6825-4492), slide 3. In the same document, slide 19, [R&D information].

¹⁷³⁴ [Internal document] (ID7992), slide 4.

Figure 129 – [Extract from internal document]

[...]

Source: [Internal document] slide 6 (ID8002)

(2402) The success of DuPont's effort at novel compounds is also testified by the track record of this company in terms of molecules with new MoAs. [R&D information], over the past 10 years, one in two new AIs introduced at global level had a new MoA (see also Section V.8.1.2).¹⁷³⁵ [R&D information].

(2403) [R&D information].¹⁷³⁶

Figure 130 – [Extract from internal document]

[...]

(2404) [Internal document; R&D information].¹⁷³⁷

(2405) [Internal document; R&D information].¹⁷³⁸

(2406) [R&D information].

Figure 131 – [Extract from internal document]

[...]

Source: [Internal document] (ID6825-4492)

(2407) [R&D information].¹⁷³⁹

Figure 132 – [Extract from internal document]

[...]

(2408) [Internal document; R&D information].¹⁷⁴⁰

(2409) DuPont's innovation capacity is also externally recognised. DuPont was the only company to win the Agrow Awards for "Best R&D pipeline in the industry" in crop protection since these awards were created in 2007. In fact, DuPont's R&D pipeline was recognised in 2007, 2013 and 2014.

(2410) The Parties argue that although the Awards aim to recognise successes in the industry, they are not intended to represent a comprehensive review of all competitor pipelines. However, [internal document; R&D information].

(2411) In the context of the attribution of the 2014 award DuPont's pipeline was described as: "*[t]his Agrow Award was bestowed upon DuPont for the second consecutive year and recognizes the critical importance of research and development to the industry. DuPont was deemed to have the most promising batch of new active ingredients in R&D. DuPont's R&D product concepts target significant market opportunities and seek new chemical classes and new modes of action that favor performance attributes like low use rates and control of resistant pests. The current R&D pipeline*

¹⁷³⁵ DuPont's response to the Commission's request for information RFI 15, [internal document].

¹⁷³⁶ [Internal document], slide 3.

¹⁷³⁷ [Internal document] (ID6825-28661).

¹⁷³⁸ [Internal document] (ID6825-28661).

¹⁷³⁹ [Internal document] (ID5273-18), slide 11.

¹⁷⁴⁰ [Internal document] (ID6825-11150), slide 33.

*will extend these high standards to additional insecticide and nematicide markets and to major fungicide targets".*¹⁷⁴¹

- (2412) Informa Plc., the advertising institution of the Agrow Awards, confirms that this is a quite prestigious and well respected award and that the winners of the awards had not been sponsoring the event.¹⁷⁴²
- (2413) The importance of these Awards is also reflected in [internal document; R&D competitive intelligence information].¹⁷⁴³
- (2414) Dow has also been a productive player in innovation. [Internal document; R&D competitive intelligence information].

Figure 133 – [Extract from internal document]

[...]

Source: [Internal document]

- (2415) [Internal document; R&D competitive intelligence information].¹⁷⁴⁴
- (2416) [Internal document; R&D competitive intelligence information].¹⁷⁴⁵

Figure 134 – [Extract from internal document]

[...]

- (2417) [Internal document; R&D competitive intelligence information].
- (2418) [Internal document; R&D information].^{1746,1747}
- (2419) [Internal document; R&D information].¹⁷⁴⁸
- (2420) [Internal document; R&D information].¹⁷⁴⁹

Figure 135 – [Extract from internal document]

[...]

Figure 136 – [Extract from internal document]

[...]

- (2421) [R&D information].¹⁷⁵⁰

Figure 137 – [Extract from internal document]

[...]

- (2422) Moreover, [R&D information].¹⁷⁵¹

¹⁷⁴¹ <http://www.prweb.com/releases/dupont-crop-protection/2014-agrow-awards/prweb12293280.htm>.

¹⁷⁴² Agreed non-confidential minutes of a call with Informa Plc, dated 11 January 2017 (ID10395).

¹⁷⁴³ [Internal document] (ID6694-15699).

¹⁷⁴⁴ [Internal document] (ID7830-34975), slide 3.

¹⁷⁴⁵ [Internal document] (ID1327-38), slide 37.

¹⁷⁴⁶ Form CO, Annex A.13.2.47.

¹⁷⁴⁷ [Internal document] (ID8836-3), slide 37.

¹⁷⁴⁸ [Internal document] (ID6143-20754).

¹⁷⁴⁹ [Internal document] (ID644-103).

¹⁷⁵⁰ [Internal document] (ID6694-6487), slide 11.

¹⁷⁵¹ Parties' response to the Commission's request for information RFI 26.5, Annex 5.7.

8.7.2. *The Parties' shares of patents and new active ingredients at industry level are higher than their downstream shares and their R&D expenditure shares suggest*

(2423) The Parties contend that they are not important innovators if compared with other players in the industry. In order to appreciate the Parties' importance on innovation, the Parties propose a number of measures, and in particular their share of private R&D spend, the total number of AI launches and the number of patent applications.

(2424) In this respect, the Parties argue¹⁷⁵² that:

- (a) the combined entity would represent approximately [R&D information] of R&D spend and are ranked fourth and fifth of the five global R&D-integrated players in both turnover and R&D spend, behind Syngenta, Bayer and BASF;
- (b) the combined entity would have a share of approximately [R&D information] in terms of R&D output as measured by the number of new AIs introduced;
- (c) the combined entity would hold the third place behind Bayer and BASF, with a share of approximately [20-30]% in terms of patent application;
- (d) the HHI levels and deltas associated to the Transaction would fall in the range that typically does not raise competition concerns according to the Horizontal Merger Guidelines.

(2425) [...].^{1753,1754}

(2426) The findings of the Commission's investigation suggest that Dow and DuPont may likely be more important innovators at the industry level than suggested by their downstream market shares. While they are the fourth and fifth of the five global R&D-integrated players in both turnover and crop protection R&D spend, they have been undertaking efforts to grow market share through their innovation effort and this is reflected in the importance of their recent patents and AI developments.

8.7.2.1. Patent shares

(2427) In Annex 1, the Commission presents an analysis of patent data for the crop protection industry in order to assess the technological strengths of the different firms involved in R&D for crop protection. This section provides a summary of the Commission's analysis of patent data (further details are available in Annex 1).

(2428) It is well-established in the economic literature that the number of citations accumulated by a patent is a good measure of its quality or its technological significance. The Commission's analysis is based on this principle.

(2429) In this section, the Commission presents a description of the methodology used in the Statement of Objections (Section V.8.7.2.1(A)). Section V.8.7.2.1(B) overviews the patent data, highlighting the heterogeneity in the data. For ease of exposition and in order to put into context the Parties' comments made in the response to the Statement of Objections, the main results reported in the Statement of Objections are summarised in Section V.8.7.2.1(C). Section V.8.7.2.1(D) presents the rebuttal of the Parties' comments made in the response to the Statement of Objections, and Section V.8.7.2.1(E) presents the results of the patent analysis.

¹⁷⁵² Parties' submission entitled [...].

¹⁷⁵³ [Internal document] (ID7064-526): [quote from internal document].

¹⁷⁵⁴ [Internal document; R&D process information], see [internal document] (ID7078-960).

(A) Presentation of the patent data

(A.i) *Introduction to the data*

- (2430) In its analysis, the Commission uses patent data submitted by [...] in the response to question 3 of the Commission's request for information RFI 42. [...] provides [R&D competitive intelligence] as of 31 December 2015. The dataset provided [...] includes [R&D competitive intelligence].
- (2431) To protect an innovation, patent applicants seek protection in several countries so that generally more than one patent publication per innovation exists. A patent family includes all patents that describe the same innovation. The Commission's analysis considers patent families in order not to count multiple patents which are related to the same innovation. On average, in the crop protection industry, a patent family corresponds to 10 patents filed in different countries. For the sake of clarity, in the following recitals, patent families and patents are used interchangeably.
- (2432) The Commission focuses on patents filed in any EEA country and still active on 31 December 2015. This sample selection allows focusing on innovations that can potentially reach the EEA.
- (2433) Patent families related to the family "mutations or genetic engineering" are excluded from the analysis. The exclusion of these patent families is based on the restrictions of GMO-technologies in the EEA.
- (2434) Patents which are also exclusively related to seed treatment are excluded since the analysis considers innovations in herbicides, insecticides, and fungicides. Patent families related to seed treatment and another use like herbicides, insecticides, or fungicides, are not excluded.
- (2435) The Commission notes that patent families exclusively related to Plant Growth Regulators seem to be included in the database on crop protection patents. Since the Parties do not have research activities in Plant Growth Regulators, including these patents in the analysis is a conservative approach as regards the Parties' importance since it overestimates the importance of others, like Bayer, BASF, and Syngenta, compared to Dow and DuPont. However, the Commission was not able to exclude these patents exclusively related to Plant Growth Regulators.

(A.ii) *Citations-based measures of patent quality*

- (2436) As discussed in Annex 1, the Commission measures patent quality (called technological significance) based on two measures: the number of external citations that a patent receives and the number of total citations (including external and internal citations) that a patent receives. External citations refer to citations made by subsequent patents owned by different firms as the one holding the cited patent. Internal citations are citations coming from subsequent patents owned by the same firm.
- (2437) While the economic literature mentions a value in internal citations, in particular because firms citing their own patents may be a reflection of the cumulative nature of innovation (within a narrow field or technology trajectory), the same economic literature also mentions a potential difficulty in interpreting internal citations due to a mechanical effect, which is that internal citations increase mechanically with the size of the patent portfolio. In particular, the more patents a firm has, the higher is the probability that a citation from a new patent will be given by a patent that it already owns. Therefore, firms with a larger portfolio size may have mechanically a larger

number of internal citations, regardless of whether internal citations are indicative of the value of a patent.¹⁷⁵⁵

- (2438) Moreover, internal citations may be impacted by different practices across companies, with some (bigger) companies having a tendency to cite themselves more often. For example, as discussed in Hall, Jaffe, and Tratjenberg (2005), "*it may well be that the "self-bias" increases with size (e.g., because of the presence of more active legal departments in firms with large portfolios)*".¹⁷⁵⁶
- (2439) In contrast, practices in terms of external citations may be less sensitive to different companies' citation practices (and therefore external citations may be a more consistent measure of patent quality across firms) since they are likely to be under a closer scrutiny, in particular because they represent a limitation on the scope of the property rights awarded by the patent. In a nutshell, the argument is that, if patent B cites patent A, it implies that patent A represents a piece of previously existing knowledge upon which patent B builds, and over which patent B cannot have a claim.¹⁷⁵⁷ This is not the case for internal citations, which do not limit the property rights awarded by the patent application. Indeed, in this example, if patent A and patent B are owned by the same company, then the company can claim property rights under both patents at the same time and therefore does not face in practice a limitation of property rights that the company can claim. In that sense, external citations are more "costly" for the patent applicant than internal citations.
- (2440) As regards this specific case, the issues discussed in recitals (2437) to (2439) have to be considered in light of the specific characteristics of the crop protection patent portfolios of the R&D-integrated firms, namely the size and average qualities of the patent portfolios. This is discussed in more detail in Annex 1.
- (2441) First, the sizes of patent portfolios are very different between the R&D-integrated firms, with in particular [R&D competitive intelligence] having a portfolio size [R&D competitive intelligence] times smaller than [R&D competitive intelligence], [R&D competitive intelligence] times smaller than [R&D competitive intelligence], and [R&D competitive intelligence] times smaller than [R&D competitive intelligence]. At the same time, for [R&D competitive intelligence], a bigger portfolio size is also associated with higher numbers and percentages of internal citations.
- (2442) Second, there are also significant differences in the quality of the patent portfolios, with a particular behaviour for DuPont which has the highest average quality among the R&D-integrated firms, both when considering total citations and external citations.
- (2443) These findings therefore suggest that [R&D information].¹⁷⁵⁸

¹⁷⁵⁵ See for example Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics, pages 32-33.

¹⁷⁵⁶ See for example Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics, pages 32-33.

¹⁷⁵⁷ See for example Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics.

¹⁷⁵⁸ [Internal document] (ID7064-526): [Quote from internal document].

- (2444) [R&D information], DuPont has the [R&D information] patent portfolio size, leading automatically to a lower number of internal citations compared to other R&D-integrated firms. Therefore, considering total citations to measure patent quality (that is to say including internal citations in addition to external citations) would underestimate the strength of DuPont, [R&D information]. In particular, while DuPont's patent portfolio has an average quality more than [R&D information] times higher than [R&D information] patent portfolio based on external citations, the average quality of DuPont's portfolio is only [R&D information].
- (2445) As discussed in Annex 1, compared to patent shares based on external citations only, when internal citations are included the main effects are a significant increase in the patent share of Bayer and a significant decrease in the patent share of DuPont. However, in addition to the issue that including internal citations does not allow taking into account properly the [R&D information], because of the mechanical effect discussed in recitals (2437) and (2438) it is also not possible to ensure that the significant increase in the patent share of Bayer reflects a significant increase in the value of its patents. This is because [R&D information] has from far the biggest portfolio size, almost [R&D information] higher than [R&D information] higher than [R&D information], and almost [R&D information] higher than [R&D information].
- (2446) Therefore, on the basis of recitals (2436) to (2445), the Commission has given more weight in the Statement of Objections to patent shares based on external citations. The Commission summarises in Section V.8.7.2.1(D) the comments raised by the Parties in the response to the Statement of Objections and the Commission's rebuttal. As discussed in Section V.8.7.2.1(D) and Section V.8.7.2.1(E), the Commission maintains its view from the Statement of Objections of giving more weight to patent shares based on external citations.

(A.iii) Time periods for the calculations of patent shares

- (2447) The patent data provided by the Parties include patents applications from 1990 to 2015. In its analysis, the Commission considers the period 2000-2015 as the most relevant period for the following reasons: (i) it shows a more recent innovation record than the period 1990-2015, in particular the Parties became relatively more active in patenting after 2000; (ii) patents filed for period 2000-2015 would correspond approximately to the period 2006-2015 for AIs launched (see Section V.8.7.2.2); and (iii) the Parties propose as well to use a 15-year period from 2000 to 2014 to assess the success of [R&D information], on the basis that the discovery and commercialisation period for crop protection chemicals is 10 to 15 years.¹⁷⁵⁹ The Commission notes that the Parties did not comment on the use of the 2000-2015 timeframe in the response to the Statement of Objections.

(A.iv) Focus on patents related to the discovery of new AIs

- (2448) Patent shares are calculated with and without mixture patents. As discussed in Annex 1, excluding mixture patents allows assessing more precisely the technological strengths of the different firms involved in research in crop protection since it allows to focus on innovations at the AI level. The Commission considers that innovation at the AI level is more important than innovation on mixtures, since it

¹⁷⁵⁹ [Internal document] (ID8841).

is more transformative and more important for resistance management (and much more costly).¹⁷⁶⁰

(2449) On that basis, as in the Statement of Objections, the Commission gives more weight to patent shares when mixture patents are excluded. In this Decision, the Commission reports patent shares when mixture patents are excluded.

(2450) As regards patent shares when mixture patents are included, they are reported in Annex 1 for completeness only, without prejudice to the considerations made in recital (2448).

(A.v) *Companies included in the calculation of patent shares*

(2451) Japanese companies are excluded since (i) their development capabilities outside of Japan are very limited; (ii) their AIs had a limited commercial importance in the past compared to AIs launched by the five R&D-integrated players and few of the AIs developed by Japanese have reached Europe; (iv) the discovery targets of the Japanese companies are mostly domestic crop/pest combinations; and (v) in the ordinary course of business when monitoring the activity of competitors in the introduction of new AIs, the Parties mainly focus on the five global R&D-integrated players.

(2452) On that basis, the Commission has preliminarily considered in the Statement of Objections that Japanese companies are less effective players (in particular for the EEA) and therefore should not be considered in the same way as the R&D-integrated companies. The Commission summarises in Section V.8.7.2.1(D) the comments raised by the Parties in the response to the Statement of Objections and the Commission's rebuttal on the treatment of Japanese companies. As discussed in Section V.8.7.2.1(D) and Section V.8.7.2.1(E), the Commission maintains its view of the Statement of Objections to give more weight to patent shares when Japanese companies are excluded.

(2453) The Commission will report in Section V.8.7.2.1(E) the patent shares when Japanese companies are excluded and included, but will give more weight to patent shares when Japanese companies are excluded.

(2454) Monsanto is included in the analysis of patent share. In principle, Monsanto should not be included given its limited importance in bringing good quality innovations in crop protection (see Section V.8.6.3.1). Actually, Monsanto is included only to follow the Parties' submissions on patents and on the basis of a recent report from the USDA.¹⁷⁶¹ As discussed in this report, Monsanto is included in this group of largest companies (Bayer, BASF, Dow, DuPont, Monsanto, Syngenta) because of its important presence in crop protection genetic traits (not relevant in the EEA) and the development of the herbicide Glyphosate, "*although Monsanto no longer conducts significant chemical R&D*" and "*its research investments in chemicals are markedly reduced*".¹⁷⁶² In any event, including Monsanto is a conservative approach.

¹⁷⁶⁰ See Section V.1.1 to V.1.4.

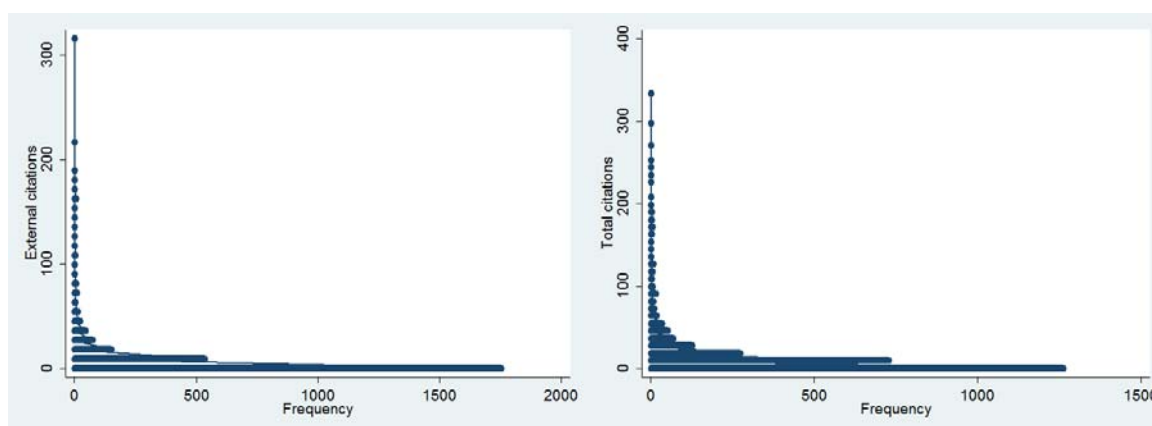
¹⁷⁶¹ These six firms are active both in seeds and crop protection. US Department of Agriculture (December 2011), "Research investments and market structure in the food processing, agricultural input, and biofuel industries worldwide". See also the Parties' submission entitled [...].

¹⁷⁶² USDA, "Research investments and market structure in the food processing, agricultural input, and biofuel industries worldwide", December 2011 (pages 34 and 51).

(B) Patents are very heterogeneous in quality

- (2455) The quality of patents in the crop protection industry is very heterogeneous. When considering external citations, many patents have zero or very few citations and only a few patents have a significant number of citations (see Figure 138). In particular, 30% of the patents have zero citations, almost 70% of the patents have less than five citations, and 90% of the patents have less than 20 citations (see Annex 1 for further details). Similar findings apply when total citations are considered (see Figure 138 and Annex 1).
- (2456) The significant heterogeneity in patent quality, with a few patents accounting for most of the external citations, implies that a simple patent count does not give an accurate picture of the technological strength of the different firms involved in R&D for crop protection. Citation-based index is therefore more appropriate to assess the technological strengths of the different firms. This is a well-established result in the economic literature.¹⁷⁶³

Figure 138 – Distribution of the number of external citations and of total citations



Source: Annex 1, Figure 3 and Figure 4

(C) Summary of the results presented in the Statement of Objections

- (2457) The analysis in the Statement of Objections focuses mainly on patent shares for the group of the highest quality patents (that is to say patents with many citations), which includes all patent families with a citation-based measure in top 10 percentile (top 10%). This section reports the results for the highest quality patents for the period 2000-2015 when mixture patents are excluded and by using external citations to measure patent quality.
- (2458) As regards innovation in crop protection overall, the Commission preliminarily considered in the Statement of Objections that: (i) DuPont is a particularly important innovator, with an increasing patent share when the quality of patents increases; (ii) Dow has also a significant patent share for high-quality patents (top 10%); (iii) the merged entity would have a significant combined patent share for high quality patent families (top 10%) of [50-60]% when mixture patents are excluded; (iv) the industry structure is concentrated for the high quality patents (top 10%) with a high level of HHI, even after considering patents filed in the EEA by Japanese companies; (v) Monsanto appears to have a limited technological strength for R&D

¹⁷⁶³ See Annex 1 for further details.

in crop protection; and (vi) BASF's technological strength is decreasing for high quality patents, and its lower importance for innovations in crop protection is mainly driven by herbicides and insecticides.

- (2459) As regards innovation specifically related to herbicides, the Commission preliminarily considered in the Statement of Objections that: (i) Dow is particularly important innovator in herbicides; (ii) DuPont is also an important innovator, in particular with a significant patent share for high-quality patents related to the discovery of new AIs; (iii) research in herbicides is concentrated for the high-quality patents, with a high level of HHI, even after considering patents filed in Europe by Japanese companies; (iv) the merged entity would have a significant patent share for high quality patents (top 10% patents) during the period 2000-2015, at [50-60]% for innovations related to the discovery of new AIs (close to [30-40]% when Japanese companies are considered); (iv) Dow and DuPont are close competitors with innovations competing against each other; (v) Syngenta has been in the past a distant competitor to Dow and DuPont by innovating in a different segment (graminicides); (vi) BASF and Monsanto have had in the past a lower importance than other R&D-integrated firms in bringing high quality innovations in herbicides; and (vii) the high quality patents of the Japanese companies are mainly related to the rice crop (main crop in Japan), which is a more limited crop in the EEA and are therefore distant competitors to Dow and DuPont.
- (2460) As regards innovation specifically related to insecticides, the Commission preliminarily considered in the Statement of Objections that: (i) DuPont is a particularly important innovator in insecticides, with a patent share of [50-60]% for high quality patents among the Big 6 companies; (ii) Dow is also an important innovator, in particular with a patent share [R&D information] Syngenta for high quality patents; (iii) research in insecticides is concentrated for high-quality patents, with a high level of HHI, even after considering patents filed in Europe by Japanese companies; (iv) the merged entity would have a significant patent share for high quality patents for the period 2000-2015, at [60-70]% for innovations related to the discovery of new AIs (around [40-50]% when Japanese companies are considered); (v) Dow and DuPont are close competitors with competing lines of research; and (vi) BASF and Monsanto have had in the past a limited role in bringing innovations in insecticides.
- (2461) As regards innovation specifically related to fungicides, the Commission preliminarily considered in the Statement of Objections that: (i) DuPont is a particularly important innovator in fungicides, by reaching a patent share higher than BASF and [...] Syngenta for high quality patents related to new AIs, despite its late entry in R&D for fungicides; and (ii) research in fungicides is concentrated for high quality patents with a high level of HHI, even after considering patents filed in Europe by Japanese companies. Analysing the importance of Dow as an innovator is more difficult [R&D information].
- (2462) As regards the category "Other", which includes patents not classified in the categories herbicides, insecticides, or fungicides, the Commission notes that DuPont ([30-40]%) and Bayer ([20-30]%) are the main firms in the high quality patents (top 10%) in the period 2000-2015.¹⁷⁶⁴ Therefore, the Commission preliminarily considered in the Statement of Objections that its analyses of patent

¹⁷⁶⁴ These patent shares are calculated by included all firms, including Japanese companies.

shares described in recitals (2458) to (2461) were conservative, since including the patent families comprised in the category "Other" is likely to increase the patent share of DuPont in insecticides, leading to an even higher combined patent share for the merged entity. For the sake of clarity, it should be noted that patent families in the category "Other" are included for the analysis of patent shares in crop protection overall (see recital (2458)).

(D) Rebuttal of the Parties' critique on methodology made in the response to the Statement of Objections

(2463) In the response to the Statement of Objections, the Parties argue that the Commission's analysis carried out in the Statement of Objections is inappropriate for three main reasons:¹⁷⁶⁵

(a) The Commission's analysis uses patent shares based on the top 10% patents by quality. In particular, the Parties argue that this methodology gives a value of zero to those patents that are not within this subset, excluding 90% of patents.

(b) The Commission's analysis focuses on external citations to measure patent quality, that is to say it excluded internal citations. The Parties argue that the increase in internal citations with a firm size cannot be considered as a mechanical or artificial effect. As the share of existing market knowledge a firm has increases, the firm will have to rely more on its own knowledge in order to develop further knowledge. The Parties argue that eliminating internal citations leads to an artificial increase of the patent shares of those firms with smaller patent portfolios, which leads to an increase in the share of DuPont.

(c) The Commission excludes patents filed by Japanese companies in Europe.

(2464) In their analysis, the Parties consider all patents, independently of their quality, including patents filed by Japanese companies in Europe, and using total citations (including internal citations) to calculate the patent shares. The combined patent shares as calculated by the Parties, where mixture patents are also included, are the following: crop protection: [20-30]%; herbicides: [20-30]%; insecticides: [20-30]%; fungicides: [10-20]%.

(2465) In the response to the Statement of Objections, the Parties made a number of more specific comments on: (i) the inclusion of the AI Aminocyclopyrachlor developed by DuPont in herbicides, (ii) the metrics used to measure patent quality and to calculate patent shares, (iii) the exclusion of mixture patents, specific internal documents from Dow and DuPont, (iv) a weak correlation between patent citations and patent quality, and (v) the relevance of citation-based measure for current and future innovation efforts.

(2466) The Commission presents its rebuttal of the three main comments raised by the Parties, as well as the comment on the exclusion of mixture patents. The more specific comments are assessed in detail in Annex 1 and will not be discussed in this section.

¹⁷⁶⁵ Annex 3 of the Parties' response to the Statement of Objections. See also pages 8-9 and pages 30-32 of the Parties' response to the Statement of Objections.

(D.i) The threshold to determine the sample in the analysis

- (2467) As regards the first argument made by the Parties on focusing on the top 10% patents in term of quality to assess the innovative strength of the Parties and their competitors, the Commission notes that: (i) this sample of patents still represents more than 50% of the overall value of patents (see Annex 1), and (ii) focusing on this sample allows to focus on patents potentially leading to blockbuster products (for example Dow's Arylex in herbicides and DuPont's Rynaxypyr in insecticides). Therefore, the Commission still considers that patent shares based on the sample of top 10% patents are informative, in particular if one is interested in assessing the importance of the different R&D-integrated companies for innovations that are the most likely to lead to blockbuster products.
- (2468) In addition, the Commission notes that in the Statement of Objections it also presented results by considering all patents above the 75th percentile (that is to say the top 25% quality patents). The top 25% sample of patent represents around 70% of the overall value of the patents (independently of the exact metric used, based on external or total citations) for crop protection, and separately for herbicides, insecticides, and fungicides. Therefore, in the results presented in Section V.8.7.2.1(E), the Commission comments on patent shares based on the top 25% as an additional informative measure of the innovative strength of the Parties, and in particular when assessing the importance of the different R&D-integrated companies for patents that are the most likely to lead to breakthrough innovations (see recitals (2472) to (2473)).
- (2469) Moreover, as a further robustness check, and applying the methodology discussed in the Statement of Objections, the Commission will also present results including the top 50% sample (see recitals (2472), (2474), (2476)), that is to say all patents above the median in terms of quality, which represents around 90% of the overall value of the patents for crop protection, and separately for herbicides, insecticides, and fungicides.
- (2470) The Commission notes that there is support in the economic literature to not consider all the patents in the distribution, and to focus instead on a sample that includes the highest quality patents. Support for this approach can be found in the economic literature, including in the key papers on patent data already cited by the Commission in the Statement of Objections.
- (2471) In particular, Hall, Jaffe, Trajtenberg (2005) show that for firms with fewer than the median number of citations per patents, it makes no difference how far below the median they fall (which includes as well patents with zero citations), while firms with more than the median number of citations per patent exhibit a very significant increase in market value.¹⁷⁶⁶ These findings suggest that patents whose quality is below the median quality do not bring a significant value to firms.¹⁷⁶⁷ This suggests

¹⁷⁶⁶ Hall, Jaffe, Trajtenberg (2005), "Market value and patent citations", RAND Journal of Economics, pages 29-30.

¹⁷⁶⁷ Another paper from Coad and Rao (2008) studies the relation between firm's growth and innovativeness ("Innovation and firm growth in high-tech sectors: A quantile regression approach", Research Policy). The innovativeness is a composite index, including notably patents and R&D expense of the firms considered. Firm's growth rates at a given year are calculated by taking differences of logs of total sales across two consecutive years. Coad and Rao (2008) find that innovativeness appears to have a small influence on firm growth for the median firm. Actually, for most of the sectors considered, there is no impact of innovativeness on firm's growth for the median firm. For firms below the median, there is

that innovations are unlikely to have an impact on firm's value when innovations are below the median quality.

- (2472) In addition, Tratjenberg (1990) finds that the value of an innovation for customers is more skewed than what could be inferred from a count of citations, suggesting that a non-linear weight should be applied to citations to measure the value of an innovation.¹⁷⁶⁸ Tratjenberg (1990) suggests applying two non-linear weights: (i) a 1.1 non-linear weight to measure the value for all customers that benefit from the innovation (this is considered as a proxy for the size of the market affected by an innovation), and (ii) a 1.3 non-linear weight to measure the value of an innovation for a representative customer. As discussed in Tratjenberg (1990), the fact the non-linearity is stronger for a representative customer means that citations are more informative of the value of the innovation per se, rather than of the size of the market for the products embedding those innovations.^{1769,1770}
- (2473) The Commission notes that applying the two non-linear weights to citations counts, as suggested by Tratjenberg (1990), supports the need to consider in the analysis only the top distribution of the patent sample. In particular, if one considers all patents (independently of their quality) and applies a 1.3 non-linear weight to citations counts, then the resulting patent shares are very similar to those obtained when the analysis is restricted to the sample of top 25% patents without non-linear weight, for crop protection, herbicides, insecticides, and fungicides (see Annex 1). As discussed in the previous paragraph, a 1.3 non-linear weight seems appropriate if one is interested in breakthrough innovations. The Commission also notes that looking at the top 25% patents is also similar to what is suggested [internal document; R&D information].¹⁷⁷¹ The economic literature therefore supports the Commission's position that restricting the analysis of patent shares to the sample of top 25% patents does not create any significant bias in patent shares, if one is interested in breakthrough innovations.
- (2474) Moreover, if one considers all patents (independently of their quality) and applies a 1.1 non-linear weight to citations counts, then the patent shares are very similar to those resulting when the analysis is restricted to the sample of top 50% patents

clearly no impact of innovativeness on firm's growth, and sometime the impact is even negative (even though most of the coefficients are not significantly different from zero). On the contrary, the impact of innovativeness on growth is significantly higher for the 90th percentile, compared to the median firm (see pages 642-645 of this economic study). Overall, this paper suggests that innovations appear to have a small influence on firm growth below the median.

¹⁷⁶⁸ Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics.

¹⁷⁶⁹ Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics, pages 182-183.

¹⁷⁷⁰ This finding of Tratjenberg (1990) is also consistent with another paper from Scherer, Harhoff, and Vopel (1997, "Exploring the tail of patented invention value", ZEW Discussion Paper No. 97-30). In this paper, the authors estimate the value of inventions by using estimates obtained directly from patent holders through a survey. The authors find the distribution of patented innovation values to be highly skewed, and find that for the top quality patents their estimated value from surveyed customers is significantly larger than other estimates from the literature using metric based on patent data (page 20 of this paper). This finding is similar to Tratjenberg (1990), suggesting that metrics using patent data (like citations counts) do not fully account for the value of innovations, in particular for the highest quality patents.

¹⁷⁷¹ [Internal document] (ID1273). [Internal document; R&D information] Parties in the response to the Statement of Objections (paragraph 245).

without non-linear weight, for crop protection, herbicides, insecticides, and fungicides (see Annex 1). The economic literature therefore further supports the Commission's position that restricting the analysis of patent shares to the sample of top 50% patents as an additional robustness does not create any significant bias in patent shares.

- (2475) On the basis of recitals (2467) to (2474), the Commission considers that it is appropriate to calculate patent shares by relying on a sub-sample of high quality patents. In the results presented in Section V.8.7.2.1(E), the Commission considers in particular the results based on the top 10% patents and top 25% patents in term of quality (that is to say with a quality measure above the 90th percentile and 75th percentile), which were already presented in the Statement of Objections.
- (2476) In light of the Parties' response to the Statement of Objections, the Commission will also report and discuss the sample of top 50% patents in terms of quality. The Commission considers that verifying the robustness of its calculation against a sample of the top 50% patents in term of quality is appropriate since: (i) based on the existing literature, innovations below the median seem to have no impact or a little impact (if any) on firm's value; (ii) based on the existing literature, patents with a high number of citations have more value for customers than what the number of citations would suggest, therefore calculating patent shares based on the whole sample and using citations counts only would underestimate the importance of the high quality patents; and (iii) calculating patent shares based on the full sample of patent and using a 1.1 non-linear weight on citation counts, which allows to give more importance to highly cited patents, leads to patent shares which are similar when the sample of the top 50% patents is used without non-linear weights (see recital (2474)).

(D.ii) The use of internal and external citations to measure patent quality

- (2477) As regards the argument on excluding internal citations to measure patent quality, while the Commission agrees with the Parties that internal citations are valuable for firms, in particular because firms citing their own patents may be a reflection of the cumulative nature of innovation, the Commission also notes that internal citations have also disadvantages to measure patent quality. The discussion in recitals (2478) to (2483) complements the discussion in Section V.8.7.2.1(A.ii).
- (2478) First, as discussed in Hall, Jaffe, Tratjenberg (2005) and Section V.8.7.2.1(A.ii), internal citations will exhibit a mechanical effect and increase automatically with the size of the patent portfolio, regardless of whether these internal citations are indicative of the type of phenomena described in recital (2477). Moreover, Hall, Jaffe, and Tratjenberg (2005) also mention that this tendency to cite itself ("self-bias") may increase with the size of the patent portfolio.¹⁷⁷² Therefore, the Commission considers plausible that this mechanical effect can weaken the link between internal citations and patent quality.
- (2479) Second, while Hall, Jaffe, Tratjenberg (2005) show that internal citations have an important impact of firm's value, they also show that the value-relevance of internal citations declines with the size of the patent portfolio. In particular, in the case of Hall, Jaffe, and Tratjenberg (2005), for firms having an average-size patent portfolio

¹⁷⁷² Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics, page 33.

(about 200 patent in their case), the effect of internal citations on firm's value is important, it is even more important for firms with smaller portfolios, but for firms with an important portfolio (about 1000 patents in their case) internal citations have no impact on firm's value, and above 1000 patents the impact of internal citations on firm's value is even negative.¹⁷⁷³

- (2480) In this Decision, the two issues discussed in recitals (2478) to (2479) have to be considered in light of the importance of [R&D competitive intelligence] portfolio with more than [R&D competitive intelligence] patents, [R&D competitive intelligence] bigger than [R&D competitive intelligence], and almost [R&D competitive intelligence] times bigger than [R&D competitive intelligence] portfolio (see Annex 1). Moreover, the share of Bayer is the main one to be affected by including internal citations, with a significant increase. However, this increase in Bayer's patent share may not be related to better quality patents, due to the mechanical effect discussed in recitals (2478) to (2479) and the decreasing value-relevance of internal citations for large-size patent portfolio.
- (2481) In the response to the Statement of Objections, the Parties argue that excluding internal citations leads to an artificial increase in the patent share of DuPont. The Commission disagrees with this comment for the reasons already discussed in recitals (2478) to (2480) in Section V.8.7.2.1(A.ii).
- (2482) In particular, [R&D information], it has a smaller patent portfolio compared to [...], [...] times smaller than [...] portfolio and around [...] times smaller than [...] portfolios, leading automatically to a lower number of internal citations compared to other R&D-integrated firms. Therefore, considering total citations to measure patent quality (that is to say including internal citations in addition to external citations) would underestimate the strength of DuPont, [R&D information]. In particular, while based on external citations DuPont's patent portfolio has an average quality between [...] times higher than the patent portfolios of other R&D-integrated firms, the difference is smaller when total citations are considered with the average quality of DuPont's portfolio being between [...] times higher.
- (2483) In its analysis, the Commission will report patent shares based on total citations (that is to say including internal and external citations) and external citations only (that is to say excluding internal citations). However, on the basis of recitals (2477) to (2482) and the discussion in Section V.8.7.2.1(A.ii), as in the Statement of Objections, the Commission will put more weight on patent shares based on external citations only.

(D.iii) Patent filed by Japanese companies in the EEA

- (2484) As regards patents filed by Japanese companies, in light of Section V.8.6.3.4 and Sections 3.2.1.3 and 3.3.3 of Annex 1, the Commission still considers that Japanese companies are less effective players than R&D-integrated players, in particular for the EEA, and therefore should not be considered in the same way as R&D-integrated players.
- (2485) In particular, while Japanese companies had some discovery patents filed in the EEA in the past, their most successful innovations were always involving one of the R&D-integrated players in the development. Among all AIs launched in Europe after 2005

¹⁷⁷³ Hall, Jaffe, Trajtenberg (2005), "Market value and patent citations", RAND Journal of Economics, page 19.

and involving a Japanese company in the development stage, close to [70-80]% of the revenues corresponds to AI where one of the R&D-integrated player was also involved in the development stage. This shows that Japanese companies alone are limited in their capability to bring their discovery innovations to consumers in the EEA, and need to rely essentially on one of the R&D-integrated players to channel their innovations to consumers in the EEA. This confirms that Japanese companies should not be treated in the same way as the R&D-integrated players, and therefore justifying why the Commission gives more weight to patent shares when Japanese companies are excluded.

- (2486) In addition, the Commission notes that calculating patent shares among the R&D-integrated players by excluding Japanese patents is actually equivalent to allocate proportionally the patent shares of Japanese companies to each of the R&D-integrated companies. This approach assumes that R&D-integrated companies use to the same extent innovations developed by Japanese companies. However, data on revenues for AIs launched in the EEA (see Section V.8.7.2.2) shows that for the AIs launched in the EEA after 2005 and co-developed by a Japanese company and one of the five R&D-integrated players, around [60-70]% of the revenue corresponds to AI co-developed by the Parties, in particular from [...]. This finding suggests that the Parties (in particular [...]) have used innovations from Japanese companies relatively more than the other R&D-integrated players, suggesting that allocating proportionally Japanese patents to each of the R&D-integrated players actually underestimates the combined patent share of the merged entity.
- (2487) On the basis of recitals (2484) to (2486), and as in the Statement of Objections, in its analysis the Commission will present the results without and with Japanese patents filed in the EEA, but will give more weight to patent shares when Japanese companies are excluded.

(D.iv) Exclusion of mixture patents

- (2488) As regards the exclusion of mixture patents, the Commission disagrees with the Parties that more weight should be given to patent shares that include mixture patents. This is because excluding mixture patents allows assessing more precisely the technological strengths of the different firms involved in research in crop protection, since it allows to focus on innovations at the AI level which are more transformative, more costly, and more important for resistance management than innovations on mixtures. In other words, mixture patents do not relate to the discovery stage.
- (2489) Therefore, and as in the Statement of Objections, while the Commission reports the results with and without mixtures patents, it will give more weight to patent shares when mixture patents are excluded. The Commission presents in Section V.8.7.2.1(E) only patent shares when mixture patents are excluded. Patent shares when mixture patents are included are only reported in Annex 1 for completeness.

(E) Commission's analysis of patent shares

- (2490) The Commission presents in this section its results on patent shares. The results are based on the methodology presented in the Statement of Objections. In order to address the Parties' criticism of the Statement of Objections, the Commission will present an additional robustness scenario.
- (2491) The methodology used by the Commission is as follows.

- (2492) First, the Commission considers patent filed in the EEA during the period 2000-2015 and still active on 31 December 2015. Patent shares are reported for crop protection, and separately for herbicides, insecticides, and fungicides.
- (2493) Second, the Commission excludes mixture patents since it allows to assess more precisely the technological strengths of the different firms involved in research for new AIs in crop protection.
- (2494) Third, the Commission will report the results by measuring patent quality using the number of external citations (that is to say excluding internal citations) and the number of total citations (that is to say including internal citations), but will give more weight to patent shares based on external citations.
- (2495) Fourth, the Commission will report results with and without patents filed by Japanese companies in the EEA, but will give more weight to patent shares calculated without Japanese companies.
- (2496) Fifth, the Commission presents the patent data using four definitions of the relevant sample: all patents, top 50%, top 25% and top 10%. Results for three of these four definitions (all patents, top 25% and top 10%) were already included in the Statement of Objections. The Commission considers the additional robustness scenario with the top 50% of patents to address the comments made by the Parties in the response to the Statement of Objections. In interpreting the results of the patent share analysis the Commission relies on the top 10% and the top 25% of patents, and for robustness also comments on the more conservative top 50% scenario. As indicated in the Statement of Objections, looking at the top distribution of the patents is relevant to assess the importance of the Parties and other R&D-integrated companies for high quality innovations: blockbuster innovations (top 10%) and breakthrough innovations (top 25%).
- (2497) Table 63 and Table 64 present the main results of the patent analysis carried out by the Commission, and the robustness scenarios.
- (2498) The Commission notes that the patent shares presented in this section refer to the top 10% sample, as those presented in the Statement of Objections. Moreover, the results presented in this section for the top 25% patents and the robustness scenario on top 50% patents on the basis of external citations and for R&D-integrated companies are similar to the results presented in the Statement of Objections where the top 25% patents were considered. The results presented confirm the robustness of the Commission's patent analysis in the Statement of Objections and of its conclusions.

Table 63 – Patent shares in crop protection, herbicides, insecticides, and fungicides (top 10% and top 25%, 2000-2015, excluding mixture patents)

External citations (excluding internal citations)								
Category	Crop protection		Herbicides		Insecticides		Fungicides	
Quality sub-group	TOP 25%	TOP 10%	TOP 25%	TOP 10%	TOP 25%	TOP 10%	TOP 25%	TOP 10%
Number of patent families	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[5-10]%	[5-10]%
DuPont	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[40-50]%	[50-60]%	[10-20]%	[20-30]%
Combined	[40-50]%	[50-60]%	[40-50]%	[50-60]%	[50-60]%	[60-70]%	[20-30]%	[20-30]%
BASF	[5-10]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%	[10-20]%
Bayer	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[20-30]%	[10-20]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Total citations (including internal citations)								
Category	Crop protection		Herbicides		Insecticides		Fungicides	
Quality sub-group	TOP 25%	TOP 10%	TOP 25%	TOP 10%	TOP 25%	TOP 10%	TOP 25%	TOP 10%
Number of patent families	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[5-10]%	[0-5]%
DuPont	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%
Combined	[30-40]%	[30-40]%	[30-40]%	[40-50]%	[40-50]%	[50-60]%	[10-20]%	[10-20]%
BASF	[10-20]%	[10-20]%	[10-20]%	[5-10]%	[5-10]%	[5-10]%	[20-30]%	[20-30]%
Bayer	[30-40]%	[30-40]%	[20-30]%	[20-30]%	[30-40]%	[30-40]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: Commission's calculations based on patent data provided by the Parties in response to the Commission's request for information RFI 42, question 3 (see Annex 1 for more details on the data)

Table 64 – Patent shares in crop protection, herbicides, insecticides, and fungicides, under the robustness scenario (top 50%, 2000-2015, excluding mixture patents)

External citations (excluding internal citations)				
Category	Crop protection	Herbicides	Insecticides	Fungicides
Quality sub-group	TOP 50%	TOP 50%	TOP 50%	TOP 50%
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[30-40]%	[10-20]%	[5-10]%
DuPont	[20-30]%	[10-20]%	[40-50]%	[10-20]%
Combined	[40-50]%	[40-50]%	[50-60]%	[20-30]%
BASF	[5-10]%	[5-10]%	[5-10]%	[10-20]%
Bayer	[30-40]%	[10-20]%	[20-30]%	[40-50]%
Syngenta	[10-20]%	[20-30]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Category	Crop protection	Herbicides	Insecticides	Fungicides
Quality sub-group	TOP 50%	TOP 50%	TOP 50%	TOP 50%
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[30-40]%	[10-20]%	[5-10]%
DuPont	[10-20]%	[5-10]%	[20-30]%	[10-20]%
Combined	[30-40]%	[30-40]%	[40-50]%	[10-20]%
BASF	[10-20]%	[10-20]%	[5-10]%	[20-30]%
Bayer	[30-40]%	[20-30]%	[30-40]%	[40-50]%
Syngenta	[10-20]%	[20-30]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

Source: Commission's calculations based on patent data provided by the Parties in response to the Commission's request for information RFI 42, question 3 (see Annex 1 for more details on the data).

(E.i) *In crop protection, the Parties are important innovators (in particular DuPont), [R&D information], in a concentrated industry structure*

- (2499) Among the top 10% patents, DuPont is a particularly important innovator, number 1 pre-Transaction with a patent share of [30-40]% when external citations are used to measure patent quality, and number 2 pre-Transaction with a patent shares of [20-30]% when total citations are used to measure patent quality. [R&D information]. The Commission also notes that Dow has a significant patent share for these high quality patents, with a patent share around [10-20]%. Overall, among these high quality patents (top 10%), the merged entity would have a significant patent share in the range of [30-40]–[50-60]%, depending on the exact measure used for patent quality, and would be number 1 post-Transaction.
- (2500) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that DuPont ([30-40]%) remains number 1 pre-Transaction, above Bayer who is number 2 with a [20-30]% patent share. As regards Dow, while its patent share ([10-20]%) is below Syngenta ([10-20]%), it is still [R&D information] higher than BASF ([5-10]%). The merged entity would be a clear

number 1 pre-merger with a [40-50]% patent share, significantly above the number-2 Bayer.

- (2501) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont ([20-30]%) is decreasing and the one of Bayer ([30-40]%) is increasing, which is expected given that DuPont has [patent information] patent portfolio ([patent information] times [patent information] than [name of company], [patent information] times [patent information] than [names of companies], see Annex 1), DuPont ([20-30]%) is still number 2 pre-merger, above Syngenta ([10-20]%). As regards Dow ([10-20]%), it still has a patent share higher than BASF ([10-20]%). Overall, the merged entity would be number 1 post-Transaction at the same level as Bayer ([30-40]%) with a significant patent share around [30-40]%, [patent information] higher than Syngenta who is the next one with a [10-20]% patent share.
- (2502) Overall, among these high quality patents (top 25%), the merged entity would have a significant patent share in the range of [30-40]–[40-50]% and would be number 1 post-Transaction above Bayer or at the same level, depending on the measure used for patent quality.
- (2503) The findings presented in recitals (2499) to (2502) on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.
- (2504) Among the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that DuPont ([20-30]%) and Bayer ([30-40]%) are both number 1 pre-Transaction. As regards Dow, while its patent share ([10-20]%) is below Syngenta ([10-20]%), it is still [patent information] higher than BASF ([5-10]%). The merged entity would be a clear number 1 pre-merger with a [40-50]% patent share, significantly above the number-2 Bayer.
- (2505) Among the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont ([10-20]%) is decreasing and the one of Bayer ([30-40]%) is increasing, which is expected given that it has [patent information] patent portfolio ([patent information] times [patent information] than [name of company], [patent information] times [patent information] than [names of companies], see Annex 1), DuPont ([10-20]%) is still number 2 pre-Transaction, above Syngenta ([10-20]%). As regards Dow ([10-20]%), it still has a patent share higher than BASF ([10-20]%). Overall, the merged entity would be number 2 post-Transaction with a significant patent share around [30-40]%, below Bayer ([30-40]%) but [patent information] higher than Syngenta ([10-20]%).
- (2506) The Commission notes that, as had already been noted in the Statement of Objections, DuPont is the only company with an increase in its patent share when the quality of patents considered increases: [20-30]% for all patents, [20-30]% for the top 50%, [30-40]% for the top 25% patents, and [30-40]% for the top 10% patents when external citations are used to measure patent quality. Dow's patent share remains constant, while the patent share of other competitors, BASF, Bayer, and Syngenta, are decreasing with the quality of the patents considered. This increase in DuPont's patent shares is consistent with DuPont being active in particular for the high quality patents. Even when total citations are used to measure patent quality, DuPont is the only company that increase its patent share when the quality of patents increases, confirming its particular importance as an innovator in crop protection.

- (2507) When considering the top 10% patents, research in crop protection is concentrated with a post-Transaction HHI of [3500-4000] (respectively [3000-3500]) and a Delta HHI of [1000-1100] (respectively [600-700]) when external citations (respectively total citations) are used to measure patent quality.¹⁷⁷⁴ This is also the case when considering the top 25% patents, with a post-Transaction HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [900-1000] (respectively [500-600]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in crop protection remains concentrated with a post-Transaction HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [800-900] (respectively [500-600]) when external citations (respectively total citations) are used to measure patent quality. The Transaction would thus be likely to significantly enhance the market power of the merged entity when one considers innovation for new AIs in crop protection.
- (2508) In Annex 1, and without prejudice to the considerations made in Sections V.8.6.3.4 and V.8.7.2.1(D.iii) on the significant differences between Japanese companies and R&D-integrated firms, the Commission also reports patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA. As discussed in Sections V.8.6.3.4 and V.8.7.2.1(D.iii), the Commission considers that Japanese companies should not be treated in the same way of R&D-integrated firms and therefore gives less weight to these patent shares.
- (2509) Among the top 10% patents, even when patents filed by Japanese companies in the EEA are included (representing collectively a [20-30]% patent share), research in crop protection remains concentrated with a post-Transaction HHI of [2000-2500] (respectively [1500-2000]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. This is also the case among the top 25% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]% patent share, with a post-Transaction HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [400-500] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]% patent share, research in crop protection remains concentrated with a post-Transaction HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [400-500] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality.
- (2510) As discussed in the Statement of Objections, this analysis contradicts the argument of the Parties that research in crop protection is not concentrated once Japanese companies are considered.¹⁷⁷⁵ In particular, the methodology used by the Parties suffers from important flaws: (i) the quality of patents is not taken into account when calculating patent shares; (ii) all patents applications are considered, irrespective if the patent is currently active (for example, many patent applications are actually inactive because of rejection by the patent offices); and (iii) all patent applications at

¹⁷⁷⁴ Horizontal Merger Guidelines, paragraph 20.

¹⁷⁷⁵ See the Parties' submission entitled [...] (Section IV, see for example Table IV-3). See also Annex 1 of the response to the Statement of Objections.

the worldwide level are considered, that is including many patents/innovations which are not relevant for any EEA country.

- (2511) Moreover, even when Japanese companies are considered, DuPont would still remain number 1 pre-Transaction (similar to Bayer) or number 2 pre-Transaction (behind Bayer) with a patent share of in the range of [20-30]% for the top 10% patents, [10-20]–[20-30]% for the top 25% patents, and [10-20]–[20-30]% for the top 50% patents, depending if internal citations are included or not to measure patent quality. Overall, the merged entity would have a significant patent share around [30-40]% for the top 10% patents, [20-30]–[30-40]% for the top 25% patents, and [20-30]–[30-40]% for the top 50% patents. Last, among the samples of the top 10% patents, the top 25% patents, and the top 50% patents, the merged entity would be number 1 post-Transaction above Bayer or at a similar level, depending on the measure used for patent quality.
- (2512) The analysis of patent shares also shows a very limited role of Monsanto and a less important role of BASF compared to Dow, DuPont, Bayer, and Syngenta, in bringing innovations for the discovery of new AIs crop protection.
- (2513) As regards Monsanto, Table 63 and Table 64 confirm its limited technological strength for crop protection's innovations, with a very limited patent share in the range of [0-5]%, depending on the measure considered for patent quality.
- (2514) As regards BASF, Table 63 and Table 64 show that its patent share is always the lowest when compared to Bayer, Dow, DuPont, and Syngenta, in all groups of patents and for both measures of patent quality. As discussed in Sections V.8.7.2.1(E.ii)-V.8.7.2.1(E.iii), the technological strength of BASF in crop protection appears limited mainly because of its limited presence in insecticides, and to a certain extent in herbicides. Moreover, as discussed in Sections V.8.8.1.6, V.8.8.2.5 and V.8.7.2.1(E.ii)-V.8.7.2.1(E.iii), [content from internal documents], suggesting that the patent shares, based on past innovations, overestimate the importance of BASF for future innovations in herbicides and insecticides.
- (2515) The results presented in recitals (2499) to (2514) confirm the conclusions from the preliminary assessment made in the Statement of Objections. On the basis of recitals (2499) to (2514), and as concluded in the Statement of Objections, the Commission considers that the analysis of patent shares shows the following: (i) DuPont is a particularly important innovator at the AI level, and has even an increasing patent share for high quality patents; (ii) Dow is also an important innovator; (iii) the industry structure is concentrated, even after considering patents filed in Europe by Japanese companies; (iv) the merged entity would have a significant patent share of [50-60]% (respectively [30-40]%) for the top 10% patents, [40-50]% (respectively [30-40]%) for the top 25% patents based on external citations (respectively total citations) for innovations related to the discovery of new AIs, and even when considering an additional robustness scenario the merged entity would have a significant patent share of [40-50]% (respectively [30-40]%) for the top 50% patents, and around [30-40]% combined patent share when Japanese companies are considered; (v) Monsanto's technological strength is particularly limited in crop protection; and (vi) BASF's technological strength is lower compared to Bayer, Dow, DuPont, and Syngenta, in particular due to its limited presence in insecticides and to a certain extent in herbicides, and is likely to decrease in the future.

(2516) The Commission also notes that [R&D information] (see Sections V.6.6 and V.8.8.3), which lead to a decrease of their patent shares for crop protection compared to Bayer, BASF, and Syngenta (which have been historically active in research for fungicides), the Parties would still have a significant combined patent share for innovation in crop protection.

(E.ii) In Herbicides, the Parties are important and close innovators for new AIs

(2517) Among the top 10% patents, Dow is a particularly important innovator, number 1 pre-Transaction under both measures of patent quality, with a patent share of [30-40]% when external citations are used to measure patent quality and [30-40]% when total citations are used to measure patent quality. The Commission also notes that DuPont is mainly active in these highest quality patents, which explains the increase in the patent share of DuPont when the quality of patent considered increases. [R&D information]. For these top 10%, DuPont has a patent share of [10-20]% based on external citations and [5-10]% based on total citations. Overall, among these high quality patents (top 10%), the merged entity would have a significant patent share in the range of [40-50]-[50-60]%, depending on the exact measure used for patent quality, and would be a clear number 1 post-Transaction.

(2518) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that Dow ([30-40]%) remains number 1 pre-Transaction, and the merged entity would be a clear number 1 post-Transaction with a [40-50]% patent share, significantly above Bayer ([10-20]%) and Syngenta ([20-30]%).

(2519) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, despite the significant increase in the patent share of Bayer ([20-30]%) [patent information], Dow ([30-40]%) is still number 1 pre-Transaction, and the merged entity would remain number 1 post-Transaction with a [30-40]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([20-30]%).¹⁷⁷⁶

(2520) Overall, among these high quality patents (top 25%), the merged entity would have a significant patent share in the range of [30-40]-[40-50]%, and would be number 1 post-Transaction independently of the measure used for patent quality.

(2521) The findings presented in recitals (2517) to (2520) on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.

(2522) Among the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that Dow ([30-40]%) is number 1 pre-Transaction, and the merged entity would be a clear number 1 post-Transaction with a [40-50]% patent share, significantly above Bayer ([10-20]%) and Syngenta ([20-30]%).

(2523) As regards the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, despite the significant increase in the patent share of Bayer ([20-30]%) [patent information], Dow ([30-40]%) is still number 1 pre-Transaction, and the merged entity would

¹⁷⁷⁶ In herbicides, Bayer owns [patent number] patents, compared to [patent number] patents for BASF, [patent number] patents for Syngenta, [patent number] patents for Dow, [patent number] patents for DuPont, and [patent number] patents for Monsanto.

remain number 1 post-Transaction with a [30-40]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([20-30]%).

- (2524) The Commission notes that, as had already been noted in the Statement of Objections, Dow and DuPont are the only companies with an increase in their patent shares when the quality of patent considered increase: when external citations are used to measure patent quality, Dow's patent share increases from [30-40]% for all patents to [30-40]% for the top 50% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 10% patents, and DuPont's patent share increases from [10-20]% for all patents to [10-20]% for the top 50% and top 25% patents, and to [10-20]% for the top 10% patents. This increase in Dow's and DuPont's patent shares suggests that the Parties are particularly active with high quality patents in herbicides. This increasing trend for the Parties is also observed when total citations are used to measure patent quality, confirming their important role as innovators.
- (2525) When considering the top 10% patents, research in herbicides is concentrated with a post-Transaction HHI of [3500-4000] (respectively [3000-3500]) and a Delta HHI of [1200-1300] (respectively [600-700]) when external citations (respectively total citations) are used to measure patent quality.¹⁷⁷⁷ This is also the case when considering the top 25% patents, with a post-Transaction HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [800-900] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in herbicides remains concentrated with a post-Transaction HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [700-800] (respectively [300-400]) for the top 50% patents when external citations (respectively total citations) are used to measure patent quality. The Transaction would thus be likely to significantly enhance the market power of the merged entity when one considers innovation for new AIs in herbicides.
- (2526) In Annex 1, and without prejudice to the considerations made in Sections V.8.6.3.4 and V.8.7.2.1(D.iii) on the significant differences between Japanese companies and R&D-integrated firms, the Commission also reports patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA. As discussed in Sections V.8.6.3.4 and V.8.7.2.1(D.iii), the Commission considers that Japanese companies should not be treated in the same way as R&D-integrated firms and therefore gives less weight to these patent shares.
- (2527) Among the top 10% patents, even when patents filed by Japanese companies in the EEA are included (representing collectively a [20-30]-[30-40]% patent share, depending on the measure used for patent quality), research in herbicides remains concentrated with a post-Transaction HHI of [2000-2500] (respectively [2000-2500]) and a Delta HHI of [500-600] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. This is also the case among the top 25% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]-[30-40]% patent share (depending on the measure used for patent quality), with a post-Transaction HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [400-500] (respectively [200-300]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents,

¹⁷⁷⁷ Horizontal Merger Guidelines, paragraph 20.

where patents filed by Japanese companies in the EEA represent collectively a [20-30]-[30-40]% patent share (depending on the measure used for patent quality), research in herbicides remains concentrated with a post-Transaction HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [300-400] (respectively [200-300]) for the top 50% patents when external citations (respectively total citations) are used to measure patent quality.

- (2528) While the Delta HHI is below 250 (with a post-Transaction HHI below 2 000) for the robustness scenario with the top 50% patents when total citations are used to measure patent quality, the Commission notes that the Delta HHI is still [...] to the 250 threshold, even though using total citations dilutes the importance of DuPont given that it does not allow to fully capture [R&D information] (see Section V.8.7.2.1(D.ii) and Annex 1 for further details). Moreover, the Delta HHI is above the 250 threshold for the top 10% and the top 25% patents. Last, the Commission also notes that the significant cross-shareholding among the R&D-integrated companies suggests that the industry is more concentrated than a HHI analysis suggests (see Annex 5 for further details). Therefore, even after taking into account the Japanese companies, the Transaction would be likely to significantly enhance the market power of the merged entity in herbicides.
- (2529) When Japanese companies filing patents in the EEA are considered, actually only two Japanese companies achieve a significant patent share, namely Sumitomo with a patent share in the range of [10-20]-[20-30]% for the top 10% patents, [10-20] for the top 25% patents, and [10-20]% for the top 50%, and Mitsui with a patent share in the range of [5-10]% for the top 10% patents, [0-5]-[5-10]% for the top 25%, and [0-5]-[5-10]% for the top 50%. This explains why research in herbicides remains concentrated, even after Japanese companies filing patents in the EEA are considered.
- (2530) Moreover, even when Japanese companies are considered, Dow still remains number 1 pre-merger with a patent share of [20-30]% for the top 10% patents, [20-30]% for the top 25% patents, and [20-30]% for the top 50% patents. DuPont's patent share is in the range of [5-10]-[10-20]% for the top 10% patents, [5-10]% for both the top 25%, and top 50% patents, depending if internal citations are included or not to measure patent quality. Overall, the merged entity would have a combined share around [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [20-30]-[30-40]% for the top 50% patents, and would still remain a clear number 1 pre-merger (see Annex 1).
- (2531) As discussed in details in Annex 1, the significant patent share of the merged entity has to be interpreted in light of several additional facts, suggesting that the Parties are closer and more important innovators than what their patent shares suggest:
- (a) As discussed in Annex 1 and in Section V.8.8.1, DuPont has been the only and most recent challenger to Dow in the past by developing a similar expertise, with a line of research related to the specific chemical class of pyridine carboxylic acids and with an auxinic MoA, where Dow is particularly present with several AIs.

- (b) [R&D information].¹⁷⁷⁸ This led to several patents filed in general during the period 2014-2016.¹⁷⁷⁹ Given that these patents are very recent, they did not have time to accumulate citations. Therefore, the analysis of patent data is likely to underestimate the strength of DuPont in innovation for herbicides.
 - (c) As regards BASF, [internal document]. Based on that, the Commission considers that the patent share of BASF, estimated by considering past innovations, is likely to overstate the importance of BASF for future innovations in herbicides.
 - (d) As regards Monsanto, the Commission also notes that its importance is limited with a patent share in the range of only [0-5]% for top 50% patents, depending on the measure used for patent quality. This is even more the case when one considers patents related to breakthrough innovations (top 25% patents and top 10% patents), with a patent share in the range of [0-5]%. This limited role of Monsanto for innovation for new AIs in herbicides is also mentioned by [internal document].
 - (e) Moreover, Monsanto is historically present for innovations related to pre-emergence applications (mainly Glyphosate-related), which is a segment where the Parties are not present. As a consequence, the Commission considers Monsanto as a distant competitor to Dow and DuPont [R&D information].
 - (f) As regards Syngenta, the Commission notes that its current sales are mostly in graminicides, suggesting that it has innovated in the past mainly in this area. As a consequence, it appears that Syngenta, despite its relatively high patent share in herbicides, would be a distant competitor to Dow and DuPont [R&D information].
 - (g) As regards Japanese companies who filed patents in the EEA, the highest quality patents, which are the main drivers of the patents shares of Japanese companies, are particularly related to the rice crop, which is not the main crop in the EEA (see Annex 1 for further details).¹⁷⁸⁰ The main crops in the EEA are cereals (35% of total production), maize, fruits and vegetables, vine, oilseed rape and potatoes (see Section V.1.1). Therefore, the Commission considers that the good quality Japanese innovations have limited applications in the EEA, and therefore considers Japanese companies as distant competitors to Dow and DuPont.
- (2532) The results presented in recitals (2517) to (2531) confirm the conclusions from the preliminary assessment made in the Statement of Objections. On the basis of the recitals (2517) to (2531), and as concluded in the Statement of Objections, the Commission considers that the analysis of patent shares shows the following: (i) Dow is particularly important innovator for new AIs in herbicides; (ii) DuPont has also an important role as an innovator by being particularly active in the high quality patents; (iii) research in herbicides is concentrated, with a high level of HHI, even after considering patents filed in Europe by Japanese companies; (iv) the merged entity would have a significant patent share for the discovery of new AIs for the

¹⁷⁷⁸ [Internal document] (slides 9 and 33), (ID8006). [Internal document] (ID6825-29270), [internal document] (ID6825-29356).

¹⁷⁷⁹ [Pipeline information]. Source: response to the Commission's request for information 45, question 7.

¹⁷⁸⁰ [...].

period 2000-2015, with a patent share of [50-60]% (respectively [40-50]%) for the top 10% patents, [40-50]% (respectively [30-40]%) for the top 25% patents based on external citations (respectively total citations), and even when considering an additional robustness scenario the merged entity would have a significant patent share of [40-50]% (respectively [30-40]%) for the top 50%, and above [30-40]% when Japanese companies are considered, with Dow being number 1 pre-Transaction and where the estimated patent shares are likely to underestimate the future importance of DuPont; (v) Dow and DuPont are close competitors with innovations competing against each other in broadleaf weeds, when considering past innovations and current innovations for new AIs, with a limited number of alternatives; (vi) Syngenta has been in the past a distant competitor to Dow and DuPont by innovating in a different segment (graminicides); (vii) the estimated patent shares are likely to overestimate the future importance of BASF in innovations for new AIs in herbicides; (viii) Monsanto had had in the past a limited role in bringing innovations for new AIs in herbicides; and (ix) the main Japanese companies, Sumitomo and Mitsui, have patents mainly related to the rice crop (main crop in Japan), which is a more limited crop in the EEA and are therefore distant competitors to Dow and DuPont.

(E.iii) In insecticides, the Parties are important and close innovators for new AIs

- (2533) Among the top 10% patents, DuPont is a particularly important innovator, number 1 pre-Transaction under both measures of patent quality, with a patent share of [50-60]% when external citations are used to measure patent quality and [30-40]% when total citations are used to measure patent quality. [R&D information]. The Commission also notes that Dow has a significant patent shares for these high quality patents, with a patent share around [10-20]%. Overall, among these high quality patents (top 10%), the merged entity would have a significant patent share in the range of [50-60]-[60-70]%, depending on the exact measure used for patent quality, and would be a clear number 1 post-Transaction.
- (2534) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that DuPont ([40-50]%) remains a clear number 1 pre-Transaction, and the merged entity would be number 1 post-Transaction with a [50-60]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([10-20]%). The Patent share of Dow ([10-20]%) is also significant and similar to Syngenta ([10-20]%).
- (2535) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont is decreasing to [30-40]% and the one of Bayer is increasing ([30-40]%) ([patent information]), the merged entity would still remain number 1 post merger ([40-50]%), with DuPont being number 2 pre-Transaction, behind Bayer ([30-40]%) but significantly above Syngenta ([10-20]%).¹⁷⁸¹
- (2536) Overall, among these high quality patents (top 25%), the merged entity would have a significant patent share in the range of [40-50]-[50-60]% and would be a clear number 1 post-Transaction independently of the measure used for patent quality.

¹⁷⁸¹ In insecticides, Bayer owns [patent number] patents, compared to [patent number] patents for BASF, [patent number] patents for Syngenta, [patent number] patents for Dow, [patent number] patents for DuPont, and [patent number] patents for Monsanto.

- (2537) The findings presented in recitals (2533) to (2536) on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.
- (2538) As regards the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that DuPont ([40-50]%) is a clear number 1 pre-Transaction, and the merged entity would be number 1 post-Transaction with a [50-60]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([10-20]%). The Patent share of Dow ([10-20]%) is also significant and similar to Syngenta ([10-20]%).
- (2539) As regards the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont is decreasing to [20-30]% and the one of Bayer is increasing ([30-40]%) ([patent information]), the merged entity would still remain number 1 post merger ([40-50]%), with DuPont being number 2 pre-Transaction, behind Bayer ([30-40]%) but significantly above Syngenta ([10-20]%).
- (2540) The Commission notes that, as had already been noted in the Statement of Objections, DuPont is the only company with an increase in its patent shares when the quality of patent considered increase: [30-40]% for all patents, [40-50]% for the top 50% patents, [40-50]% for the top 25% patents, and [50-60]% for the top 10% patents when external citations are used to measure patent quality. Dow's patent share remains constant or slightly decreases, while the patent share of other competitors, BASF, Bayer, and Syngenta, are decreasing with the quality of the patents considered. This increase in DuPont's patent shares is consistent with DuPont being active in particular for the high quality patents, as well as Dow to a certain extent. Similar findings apply when total citations are used to measure patent quality, confirming the particular importance of DuPont as an innovator in insecticides, as well as Dow's importance to a certain extent.
- (2541) When considering the top 10% patents, research in insecticides is concentrated with a post-Transaction HHI of [5000-5500] (respectively [3500-4000]) and a Delta HHI of [1400-1500] (respectively [800-900]) when external citations (respectively total citations) are used to measure patent quality.¹⁷⁸² This is also the case when considering the top 25% patents, with a post-Transaction HHI of [4000-4500] (respectively [3000-3500]) and a Delta HHI of [1100-1200] (respectively [700-800]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in insecticides remains concentrated with a post-Transaction HHI of [3500-4000] (respectively [3000-3500]) and a Delta HHI of [1100-1200] (respectively [700-800]) when external citations (respectively total citations) are used to measure patent quality. The Transaction would thus be likely to significantly enhance the market power of the merged entity when one considers innovation for new AIs in insecticides.
- (2542) In Annex 1, and without prejudice to the considerations made in Sections V.8.6.3.4 and V.8.7.2.1(D.iii) on the significant differences between Japanese companies and R&D-integrated firms, the Commission also reports patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA.

¹⁷⁸² Horizontal Merger Guidelines, paragraph 20.

As discussed in Sections V.8.6.3.4 and V.8.7.2.1(D.iii), the Commission considers that Japanese companies should not be treated in the same way of R&D-integrated firms and therefore gives less weight to these patent shares.

- (2543) Among the top 10% patents, even when patents filed by Japanese companies in the EEA are included (representing collectively a [20-30]-[30-40]% patent share, depending on the measure used for patent quality), research in insecticides remains concentrated with a post-Transaction HHI of [2500-3000] (respectively [2000-2500]) and a Delta HHI of [600-700] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. This is also the case among the top 25% patents, where patents filed by Japanese companies in the EEA are included represent collectively a [20-30]-[30-40]% patent share (depending on the measure used for patent quality), with a post-Transaction HHI of [2000-2500] (respectively [2000-2500]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]-[30-40]% patent share (depending on the measure used for patent quality), research in insecticides remains concentrated with a post-Transaction HHI of [2000-2500] (respectively [2000-2500]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. Therefore, even after taking into account the Japanese companies, the Transaction would be likely to significantly enhance the market power of the merged entity in insecticides.
- (2544) When Japanese companies filing patents in the EEA are considered, actually only one Japanese companies achieves a patent share somehow comparable to (but still below) Dow and Syngenta, namely Nissan Chemical with a patent share in the range of [5-10]-[10-20]% for the top 10% patents, [5-10]-[10-20]% for the top 25% patents, and of [5-10]% for the top 50% patents, depending on the measure used for patent quality. This explains why research in insecticides remains concentrated, even after Japanese companies filing patents in the EEA are considered.
- (2545) Moreover, even when Japanese companies are considered, when external citations are used to measure patent quality, DuPont remains number 1 pre-Transaction with a patent share of [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [20-30]% for the top 50% patents. Dow's patent share is significant in the range of [5-10]%. The merged would be number 1 post-Transaction, with a significant patent share of [40-50]% for the top 10% patents, [40-50]% for the top 25% patents, and [30-40]% for the top 50% patents. When total citations are used to measure patent quality, while the patent share of DuPont decreases to [20-30]% for the top 10% patents, [20-30]% for the top 25% patents, and [20-30]% for the top 50% patents, and the one of Bayer increases to [20-30]% for the top 10% patents, [20-30]% for the top 25% patents, and [20-30]% for the top 50% patents, DuPont is still number 1 or 2 pre-Transaction, significantly above Syngenta ([5-10]-[10-20]%), and the merged entity would still remain number 1 post-Transaction with a patent share of [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 50% patents (see Annex 1).

- (2546) As discussed in detail in Annex 1, the significant patent share of the merged entity has to be interpreted in light of several additional facts, suggesting that the Parties are closer and more important than what their patent shares suggest:
- (a) Dow and DuPont are close competitors, in particular Dow [R&D information] (see also Section V.8.8.2.1).¹⁷⁸³
 - (b) As regards Monsanto, it is not present for research in insecticides.
 - (c) As regards BASF, its patent share is always the lowest when compared to Bayer, Dow, DuPont, and Syngenta, in all groups of patent quality and using both measures for patent quality, and with a decreasing patent share for the group of highest quality patents (top 25%, top 10%, see Annex 1). [Internal document] (see also Section V.8.8.2.5).¹⁷⁸⁴ Therefore, it is likely that the estimated patent share of BASF, which is based on past innovations, overestimates its innovative strength in the future for innovations for new AIs in insecticides.
- (2547) The results presented in recitals (2533) to (2546) confirm the conclusions from the preliminary assessment made in the Statement of Objections. On the basis of recitals (2533) to (2546), and as concluded in the Statement of Objections, the Commission considers that the analysis of patent shares shows that following: (i) DuPont is particularly important innovator for new AIs in insecticides, being number 1 or number 2 pre-Transaction, with a significant patent share of [50-60]% (respectively [30-40]%) for the top 10% patents, [40-50]% (respectively [30-40]%) for the top 25% patents, [40-50]% (respectively [20-30]%) for the top 50% patents, based on external citations (respectively total citations); (ii) Dow is also an important innovator, in particular with a patent share similar to Syngenta; (iii) research in insecticides is concentrated, with a high level of HHI, even after considering patents filed in Europe by Japanese companies; (iv) the merged entity would have a significant patent share for the discovery of new AIs in insecticides for the period 2000-2015, with a [60-70]% (respectively [50-60]%) patent share for the top 10% patents, [50-60]% (respectively [40-50]%) patent share for the top 25% patents based on external citations (respectively total citations), and even when considering an additional robustness scenario the merged entity would have a significant patent share of [50-60]% (respectively [40-50]%) patent share for the top 50% patents, and significantly above [30-40]% (in the range of [30-40]-[40-50]%) when Japanese companies are considered; (v) Dow and DuPont are close competitors with competing lines of research, with a limited number of alternatives; (vi) Monsanto is absent for research in insecticides; and (vii) BASF had a more limited role than other R&D-integrated firms in bringing innovations for new AIs in insecticides, with the lowest patent share and a decreasing patent share for the highest quality innovations, and its role is expected to be even lower for the future.

¹⁷⁸³ [Internal document] (ID7081-377).

¹⁷⁸⁴ [Internal document] slide 3 (ID7999).

(E.iv) *In Fungicides, DuPont is an important innovator, reaching a patent share similar to BASF and Syngenta (when external citations are used to measure patent quality and without mixture patents), [...]*

- (2548) First, the Commission notes that the [R&D information] (see Sections V.6.6 and V.8.8.3), and therefore considers that the patent shares of the Parties have to be interpreted in light of [R&D information].
- (2549) When external citations are used to measure patent quality, this analysis shows that DuPont has achieved a significant patent share ([20-30]% for the top 10% patents, [10-20]% for the top 25% patents, [10-20]% for the top 50% patents) [R&D information], similar to Syngenta ([10-20]-[20-30]%) and above BASF ([10-20]%).
- (2550) As regards Dow, while its patent share is limited ([5-10]% for the top 10% patents, [5-10]% for the top 25% patents, [5-10]% for the top 50% patents), the Commission notes that its patent related to the product Inatreq is [pipeline information] in the top [...]%. As discussed in the Sections V.6.6 and V.8.8.3, Inatreq is an important product for Dow currently. [Pipeline information]. Therefore, [R&D information], it is not surprising that Dow's patent share is relatively limited. The Commission notes [pipeline information]. As discussed in details in Section V.8.8.3, it is important to note that the entry of Dow and DuPont is taking place at the same time as other firms face significant regulatory pressure on their existing products.
- (2551) Overall, the merged entity would be the number 2 post-Transaction with a patent share of [20-30]% for the top 10% patents, [20-30]% for the top 25% patents, and [20-30]% for the top 50% patents, significantly below Bayer ([40-50]%), but above BASF ([10-20]%) and Syngenta ([10-20]-[20-30]%). [R&D information], the Commission considers this combined patent share as being significant.
- (2552) When total citations (that is to say including internal citations) are used to measure patent quality, both the patent shares of Dow and DuPont are decreasing, such that the merged entity would be number 4 post merger with a [10-20]% patent share for the top 10% and top 25% patents, and a [10-20]% patent share for the top 50% patents. However, this is expected since [R&D information] (see Annex 1 for further details). In that specific case, [R&D information], while BASF, Bayer, and Syngenta, have been historically active in research for fungicides, the Commission considers that patent shares that include internal citations should be interpreted with caution because results are likely to be biased significantly against the new entrants.
- (2553) Among the high quality patents (top 10%), when external citations are used to measure patent quality, research in fungicides is concentrated with a post-Transaction HHI of [3000-3500] and a Delta HHI of [100-200].¹⁷⁸⁵ This is also the case for the top 25% patents, with a post-Transaction HHI of [3000-3500] with a Delta HHI of [200-300]. The Commission notes that even under the robustness scenario with the top 50% patents, research in fungicides remains concentrated with a post-Transaction HHI of [3000-3500] and a Delta HHI of [200-300].
- (2554) When total citations are used to measure patent quality, while the HHI post-Transaction are high ([2500-3000] for the top 10% patents, [2500-3000] for the top 25% patents, and [3000-3500] for the top 50% patents), the Delta HHI is below 150 for the top 10%, top 25% patents, and top 50% patents. However, as

¹⁷⁸⁵ Horizontal Merger Guidelines, paragraph 20.

discussed in details in Annex 1, the Commission gives a lower weight for concentration measures with total citations, due to the negative bias against the merged entity [R&D information]. Moreover, the Commission also notes that the significant cross-shareholding among the R&D-integrated companies suggests that the industry is more concentrated than a HHI analysis suggests (see Annex 5 for further details).

- (2555) In Annex 1, and without prejudice to the considerations made in Section V.8.6.3.4 and V.8.7.2.1(D.iii) on the significant differences between Japanese companies and R&D-integrated firms, the Commission also reports patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA. As discussed in Sections V.8.6.3.4 and V.8.7.2.1(D.iii), the Commission considers that Japanese companies should not be treated in the same way of R&D-integrated firms and therefore gives less weight to these patent shares.
- (2556) Among the high quality patents (top 10%, top 25%), when external citations are used for patent quality, patent filed by Japanese companies in the EEA represent collectively a [10-20]%. While the Delta HHI is below 150 for the top 10% patents ([100-200]),¹⁷⁸⁶ it is above 150 for the top 25% patents ([100-200]) with a post-Transaction HHI of [2000-2500]. The Commission therefore considers that research in fungicides is concentrated, [R&D information].¹⁷⁸⁷ Moreover, the Commission notes that under the robustness scenario with the top 50% patents, research in fungicides is concentrated with a post-Transaction HHI of [2000-2500] and a Deal HHI of [100-200]. As discussed in recital (2552), this has to be interpreted [R&D information].¹⁷⁸⁸
- (2557) When total citations are used to measure patent quality, while the post-Transaction HHI is above 2 000 for the top 10% patents, top 25% patents, and top 50% patents, the Delta HHI is below 150 for each group ([0-100] for the top 10%, [0-100] for the top 25% patents, [0-100] for the top 50% patents). However, as discussed in details in Annex 1, the Commission gives a limited weight for concentration measures with total citations, due to the negative bias against the merged entity [R&D information].
- (2558) When Japanese companies filing patents in the EEA are considered, actually only one Japanese company achieves a significant patent share, namely Kumiai and Ihara (for patents jointly owned) with a patent share in the range of [0-5]-[10-20]%, depending on the measure use for patent quality. The next Japanese company is Nippon Soda with a patent share in the range of [0-5]%. This explains why research in fungicides remains concentrated (when considering external citations as a measure of patent quality), even after Japanese companies filing patents in the EEA are considered.
- (2559) Moreover, when Japanese companies are considered, the Commission notes that no Japanese company has a bigger patent share than the combined share of the merged entity, in the range of [10-20]-[20-30]% for the top 10% and top 25% patents and [10-20]% for the top 50% patents, depending on the measure used for patent quality.

¹⁷⁸⁶ The post-Transaction HHI is [HHI figure] for the top 10%.

¹⁷⁸⁷ Horizontal Merger Guidelines, paragraph 20.

¹⁷⁸⁸ Horizontal Merger Guidelines, paragraph 20.

(2560) The results presented in recitals (2548) to (2559) confirm the conclusions from the preliminary assessment made in the Statement of Objections. As concluded in the Statement of Objections, the analysis of patent shares for fungicides shows that: (i) DuPont is an important innovator and has been able to reach a patent share for new AIs similar to BASF and Syngenta (when external citations are used to measure patent quality), despite its late entry in R&D for fungicides; and (ii) research in fungicides is concentrated when external citations are used to measure patent quality (which the Commission considers as the most appropriate measure [R&D information]), even after considering patents filed in Europe by Japanese companies. Analysing the importance of Dow as an innovator is more difficult [R&D information]. The Commission also notes that, as discussed in details in Sections V.6.6 and V.8.8.3, the entry of Dow and DuPont is taking place at the same time as other firms face significant regulatory pressure on their existing products.

(E.v) In the category "Other", DuPont is the main innovator with important innovations in insecticides and nematocides

(2561) As regards the category "Other", which includes patents not classified in the categories herbicides, insecticides, or fungicides (see Annex 1), the Commission notes that DuPont and Bayer are the main firms in the high quality patents in the period 2000-2015. This category includes [patent number] patents, among which [patent number] patents in the highest quality group (top 10%), [patent number] patents are in the top 25% group, and [patent number] patents are in top 50% group.

(2562) Among the Big6 R&D-integrated firms, depending on the measure used for patent quality, DuPont has the highest patent share in the range of [30-40]-[40-50]% for the top 10% patents, [30-40]-[40-50]% for the top 25% patents, and of [30-40]% for the top 50% patents, followed by Bayer ([30-40]% for the top 10% patents, [20-30]-[30-40]% for the top 25% patents, [20-30]% for the top 50% patents). When Japanese companies are included, DuPont has still the highest patent share in the range of [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and of [20-30]% for the top 50% patents, followed by Bayer ([20-30]% for the top 10% patents, [20-30]% for the top 25% patents, [20-30]% for the top 50% patents), depending on the measure used for patent quality. None of the Japanese company has a significant patent share in this category.

(2563) Looking at the abstract of the patents in the highest quality group (top 10%), which are the main drivers of the patent shares, the Commission understands that these patents are mainly related to insecticides, including nematocides. The Commission notes that in the response to the Statement of Objections, the Parties did not comment on this evidence.

(2564) Other companies present in the category are: BASF ([5-10]% for the top 10% patents, [5-10]% for the top 25% patents, [5-10]% for the top 50% patents), Dow ([5-10]-[10-20]% for the top 10% patents, [5-10]-[10-20]% for the top 25% patents, [5-10]-[10-20]% for the top 50% patents), Monsanto ([5-10]% for the top 10% patents, [5-10]% for the top 25% patents, [5-10]% for the top 50% patents), and Syngenta ([0-5]% for the top 10% patents, [5-10]% for the top 25% patents, [10-20]% for the top 50% patents). The Commission notes that some of these patents seem related to Plant Growth Regulators, where Dow and DuPont are currently not active.

(2565) Therefore, the Commission considers its analyses of patent shares described in recitals (2561) to (2564) is conservative, since including the patent families included in the category "Other" is likely to increase the patent share of DuPont in insecticides, leading to an even higher combined patent share for the merged entity.

(2566) For the sake of clarity, it should be noted that patent families in the category "Other" are included for the analysis of patent shares in crop protection.

(E.vi) Conclusion: the analysis of patent data shows that Dow and DuPont are important and close innovators for new AIs in crop protection, in particular for herbicides and insecticides

(2567) The Commission has analysed patent data in the crop protection industry to assess the technological importance of the R&D-integrated firms. Table 65, Table 66, and Table 67 provide a summary of the main results of the analysis on patent shares. The results presented in this Section V.8.7.2.1 confirm the conclusions from the preliminary assessment made in the Statement of Objections.

(2568) As in the Statement of Objections, the Commission considers that the analysis of patent shares shows the following:

(a) Dow and DuPont have been important innovators in the crop protection industry for the discovery of new AIs, in particular Dow in herbicides and DuPont in insecticides and fungicides.

(b) Dow and DuPont would have a significant combined patent share for the period 2000-2015 for the discovery of new AIs in crop protection ([50-60]% for the top 10% patents, [40-50]% for the top 25% patents, and [40-50]% for the top 50% patents robustness scenario, based on external citations; [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 50% patents robustness scenario, based on total citations), herbicides ([50-60]% for the top 10% patents, [40-50]% for the top 25% patents, and [40-50]% for the top 50% patents robustness scenario based on external citations; [40-50]% for the top 10% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 50% patents robustness scenario based on total citations), and insecticides ([60-70]% for the top 10% patents, [50-60]% for the top 25% patents, and [50-60]% for the top 50% patents robustness scenario, based on external citations; [50-60]% for the top 10% patents, [40-50]% for the top 25% patents, and [40-50]% for the top 50% patents robustness scenario, based on total citations).

(c) The industry structure is concentrated with high levels of HHI post-Transaction and Delta HHI, for crop protection, and in particular for herbicides and insecticides. The Commission also notes that the significant cross-shareholding among the R&D-integrated companies suggests that the industry is more concentrated than a HHI analysis suggests (see Annex 5 for further details).

(d) In innovations for new AIs in herbicides, Dow and DuPont are important and close competitors (considering past innovations and current innovations) with a limited number of alternatives, Monsanto had a limited role in the past and is a distant competitor to the Parties, BASF's importance is likely to be lower in the future, Syngenta is a distant competitor to the Parties. As regards Japanese companies filing patents in the EEA, they are distant competitors to the Parties due to focus on the rice crop, which is of a limited importance for the EEA;

- (e) In innovations for new AIs in insecticides, Dow and DuPont are important and close innovators (considering past innovations and current innovations) with a limited number of alternatives, Monsanto is absent, BASF had a more limited role in the past compared to other R&D-integrated firms and it is expected to be even lower for the future.
- (f) Despite its late entry in research for fungicides, DuPont has been able to achieve a significant patent share, suggesting that it is likely to be more important in the future than what is suggested by its current patent share.
- (g) Even under a conservative approach that includes patents filed in the EEA by Japanese companies, research in crop protection, and notably in herbicides and insecticides is still concentrated, and the merged entity would have significant patent shares: crop protection (around [30-40]%), herbicides (around [30-40]%), insecticides ([30-40]-[40-50]%).

Table 65 – Summary of patent shares and concentration indexes (2000-2015, top 10% patents, excluding mixture patents)

R&D-integrated companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%	[30-40]%	[50-60]%	[3500-4000]	[1000-1100]
	([10-20]%)	([20-30]%)	([30-40]%)	([3000-3500])	([600-700])
Herbicides	[30-40]%	[10-20]%	[50-60]%	[3500-4000]	[1200-1300]
	([30-40]%)	([5-10]%)	([40-50]%)	([3000-3500])	([600-700])
Insecticides	[10-20]%	[50-60]%	[60-70]%	[5000-5500]	[1400-1500]
	([10-20]%)	([30-40]%)	([50-60]%)	([3500-4000])	([800-900])
Fungicides	[5-10]%	[20-30]%	[20-30]%	[3000-3500]	[100-200]
	([0-5]%)	([10-20]%)	([10-20]%)	([2500-3000])	([0-100])
R&D-integrated companies and Japanese companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%	[20-30]%	[30-40]%	[2000-2500]	[500-600]
	([10-20]%)	([20-30]%)	([30-40]%)	([1500-2000])	([400-500])
Herbicides	[20-30]%	[10-20]%	[30-40]%	[2000-2500]	[500-600]
	([20-30]%)	([5-10]%)	([30-40]%)	([2000-2500])	([300-400])
Insecticides	[5-10]%	[30-40]%	[40-50]%	[2500-3000]	[600-700]
	([5-10]%)	([20-30]%)	([30-40]%)	([2000-2500])	([400-500])
Fungicides	[0-5]%	[10-20]%	[20-30]%	[2000-2500]	[100-200]
	([0-5]%)	([10-20]%)	([10-20]%)	([2000-2500])	([0-100])

Source: Commission's calculations based on patent data provided by the Parties in response to the Commission's request for information RFI 42, question 3 (see Annex 1 for more details on the data)

Note: Patent shares based on external citations (not in parenthesis) and based on total citations (in parenthesis) to measure patent quality

Table 66 – Summary of patent shares and concentration indexes (2000-2015, top 25% patents, excluding mixture patents)

R&D-integrated companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%	[30-40]%	[40-50]%	[3000-3500]	[900-1000]
	([10-20]%)	([20-30]%)	([30-40]%)	([2500-3000])	([500-600])
Herbicides	[30-40]%	[10-20]%	[40-50]%	[3000-3500]	[800-900]
	([30-40]%)	([5-10]%)	([30-40]%)	([2500-3000])	([400-500])
Insecticides	[10-20]%	[40-50]%	[50-60]%	[3000-3500]	[1100-1200]
	([10-20]%)	([30-40]%)	([40-50]%)	([2500-3000])	([700-800])
Fungicides	[5-10]%	[10-20]%	[20-30]%	[3000-3500]	[200-300]
	([5-10]%)	([10-20]%)	([10-20]%)	([2500-3000])	([100-200])
R&D-integrated companies and Japanese companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%	[20-30]%	[30-40]%	[1500-2000]	[400-500]
	([10-20]%)	([10-20]%)	([20-30]%)	([1500-2000])	([300-400])
Herbicides	[20-30]%	[5-10]%	[30-40]%	[1500-2000]	[400-500]
	([20-30]%)	([5-10]%)	([30-40]%)	([1500-2000])	([200-300])
Insecticides	[5-10]%	[30-40]%	[40-50]%	[2000-2500]	[500-600]
	([5-10]%)	([20-30]%)	([30-40]%)	([2000-2500])	([400-500])
Fungicides	[5-10]%	[10-20]%	[20-30]%	[2000-2500]	[100-200]
	([0-5]%)	([10-20]%)	([10-20]%)	([2000-2500])	([0-100])

Source: Commission's calculations based on patent data provided by the Parties in response to the Commission's request for information RFI 42, question 3 (see Annex 1 for more details on the data)

Note: Patent shares based on external citations (not in parenthesis) and based on total citations (in parenthesis) to measure patent quality

Table 67 – Summary of patent shares and concentration indexes (2000-2015, top 50% patents, excluding mixture patents)

R&D-integrated companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%	[20-30]%	[40-50]%	[3000-3500]	[800-900]
	([10-20]%)	([10-20]%)	([30-40]%)	([2500-3000])	([500-600])
Herbicides	[30-40]%	[10-20]%	[40-50]%	[3000-3500]	[700-800]
	([30-40]%)	([5-10]%)	([30-40]%)	([2500-3000])	([300-400])
Insecticides	[10-20]%	[40-50]%	[50-60]%	[3500-4000]	[1100-1200]
	([10-20]%)	([20-30]%)	([40-50]%)	([3000-3500])	([700-800])
Fungicides	[5-10]%	[10-20]%	[20-30]%	[3000-3500]	[200-300]
	([5-10]%)	([10-20]%)	([10-20]%)	([3000-3500])	([100-200])
R&D-integrated companies and Japanese companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%	[20-30]%	[30-40]%	[1500-2000]	[400-500]
	([10-20]%)	([10-20]%)	([20-30]%)	([1500-2000])	([300-400])
Herbicides	[20-30]%	[5-10]%	[30-40]%	[1500-2000]	[300-400]
	([20-30]%)	([5-10]%)	([20-30]%)	([1500-2000])	([200-300])
Insecticides	[5-10]%	[20-30]%	[30-40]%	[2000-2500]	[500-600]
	([10-20]%)	([20-30]%)	([30-40]%)	([2000-2500])	([400-500])
Fungicides	[5-10]%	[10-20]%	[10-20]%	[2000-2500]	[100-200]
	([5-10]%)	([5-10]%)	([10-20]%)	([2000-2500])	([0-100])

Source: Commission's calculations based on patent data provided by the Parties in response to the Commission's request for information RFI 42, question 3 (see Annex 1 for more details on the data)

Note: Patent shares based on external citations (not in parenthesis) and based on total citations (in parenthesis) to measure patent quality

8.7.2.2. New active ingredients shares

(2569) The Parties suggest that the number of AI launches is a good measure of innovation output. However, as explained in Section V.5.2.2, AIs are likely to differ greatly in their quality, as suggested also by the analysis of patent data (see Annex 1). In order to measure for the effective significance of the R&D output of crop protection

companies, one should thus take account the commercial success of the AIs launched by crop protection companies.

- (2570) Gauging the commercial success of AIs allows controlling for an important factor that affects the development capabilities of crop protection companies, that is to say their capability to develop an AI on a large scale and to distribute it to enable its commercial success on the market. The Parties themselves seem to acknowledge that the commercial success of an AI is an important factor when assessing the relevance of the innovation effort of a crop protection companies.
- (2571) As already explained in Section V.4.4.2 a number of regional factors justify the different geographical focus of companies' innovation efforts. Therefore, the Commission considers the relevant geographic dimension of innovation spaces to be global, with a strong differentiation between the different regions, or at least EEA-wide. In this section, the Commission will thus analyse the commercial success of the AIs launched by crop protection companies both at a global and EEA level.
- (2572) In this section, the Commission will therefore consider firms' shares of 2015 downstream turnover of products that include AIs recently developed and launched, namely those introduced during 2006-2015 ("New AIs share") in line with the methodology described in Section V.8.6.3.5. The period considered is consistent with the patent shares timeframe analysed in the previous section over 2000-2015 since while patent shares intend to measure discovery capabilities, which start earlier in the innovation process, New AIs shares intends to measure development capabilities. In fact, AIs launched before 2006 would be the result of innovation efforts that took place more than 20 years ago and would not reflect the current innovation capabilities of R&D-integrated players.
- (2573) At a global level, based on the 2015 turnover generated by the AIs launched during 2006-2015, it is possible to conclude that the Parties have been successful in launching AIs with significant commercial results.
- (2574) In particular, DuPont is the leader as regards launching new AIs with significant commercial results, accounting for [30-40]% of the 2015 global turnover, ahead of Bayer with [20-30]%. Dow also has a significant share of [5-10]%. Post-Transaction the Parties would together account for [30-40]% of the 2015 global turnover, [R&D information] times more than BASF and Syngenta and almost [R&D information] percentage points above Bayer.
- (2575) According to this metric to measure innovation competition concentration at the industry level, the Transaction would lead to a significant increase of the HHI level at a global level. The delta associated to the Transaction is equal to [400-500]. The post-Transaction HHI level would equal to [2000-2500].

Figure 139 – Share of worldwide turnover generated in 2015 by AIs launched during 2006-2015, identified by the R&D-integrated players which (co-)developed these AIs

[...]

Source: Commission's calculations based on data provided by the Parties in response to the Commission's request for information RFI 38, question 5 (see Annex 3 for more details on the data)

Notes: When an AI has been co-developed by two companies, the turnover associated to that AI was divided equally between the companies

In order for Figure 139 and Figure 140 to be consistent, the period refers to the year in which the active ingredient was reported by the Parties to be first launched, irrespective of the region in which it was first launched

- (2576) As regards EEA turnover of all new AIs launched between 2006 and 2015, the Parties' share is lower, with Dow and DuPont being the fourth and fifth player with [10-20]% and [5-10]% share, respectively. Post-Transaction, however the merged entity would have a share very similar to BASF and Syngenta, namely [20-30]%, below Bayer. The Commission notes however that, in the EEA, the fringe of other players is very weak, with only [5-10]% of the share not being accounted by the Big 5.
- (2577) According to this metric to measure innovation competition concentration at the industry level, in the EEA the Transaction would still lead to a significant increase of the HHI level. The delta associated to the Transaction is equal to [100-200]. The post-Transaction HHI level would equal to [2000-2500].

Figure 140 – Share of EEA turnover generated in 2015 by AIs launched during 2006-2015 and further introduced in the EEA, identified by the R&D-integrated players which (co-)developed these AIs

[...]

Source: Commission's calculations based on data provided by the Parties in response to the Commission's request for information RFI 38, question 5 (see Annex 3 for more details on the data)

Notes: When an AI has been co-developed by two companies, the turnover associated to that AI was divided equally between the companies

In order for Figure 139 and Figure 140 to be consistent, the period refers to the year in which the active ingredient was reported by the Parties to be first launched, irrespective of the region in which it was first launched

- (2578) The Commission considers that these shares underestimate the Parties innovation strength given that both Dow and DuPont have several products [R&D information] in herbicides with Arylex from Dow and in fungicides with Inatreq from Dow and [pipeline information] from DuPont, with particular focus in Europe. In the future, it is thus likely that the Parties' market share would increase to significant larger values in Europe.
- (2579) In their response to the Article 6(1)(c) Decision and the Statement of Objections the Parties argued that aside from Rynaxypyr, launched in 2008 and introduced in the EEA in 2014, none of DuPont's AIs has been particularly successful. More specifically, according to the Parties, Rynaxypyr represented [sales estimate]% of the worldwide revenues associated to the six AIs introduced in the EEA during 2005-2016. In particular, the Parties state that "*DuPont launched six AIs in the period 2005-2016 (Rynaxypyr, Cyazypyr, Penthiopyrad, Proquinazid, Oxathiapiprolin and Aminocyclopyrachlor). Actual 2015 revenues from these six actives amounted to [quote from the submission on sales estimate].*"¹⁷⁸⁹
- (2580) The Commission notes that out of these six AIs, the Parties have indicated that two of them have not been launched in the EEA (aminocyclopyrachlor and oxathiapiprolin), that no global turnover was provided for one of them (oxathiapiprolin) and that one has been launched in the EEA in 2016 (Cyazypyr). Therefore, the Commission cannot comment on the figures provided by the Parties.
- (2581) The Commission considers that Rynaxypyr should be included in DuPont's market share calculation. As explained in Section V.5.2, the Commission refers in its analysis to different quantitative metrics capable of measuring output. The purpose

¹⁷⁸⁹ Parties' response to the Article 6(1)(c) Decision, paragraph 217 and footnote 168.

of the calculation of New AIs shares is to obtain a proxy to measure the ability of a crop protection company to deploy capabilities in securing, developing and bringing innovation to the market. Commercial success of an AI is used as a proxy of the capabilities of a given company. In this respect, it is not correct to exclude an AI because of its success.

- (2582) As regards the circumstance that most of the revenues are only due to one AI, the development of a blockbuster molecule with significant sales cannot be considered, as suggested by the Parties, as a mere product of chance.
- (2583) The analysis of DuPont's pipeline and historic performance explains that Rynaxypyr is the result of an effort undertaken by DuPont. In fact, the analysis of DuPont's pipeline and historic performance explains that Rynaxypyr is the result of an effort undertaken by DuPont to build a robust pipeline [R&D information]. In this respect, it is the combination of the New AIs shares with other quantitative and qualitative elements to suggest that it is not a casual success, but the result of a significant effort. [R&D information].
- (2584) This is [...] corroborated by [internal documents], but also by high quality patent shares within insecticides. [R&D information]. In addition, when one looks to the patent data (described in Section V.8.7.2.1), it is evident that the strength of DuPont depends also on its patents in herbicides, patents in insecticides not related to Rynaxypyr (for example Cyazypyr), and patents in fungicides.
- (2585) The Parties argued that the Commission based its assessment in an arbitrary timeline and where their market shares are the highest. According to the Parties if one considers instead a five or 15 years period the market structure changes significantly, which constitutes evidence of the sensitivity of this indicator.¹⁷⁹⁰
- (2586) The Commission considers that a 10 years period reference is a better measure of the Parties' innovation strength than any of the two other suggestions of the Parties.
- (2587) In order to understand what is measured by the New AIs shares, it is necessary to consider the after-launch life-cycle of a product, and in particular the fact that peak revenues are achieved years after launch (as the product is rolled-out and launched in different jurisdictions). In this context, because the revenues used refer to one year (namely 2015), the sample measured has to extend sufficiently to the past in order to capture AIs which have reached peak/maturity sales
- (2588) Considering AIs launched over a window of five years is not appropriate because (i) five years capture only a limited number of launches corresponding to USD [sales estimate] in 2015 sales, versus a 10 year sample capturing approximately USD [sales estimate] in 2015 sales; (ii) new AIs reach peak/maturity sales over time, 2015 revenues would in essence be highlighting peak sales only for AIs launched around 2011-2012. Because of the same reasons, the selection of different five year periods leads to very different results, driven by the AIs which achieved peak/maturity over that short period (considering that crop protection companies do not typically launch product every year).
- (2589) Moreover, [R&D information].¹⁷⁹¹

¹⁷⁹⁰ Parties' response to the Statement of Objections, pages 8-10. See also response to Letter of Facts, section VI.5.

¹⁷⁹¹ [Internal document] (ID8008).

Figure 141 – [Extract from internal document]

[...]

(2590) [R&D information].¹⁷⁹²

Figure 142 – [Extract from internal document]

[...]

Figure 143 – [Extract from internal document]

[...]

(2591) As regards the suggestion of the Parties to use a 15 year period, namely 2001-2015, the Commission notes that this [R&D information].¹⁷⁹³

Figure 144 – [Extract from internal document]

[...]

(2592) The analysis of DuPont's pipeline and historic performance suggests that Rynaxypyr is the result of this effort undertaken by DuPont to build a robust pipeline focusing on new MoAs.

(2593) In addition, in order to account for the importance of new AIs introduced before 2006, the Parties still use revenues from 2015. The revenue data is however also available for the years 2011, 2012, 2013, 2014 and 2015. In order to have a dynamic view of the revenues generated by launches of AIs since 2002, it is thus possible to calculate five series of 10 year rolling averages (revenue data from the last year of the period).¹⁷⁹⁴

(2594) This analysis confirms that DuPont has been growing significantly in importance in terms of commercial success of its AIs over the past years. The Parties combined position grew from around [10-20]% to [30-40]% in the more recent period.

¹⁷⁹² [Internal document] (ID3987-126).

¹⁷⁹³ DuPont's response to Question 8 of the Commission's request for information RFI 38.

¹⁷⁹⁴ In the Statement of Objections, the Commission conducted a similar analysis to the one presented in Figure 145 and Figure 146, but taking 2015 as the year of reference to measure revenues of each period of AIs launched. In the first Letter of Facts, the Commission presented the results of this analysis at the worldwide level taking into account the revenue data from the last year of each period, as in Figure 145. The Parties, in the response to the first Letter of Facts presented the same Figure for the EEA, as in Figure 146. Additionally, the Parties presented the same analysis but for different timeframes, namely AIs launched in a period of 15, seven and five years range to illustrate the fact that results are highly dependent of this selection. The Commission, however, considers that a 10 years period is the best timeframe, as explained in recitals (2586) to (2591).

Figure 145 – Evolution of the share of worldwide turnover of AIs launched during 10-years long periods, identified by the R&D-integrated players which (co-)developed these AIs

[...]

Source: Commission's calculations based on data provided by the Parties in response to the Commission's request for information RFI 38, question 5 (see Annex 3 for more details on the data)

Notes: The turnovers used for this graph are the ones generated in the last year of the period of reference, for example turnover generated in 2012 for the period 2003-2012

When an AI has been co-developed by two companies, the turnover associated to that AI was divided equally between the companies

In order for Figure 145 and Figure 146 to be consistent, the period refers to the year in which the active ingredient was reported by the Parties to be first launched, irrespective of the region in which it was first launched

(2595) As regards EEA turnover, Parties' shares also increased significantly from around [10-20]% for the period 2002-2011 to [20-30]% for the period 2006-2015.

Figure 146 – Evolution of the share of EEA turnover of AIs launched during 10-years long periods and further introduced in the EEA, identified by the R&D-integrated players which (co-)developed these AIs

[...]

Source: Commission's calculations based on data provided by the Parties in response to the Commission's request for information RFI 38, question 5 (see Annex 3 for more details on the data)

Notes: The turnovers used for this graph are the ones generated in the last year of the period of reference, for example turnover generated in 2012 for the period 2003-2012

When an AI has been co-developed by two companies, the turnover associated to that AI was divided equally between the companies

In order for Figure 145 and Figure 146 to be consistent, the period refers to the year in which the active ingredient was reported by the Parties to be first launched, irrespective of the region in which it was first launched

(2596) The results of this analysis confirm the qualitative evidence described in Section V.8.7.1 as well as the patent analysis of Section V.8.7.2.1, that is to say that the Parties are important innovators in crop protection, and even more than their R&D expenditure would suggest.

8.7.3. Conclusion on the importance of Dow and DuPont as innovation competitors at industry level

(2597) The Commission concludes that Parties are important innovators in the crop protection industry [R&D information].

(2598) In addition, according to quantitative metrics better fitted to measure innovation capabilities at an industry level, namely patent shares (based on quality of patents) and new AIs shares (based on turnover on downstream markets), the Commission concludes that the Parties' importance as innovation competitors at an industry level is higher than their downstream shares and their R&D expenditure shares suggest.

(2599) Therefore, the Commission considers that the Transaction would bring together two important innovation competitors which likely would contribute to significantly impede effective innovation competition post-Transaction.

8.8. In a number of innovation spaces, the Transaction would bring together two important and closely competing innovation competitors with few other alternatives available

- (2600) In line with paragraph 28 of the Horizontal Merger Guidelines, the higher the substitutability between the Parties' products, the more likely it is that the Parties would reduce innovation post-Transaction.
- (2601) The extent to which the Parties exert competitive pressure on each other on innovation competition can be captured by current product overlaps as well as by overlaps in their lines of research and early pipeline products.
- (2602) In this section, concrete cases are discussed which shows that the Parties have strongly innovated in the past to take away share from each other. Had the Parties been part of the same entity when the company had to decide on their advancement into development, they would have faced substantially weaker incentives to bring that innovation to market, leading to a loss in innovation.
- (2603) Post-Transaction, this type of innovation competition between the Parties would not be present anymore, which would likely result in harm for innovation. Therefore, the Commission also identifies in this section the current lines of research and early pipeline products of the Parties which overlap and that could therefore risk being discontinued, deferred or redirect by the merged entity.

8.8.1. The Parties are important and close competitors in the discovery of herbicides with overlapping lines of research and early pipeline products with few other alternatives available

8.8.1.1. The Parties' past innovations in herbicides have led to product competition today

- (2604) This section presents evidence of past innovation competition between the Parties and should be read in conjunction with the section on current product market competition in herbicides (see Section V.6.3).
- (2605) As discussed in Section V.6.3 on herbicide product competition, the Parties are currently important and close competitors in several herbicide markets. This is the result of past innovation efforts by both Parties, focusing on similar innovation spaces for herbicides.
- (2606) [Content from internal document].¹⁷⁹⁵
- (A) Aminocyclopyrachlor vs. aminopyralid
- (2607) [Pipeline information]. Aminocyclopyrachlor was developed as a herbicide for the control of annual and perennial broadleaf weeds in range, pasture and vegetation management (see Section V.6.3.6.1).
- (2608) As explained in Annex 1, the patent for this AI is DuPont's best-quality patent in herbicides and is part of the group of high-quality patents in herbicides.
- (2609) Aminocyclopyrachlor belongs to the chemical class of pyridine carboxylic acids. The other members of this chemical class have all been developed by Dow, namely aminopyralid, clopyralid, fluroxypyr, and triclopyr. DuPont is therefore Dow's only challenger in this particular chemical class.

¹⁷⁹⁵ [Internal document], slide 15.

- (2610) Aminopyralid is the most recent addition to Dow's range of pyridine herbicides. It was introduced in 2006 for use in cereals, pasture and rangeland [product information] (see Section V.6.3.6.1).
- (2611) Moreover, the AI aminocyclopyrachlor developed by DuPont is a member of the auxinic MoA group. The Commission notes that, apart from this DuPont AI (launch date 2011), the other recently introduced members of this MoA group have all been developed by Dow, namely aminopyralid (launch date 2006), Halauxifen-methyl (Arylex, launch recently started in 2016 in the EEA) and florypyrauxifen-benzyl (Rinskor, end of development AI with roll-out planned for [launch date] in the EEA).¹⁷⁹⁶
- (2612) Dow's Arylex and Rinskor are the only members of the new chemical class of arylopicolinates, which is closely related to the pyridine carboxylic class. [Pipeline information].
- (2613) This means that Dow has developed particular expertise in the pyridine carboxylic acids chemical class and in the auxinic MoA group, and that the only challenger in the past has been DuPont, who has developed similar expertise with the aminocyclopyrachlor line of research.
- (2614) [Pipeline information].¹⁷⁹⁷
- (2615) [Quote from internal document].¹⁷⁹⁸
- (2616) [Quote from internal document].¹⁷⁹⁹
- (2617) Closeness between Dow and DuPont in research on herbicides within the same MoA is also confirmed by patent citation data (see Annex 1). The Commission found that DuPont's patent for aminocyclopyrachlor is mainly cited by Dow for herbicides applications (with [...] citations), and subsequently by Bayer ([...]) and Sumitomo ([...]). This suggests that this DuPont line of research is particularly close to Dow's lines of research in herbicides.¹⁸⁰⁰
- (2618) On the basis of recitals (2607) to (2617), the Commission considers that Dow (notably with its aminopyralid herbicide) and DuPont (notably with its aminocyclopyrachlor herbicide) have competed closely for innovation in range and pasture herbicides. The Commission notes that Dow's aminopyralid and DuPont's aminocyclopyrachlor both belong to the chemical class of pyridine carboxylic acids and that both companies are the only crop protection players to have developed AIs in this chemical class.
- (B) Arylex vs. DuPont SUs
- (2619) There are clear indications that Dow's Arylex has been developed to compete closely against DuPont's SUs.
- (2620) [Content from internal document].

¹⁷⁹⁶ [Internal document].

¹⁷⁹⁷ [Internal document], slide 19.

¹⁷⁹⁸ [Internal document], slide 60.

¹⁷⁹⁹ [Internal document], slide 500.

¹⁸⁰⁰ This analysis was carried out in the PatentSight web-interface directly.

- (2621) Arylex is a new broadleaf auxinic herbicide [quote from internal document]¹⁸⁰¹, with utility in multiple crops. [In the EEA the product is being rolled out in cereals, but will also be launched in oilseed rape (see Section V.6.3.4.4)].
- (2622) Metsulfuron is the third leading SU cereal herbicide for DuPont. It is widely used for late season control of difficult perennial broadleaf weeds in cereals (see Section V.8.7.2.1(D.ii)).
- (2623) [Quote from internal document].¹⁸⁰² [R&D information].
- (2624) [R&D information].¹⁸⁰³
- (2625) [Quote from internal document; R&D information].¹⁸⁰⁴
- (2626) Dow's communication efforts also support the finding that Arylex has been positioned to compete against DuPont SUs. The only two comparative videos for Arylex found on the Dow Agrosiences Youtube channel both show weed treatment tests featuring Arylex and DuPont SUs. One compares Arylex with metsulfuron on key weed Lamium (deadnettle) and another contrasts Pixxaro EC with tribenuron on key weed Stellaria media (chickweed).¹⁸⁰⁵
- (2627) The fact that this type of mass-audience communication features only DuPont SUs in product comparisons with Arylex indicates that the SUs are key competing products against which Arylex has been positioned.
- (2628) In addition, these comparative tests indicate that Lamium and Stellaria media are important key weeds which guide farmers' choices. They also show that these weeds are part of a spectrum overlap where Arylex and these DuPont SUs compete.
- (2629) Further evidence of competitive closeness between Dow's Arylex and DuPont's SUs can be found in Section V.6.3.4.5.
- (2630) On the basis of recitals (2619) to (2629), the Commission considers that Dow (with its Arylex herbicide) and DuPont (with its SU cereal herbicides) have competed closely for innovation in broadleaf cereal herbicides in the past, in particular for spring applications.
- (C) Rinskor vs. azimsulfuron
- (2631) [R&D information].
- (2632) [R&D information].
- (2633) Rinskor is a post-emergence cross-spectrum herbicide for use in rice belonging to the arylpicolinate chemical class and the synthetic auxin MoA group, offering a new MoA for rice crops. Dow is targeting launch in the EEA in [launch date] (see Section V.6.3.5.4).

¹⁸⁰¹ [Internal document], (ID00455-00036), [internal document].

¹⁸⁰² [Internal document].

¹⁸⁰³ [Internal document] (ID9304-55), page 30.

¹⁸⁰⁴ [Internal document] (ID9304-55), page 13.

¹⁸⁰⁵ See Dow video "Arylex™ Active versus metsulfuron - speed of kill", file name "20170201-181040_youtube.pdf", and Dow video "Pixxaro EC und Tribenuron", file name "20170201-181854_youtube.pdf" respectively.

(2634) Azimsulfuron is a cross-spectrum product for post-emergence control of grass and broadleaf weeds in rice. It belongs to the SU chemical class and the ALS MoA group (See Section V.6.3.5.1).

(2635) [Quote from internal document].¹⁸⁰⁶ [R&D information].

(2636) [Content from internal document].¹⁸⁰⁷

Figure 147 – [Extract from internal document]

[...]

Source: [Internal document] (ID6696-32056), slide 46

(2637) Further evidence of competitive closeness between Dow's Rinskor and DuPont's azimsulfuron can be found in Section V.6.3.5.5.

(2638) On the basis of recitals (2631) to (2637), the Commission considers that Dow (with its Rinskor herbicide) and DuPont (with its azimsulfuron herbicide) have competed closely for innovation in post-emergence cross-spectrum rice herbicides in the past.

(D) Other players do not compete closely with the Parties on innovation

(2639) This section deals with innovation competition between the Parties and other players and should be read in conjunction with the section on current product market competition in herbicides (see Section V.6.3).

(2640) Among the leading crop protection players, Dow and DuPont are the only companies with a clear focus on broadleaf weed herbicides.

(2641) The Commission notes that Syngenta, despite its high patent share in herbicides, is a distant competitor to Dow and DuPont as it has engaged in different discovery areas. The company's current sales are mostly in graminicides, which suggests that it has innovated mainly in this area in the past.¹⁸⁰⁸

(2642) In addition, Syngenta's broadleaf weed and cross-spectrum products do not appear to target the same key weeds as Dow and DuPont. Its recently launched bicyclopyrone cross-spectrum corn herbicide for instance primarily [targeted weeds].¹⁸⁰⁹

(2643) As for Monsanto, this company has been focusing on innovations related to pre-plant or pre-emergence applications, mainly on the basis of glyphosate, which is a different segment from those that the Parties are focusing on.¹⁸¹⁰

(2644) While Dow and DuPont specialise in broadleaf herbicides, Bayer and BASF do not have a clear focus in terms of weed classes as they currently have portfolios that are more balanced between graminicides and broadleaf herbicides.¹⁸¹¹

¹⁸⁰⁶ [Internal document].

¹⁸⁰⁷ [Internal document] (ID6696-32056), slide 46.

¹⁸⁰⁸ [Internal document], slide 23.

¹⁸⁰⁹ See the bicyclopyrone entry in the University of Hertfordshire's Pesticide Properties Database, file name "20170201-181108_sitem.herts.ac.pdf".

¹⁸¹⁰ The Commission's patent analysis has shown that among the [...] patents of Monsanto in the top 10% group, the first [...] patents in terms of quality concern explicitly pre-plant or pre-emergence applications (in particular due to the use of Glyphosate): See Annex 1 on patents.

¹⁸¹¹ [Internal document], slide 23.

(E) Conclusion

(2645) On the basis of the evidence presented in Section V.8.8.1.1, the Commission considers that Dow and DuPont have competed closely for innovation in herbicides in the past, both having developed closely competing products in pasture, post-emergence broadleaf cereals and post-emergence cross-spectrum rice herbicides. In addition, Dow and DuPont are the only companies with a clear focus on broadleaf weed herbicides.

8.8.1.2. [Pipeline information]

(2646) [R&D information].¹⁸¹²

Figure 148 – [Extract from internal document]

[...]

(2647) [R&D information].

Figure 149 – [Extract from internal document]¹⁸¹³

[...]

(2648) [R&D information].

(2649) [R&D information].

8.8.1.3. The Parties currently have overlapping lines of research and early development products on [targeted weeds/crops]

(A) DuPont's current lines of research [...] against Dow's existing products

(A.i) *DuPont*

(2650) DuPont is conducting discovery programme [pipeline information].

(2651) [Pipeline information].¹⁸¹⁴

(2652) [Pipeline information].

(2653) DuPont is conducting discovery programme [pipeline information].

(2654) [Pipeline information].¹⁸¹⁵

(2655) [Pipeline information].¹⁸¹⁶

(A.ii) *Dow*

(2656) [Pipeline information].

(B) DuPont's current lines of research [...] against Dow's current lines of research

(B.i) *DuPont's research programmes [pipeline information]*

(2657) DuPont is conducting late discovery of programme [pipeline information].

(2658) [R&D information].¹⁸¹⁷ [Pipeline information].¹⁸¹⁸

¹⁸¹² See also [internal document], pages 44, 45, 54 and 55.

¹⁸¹³ [Internal document].

¹⁸¹⁴ [Internal document].

¹⁸¹⁵ [Internal document].

¹⁸¹⁶ [Internal document].

- (2659) [Pipeline information].¹⁸¹⁹
- (2660) [Pipeline information].¹⁸²⁰
- (2661) [Pipeline information].¹⁸²¹
- (2662) DuPont is conducting discovery programme [pipeline information].
(B.ii) Dow's [pipeline information]
- (2663) [Pipeline information].
- (2664) [Pipeline information].¹⁸²²
- (2665) [Pipeline information].¹⁸²³
- (2666) [Pipeline information].
 (C) Conclusion
- (2667) On the basis of the evidence presented in Section V.8.8.1.3, the Commission considers that Dow and DuPont are close competitors for innovation on herbicides [R&D information].
- 8.8.1.4. The Parties have currently overlapping lines of research and early development products [...] in rice
- (A) DuPont's research programme [pipeline information]
- (2668) DuPont is conducting development of programme [pipeline information].^{1824,1825}
- (2669) It offers a new MoA, [quote from internal document].¹⁸²⁶ [Quote from internal document].¹⁸²⁷
- (2670) [Pipeline information].^{1828,1829} [R&D information].¹⁸³⁰ [Pipeline information].¹⁸³¹
- (2671) [Pipeline information].^{1832,1833}
 (B) Dow's forthcoming rice herbicide Rinskor [pipeline information]
- (2672) DuPont's [pipeline information] programme competes with Dow's end-of-pipeline product Rinskor, which is a cross-spectrum herbicide for the post-emergent control of grasses including Echinochloa, broadleaf weeds including Amaranth, and sedges, including resistant species, primarily in rice [pipeline information].

1817 See for instance [internal document] (ID6353-110), [internal document].

1818 [Internal document], slide 41 (ID6825-7771).

1819 [Internal document].

1820 [Internal document].

1821 [Internal document].

1822 [Internal document].

1823 [Internal document].

1824 Internal document] (ID5682-15), [internal document], slide 14.

1825 [Pipeline information].

1826 [Internal document].

1827 [Internal document], slide 2.

1828 [Internal document] (ID5682-15), [internal document], slide 25.

1829 [Internal document] (ID5682-15), [internal document], slide 17.

1830 [Internal document] (ID5682-15), [internal document], slide 21.

1831 Parties' submission [internal document], page 7.

1832 [Internal document].

1833 [Internal document].

- (2673) Rinskor is an arylopicolinate with a synthetic auxin MoA, and is part of the same chemical class and MoA group as Dow's Arylex.
- (2674) [Quote from internal document; pipeline information].¹⁸³⁴
- (2675) Formulated products based on this molecule are not yet registered in the Union. Dow applied for Union registration of Rinskor [registration date]. It is targeting launch in Italy [launch date, pipeline information]¹⁸³⁵.
- (2676) [Pipeline information].¹⁸³⁶
- (2677) [Pipeline information].
- (2678) [Pipeline information].¹⁸³⁷
- (2679) [Pipeline information].¹⁸³⁸
- (2680) [Pipeline information] Dow's existing cross-spectrum rice herbicide penoxsulam, which is its leading sulfonamide AI. It was introduced in 2005, offering a broad spectrum of weed control in dry seeded, transplanted and water seeded rice. The product has been very successful since it was introduced, and is now the leading rice herbicide worldwide.

(C) Conclusion

- (2681) On the basis of the evidence presented in Section V.8.8.1.4, the Commission considers that Dow and DuPont are close competitors for innovation on herbicides [...] in rice.

8.8.1.5. The Parties have currently overlapping lines of research and early development products on [targeted weeds]

- (A) DuPont has the following pipeline programmes targeted at primary or secondary uses as [...].

(A.i) [Pipeline information]

- (2682) [Pipeline information].¹⁸³⁹

(A.ii) [Pipeline information]

- (2683) DuPont is also conducting discovery of [pipeline information].^{1840,1841,1842,1843,1844}

- (2684) [Pipeline information].

¹⁸³⁴ [Internal document], slide 13.
¹⁸³⁵ [Internal document], slide 5.
¹⁸³⁶ [Internal document], slide 15.
¹⁸³⁷ [Internal document], slide 26.
¹⁸³⁸ [Internal document].
¹⁸³⁹ [Internal document].
¹⁸⁴⁰ [Internal document].
¹⁸⁴¹ [Internal document], slide 1.
¹⁸⁴² [Internal document], slide 16.
¹⁸⁴³ [Internal document], slide 15.
¹⁸⁴⁴ [Internal document], slides 3, 12 and 15.

(A.iii) *Other programmes*

(2685) [Pipeline information].

(B) Dow's [pipeline information]

(2686) [Pipeline information].

(C) Conclusion

(2687) On the basis of the evidence presented in Section V.8.8.1.5, the Commission considers that Dow and DuPont are close competitors for innovation on herbicides [...].

8.8.1.6. There are few alternatives to the Parties' lines of research and early pipeline products

(2688) The Parties closely monitor competitors' pipelines and patent activity, and test molecules patented by competitors to assess targets and efficacy. [Content from internal document].¹⁸⁴⁵

(2689) Publicly available sources indicate that the Parties' competitors have very few pipeline products planned for launch in the 2017-2022 timeframe which compete in the same herbicide areas as Dow and DuPont products.

(2690) **Bayer** has the forthcoming cross-spectrum rice herbicide triafamone which targets grasses including Echinochloa, sedges, including ACCase resistant species, and is suitable for foliar and soil application in pre-emergence and early - mid post-emergence. It is part of the existing ALS MoA group. Global product concepts for straight and mixed products are currently under evaluation, while country-specific mixtures are being assessed, for example for Japan. Global launch is planned for 2017, while it is not clear whether Bayer is seeking registration in the EU.¹⁸⁴⁶

(2691) Bayer also has the cross-spectrum herbicide iofensulfuron for use in cereals, corn, soybeans, rice, turf and non-crops. Its driver weeds are Agrostis grass weeds, while also targeting other grass and broadleaf weeds. [Pipeline information].¹⁸⁴⁷ It is part of the sulfonylurea chemical class and the ALS MoA group.¹⁸⁴⁸

(2692) **Syngenta's** bicyclopyrone cross-spectrum one-shot herbicide is mainly targeted at corn, but also cereals and sugarcane.¹⁸⁴⁹ Key weeds controlled include foxtail, wild buckwheat and common ragweed.¹⁸⁵⁰ [Pipeline information]. This AI was first registered in the US in 2014. It is part of the existing HPPD inhibitors MoA group.¹⁸⁵¹

(2693) **FMC** has acquired from Kumiai a forthcoming herbicide (fenquinotrione), which it is mainly developing for rice, corn and soybeans.¹⁸⁵² It is part of the benzoylcyclohexanedione chemical class and the existing HPPD MoA group. It targets key weeds such as Monochoria, Cyperus and Amaranthus, and sedges,

¹⁸⁴⁵ [Internal document], pages 152 and 165.

¹⁸⁴⁶ Bayer's response to the Commission's Article 11(3) request for information to competitors decision, file name "Article 11_3 decision_Bayer-Annex_final_incl_non-confidential" (ID8753).

¹⁸⁴⁷ [Internal document]. See also [internal document], slide 3 (ID6748-9240).

¹⁸⁴⁸ [Internal document].

¹⁸⁴⁹ [Internal document], slide 3 (ID6748-9240).

¹⁸⁵⁰ See the bicyclopyrone entry in the University of Hertfordshire's Pesticide Properties Database, file name "20170201-181108_sitem.herts.ac.pdf".

¹⁸⁵¹ [Internal document].

¹⁸⁵² [Internal document] (ID7973-00015), [internal document].

including resistant biotypes.¹⁸⁵³ [Pipeline information]. Field trials are ongoing in Japan and the compound seems to target the Asian market. If successful, it could be launched in 2020.

- (2694) FMC is also developing a pre- and post-emergence broadleaf herbicide (F4050) that is targeted at cereals and sunflower crops and belongs to the existing HPPD MoA group.¹⁸⁵⁴ It is not expected to be launched before [launch date].¹⁸⁵⁵
- (2695) The Japanese company **SDS Biotech** has developed together with US-brand manufacturer Gowan benzobicyclon, a cross-spectrum rice herbicide, which can be used for pre- and early post application. It belongs to the existing HPPD MoA group. It will target grasses (including Echinochloa), sedges and broadleaf weeds.¹⁸⁵⁶ Benzobicyclon is listed as never notified or authorised in the Union.¹⁸⁵⁷ The product seems to be developed for paddy rice farming.¹⁸⁵⁸
- (2696) **Mitsui** is currently conducting development of cyclopyrimorate, a rice herbicide targeting annual broadleaf weeds. It belongs to the existing chemical class of pyridazines. [Content from internal document].¹⁸⁵⁹
- (2697) None of the forthcoming products from other companies described in recitals (2690) to (2696) are likely to capture significant market shares from the Parties, as they are all part of existing chemical classes (including sulfonylureas) and existing MoAs (ALS and HPPD). In addition, for most of these products it is not yet clear whether or not registration will be sought in the EEA as they seem to be developed for markets outside Europe. [Pipeline information].
- (2698) [Content from internal document].¹⁸⁶⁰
- (2699) As a result the Commission is of the view that the herbicide pipeline products from competitors do not have the potential to pose a serious threat to the Parties' market positions in Europe.
- (2700) As for pipeline products that may reach the market beyond 2022, the Commission has reviewed the publicly available information including patent data and internal documents. On the basis of an Article 11(3) Decision the Commission has also asked the Parties' main competitors to provide their latest pipeline data. In addition, the Commission has looked at pipeline data before the patenting stage. This information has indicated that the Parties' competitors currently have very few products in the discovery or development stage that would be able to compete directly with the Parties' products in the foreseeable future.
- (2701) The Commission found nothing to call into question its conclusions that the Parties are important competitive forces with their novel-MoA forthcoming products and further lines of research.

¹⁸⁵³ [Internal document].

¹⁸⁵⁴ Form CO, Annex B.I.6.4 [internal document], page 3.

¹⁸⁵⁵ Phillips McDougall – AgriService, Research Section – 2015, page 15 (ID7079-1858).

¹⁸⁵⁶ Form CO, part.B.I. – Herbicides, pages 12-13.

¹⁸⁵⁷ See the benzobicyclon entry in DG SANTE's pesticide online database, file name "20170201-110507_ec.europa.pdf".

¹⁸⁵⁸ [Internal document], page 3.

¹⁸⁵⁹ [Internal document] (ID7973-5).

¹⁸⁶⁰ [Internal document] (ID8833-7).

8.8.1.7. Conclusion on the Parties' overlapping lines of research and early pipeline products in herbicides

(2702) Dow and DuPont are currently and have been in the past important and close innovators in herbicides, especially for key broadleaf and grass weeds [...].

(1) Past lines of research have led to product competition today. Dow and DuPont have in the past competed closely for innovation in range and pasture herbicides (Dow's aminopyralid vs. DuPont's aminocyclopyrachlor), broadleaf cereal herbicides (Dow's Arylex vs. DuPont's SUs), and cross-spectrum rice herbicides (Dow's Rinskor vs. DuPont's azimsulfuron).

(2) Dow has developed particular expertise in the pyridine carboxylic acids chemical class, where the only challenger has been DuPont, who has developed similar expertise with the aminocyclopyrachlor line of research. Dow and DuPont have also been competing closely in auxinic MoA herbicides as both companies have developed all recently introduced members of this MoA group.

(3) [R&D information].

(4) [R&D information].

(5) [R&D information].

(6) DuPont's and Dow's current and recent lines of research are providing new MoAs or new chemical classes, for example DuPont's [pipeline information] Dow's Arylex (new chemical class), Rinskor (new chemical class, new MoA for rice crops), [pipeline information].

(7) [R&D information].

(8) [R&D information], there are a limited number of alternative lines of research to the Parties and even more limited when considering new MoAs and chemical classes.

(9) [Pipeline information].

(10) [Pipeline information].

(2703) In conclusion, the Commission considers that Dow and DuPont are currently and have been in the past important and close competitors in herbicide innovation. This conclusion was not changed by the full review of competitors' pipelines carried out by the Commission in the course of the investigation.

8.8.2. *The Parties are important and close competitors in the discovery of insecticides with overlapping lines of research and early pipeline products with few other alternatives available*

8.8.2.1. The Parties' innovations in the past on insecticides have led to product competition today

(2704) This section presents the evidence of past innovation competition between the Parties. This section should be read in conjunction with the section on current product market competition in insecticides (see Section V.6.4).

- (A) Dow's Spinetoram vs DuPont's Rynaxypyr and Indoxacarb for chewing insects, notably Lepidopteran insect pests
- (2705) A recent peer-reviewed paper published in an academic journal by a Dow's senior research fellow suggests that Dow and DuPont have been involved in the development of the three most recent chemical classes that can be used against Lepidopteran insect pests. This paper list three chemical classes in particular.¹⁸⁶¹
- (1) The Spinosyns chemical class, composed of Dow's Spinosad and Dow's Spinetoram;
 - (2) The sodium channels blockers, composed of DuPont's Indoxacarb and BASF's Metaflumizone (developed jointly with Nihon Nohyaku);
 - (3) The diamide chemical class, composed of DuPont's Chlorantranilipole and Bayer's Flubendiamide.
- (2706) This paper also shows that DuPont's Indoxacarb, Dow's Spinosad, Dow's Spinetoram, and DuPont's Chorrantranilipole have the most efficient insecticides against Lepidopteran insect pests, with the highest vertebrate selectivity ratios combined with ones of the lowest fied use rate (see Figure 150). This paper mentions that "*Spinosad, indoxacarb, spinetoram and chlorantraniliprole all exhibit greatly improved VSRs compared to prior lepidopteran insecticides (Fig. 5A) clearly demonstrating that the agrochemical industry can and is continuing to improve on the environmental and toxicological profile of insecticides, in part, by identifying new classes of chemistry with novel modes of action. It is these new chemistries, along with the neonicotinoids and others (e.g. tetriconic and tetramic acid derivatives [64] that are increasingly capturing sizable portions of the global insecticide market compared to the organophosphates, carbamates and pyrethroids (Fig. 6)".*

Figure 150 – DuPont's Indoxacarb, Dow's Spinosad, Dow's Spinetoram, and DuPont's Chorrantranilipole are the most efficient insecticides against Lepidopteran insect pests

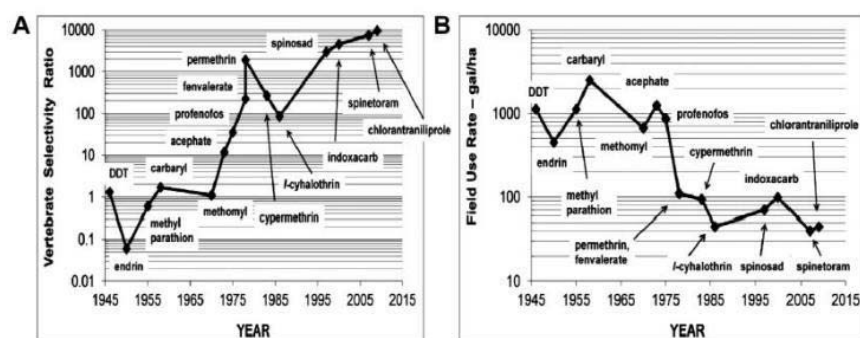


Fig. 5. A – Vertebrate selectivity ratios for representative Lepidoptera insecticides during the past 60 years. The presented ratios are based on the topical LD₅₀ (µg/g) for *Heliothis virescens* (tobacco budworm; 48–72 h. mortality data)/acute oral LD₅₀ (mg/kg) for the rat. Data adapted, in part, from [85–87], and unpublished data. B – Decrease in insecticide use rates for these representative insecticides during the past 60 years – Data based on typical use rate for *H. virescens* and/or *Helicoverpa zea* (cotton bollworm/tomato fruitworm) on cotton or vegetables. Data adapted, in part, from [88–96].

- (2707) This paper also mentions that these three new classes of chemistry (Spinosyns, sodium channels blockers, and diamides) together accounts for 12% of insecticides sales on the global level and are continuing to expand (see Figure 151).

¹⁸⁶¹ Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

(2708) The Commission also notes that DuPont's Indoxacarb has a new MoA, based on the following elements from some authoritative industry reports:

(1) [Content from internal document].¹⁸⁶²

(2) [Content from internal document].¹⁸⁶³

(2709) The other chemical classes in Figure 151 will be discussed in recitals (2721) to (2728) in the section on alternatives available to the Parties.

Figure 151 – Chemical classes in insecticides

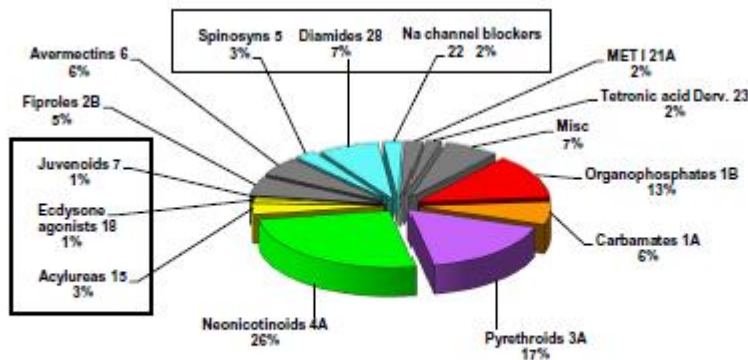


Fig. 6. Percent of total sales for the different classes of insecticides. Data is based on end user sales [97]. Numbers next to class name are the IRAC mode of action group numbers [13]. Insect growth regulators such as juvenoids, ecdysone agonists (diacylhydrazines) and acylureas account for about 5% of the total market. The spinosyns, diamides and sodium (Na) channel blockers (indoxacarb, metalum izone) account for about 12% of the market.

(2710) [Quote from internal document].¹⁸⁶⁴

(2711) [Quote from internal document].¹⁸⁶⁵

(2712) [Quotes from internal documents].^{1866,1867}

(2713) On the basis of recitals (2705) to (2712), the Commission considers that Dow and DuPont have competed closely for innovation in chewing insecticides in the past, both having developed the most recent chemical classes against Lepidopteran insect pests, and their corresponding products being the most efficient against Lepidopteran insect pests.

(B) Dow's Isoclast vs DuPont's Cyazypyr for sucking insects, notably Aphids, and Thrips

(2714) Dow's Isoclast corresponds to the AI Sulfoxaflor and the chemical class of Sulfoximines, discovered by Dow in 2005. The Commission notes that this AI and corresponding chemical class are the most recent discoveries in insecticides.¹⁸⁶⁸ In addition, as discussed in Annex 1, Dow's Isoclast corresponds to the best quality patent of Dow in insecticides and is part of the top quality innovations in

¹⁸⁶² [Internal document] (ID1328-523).

¹⁸⁶³ Phillips McDougall Product Directory 2013 Market, file name [internal document] (ID1328-454).

¹⁸⁶⁴ [Internal document] (ID1329-598).

¹⁸⁶⁵ [Internal document] (ID719-7).

¹⁸⁶⁶ [Internal document] (ID6827-51307), slide 44.

¹⁸⁶⁷ [Internal document] (ID6696-11502).

¹⁸⁶⁸ Table 1 of Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

insecticides. [R&D information]. Dow's Isoclast insecticide received the Union Annex I registration in 2015.¹⁸⁶⁹

(2715) The Commission notes that the Sulfoxamines chemistry, invented in 2005, is the most recent chemical class invented in insecticides.¹⁸⁷⁰

(2716) [R&D information].¹⁸⁷¹

(2717) [Content from internal document; R&D information].¹⁸⁷²

(2718) [Content from internal document].^{1873,1874}

(2719) [Content from internal document].¹⁸⁷⁵

(2720) On the basis of recitals (2714) to (2719), the Commission considers that Dow (with its Isoclast insecticides) and DuPont (with its Cyazypyr insecticide) have competed closely for innovation in sucking insecticides in the past, in particular against Aphids and Thrips.

(C) Competitors do not compete closely on innovation

(2721) This section presents the evidence of innovation competition between the Parties and other players. This section should be read in conjunction with the section on current product market competition in insecticides (see Section V.6.4).

(2722) As discussed in recital (2706), the promising new chemical classes are the Spinosyns chemistry (developed by Dow), the sodium channels blockers (composed by DuPont's Indoxacarb, BASF's Metoflumizone) and the diamides (composed of DuPont's chlorantranilipole and Bayer's Flubendiamide). Importantly, the paper published in 2013 by T.C. Sparks mentions that "*virtually all new insecticides developed in the US, EU and Japan fall outside of the now classic organophosphorus, carbamate and pyrethroid chemotypes with new modes of action an important driver*".¹⁸⁷⁶ The Commission also notes that the insecticides derived from the neonicotinoid chemical class face more and more regulatory pressure in Europe, which concerns notably Syngenta who has a string expertise in this particular chemical class with the AI Thiametoxam.

(2723) First, as regards chewing insecticides, **Bayer** has recently had very few products targeting lepidoptera and those products are under regulatory pressure. It co-developed one diamide, Flubendiamide, with Nihon Nohyaku, but this AI has had regulatory issues and has been withdrawn from products in the Union and the US.¹⁸⁷⁷

¹⁸⁶⁹ [Internal document] (ID1357-114).

¹⁸⁷⁰ Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

¹⁸⁷¹ [Internal document] (ID8838-16) slide 11.

¹⁸⁷² [Internal document] (ID8836-13) slide 21.

¹⁸⁷³ [Internal document] (ID8836-14) slide 33.

¹⁸⁷⁴ [Internal document] (ID7081-377).

¹⁸⁷⁵ [Internal document] (ID7830-35919).

¹⁸⁷⁶ Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

¹⁸⁷⁷ <https://www.epa.gov/ingredients-used-pesticide-products/flubendiamide-notice-intent-cancel-and-other-supporting>.

[Quote from internal document].¹⁸⁷⁸ Bayer has co-developed another diamide recently with Agro Kanesho, Tetraniliprole, [content from internal document].¹⁸⁷⁹

- (2724) Second, although **Syngenta** has in the past produced a number of AIs targeting chewing insects, the majority are relatively old and face resistance or regulatory issues. Syngenta has not discovered, developed and launched any new chewing AIs in recent years. Further, as regards Syngenta, the Commission notes that it has a collaboration agreement with DuPont for the development of Rynaxypyr, therefore it seems unlikely that it will innovate to develop a competing product to DuPont's Rynaxypyr.
- (2725) Third, as discussed in Annex 1, **BASF** had in the past a limited importance in bringing good quality innovations in insecticides. [Content from internal document].¹⁸⁸⁰ [Content from internal document].¹⁸⁸¹ The Commission also notes that in the paper published by a Dow senior research fellow,¹⁸⁸² only Dow's Spinosyns and Spinetoram are compared against DuPont's Indoxacarb and Rynaxypyr for Lepidopteran insect pests, and BASF's Metoflumizone does not appear. These findings suggest that BASF's Metoflumizone is a distant competitor from Dow and DuPont. In the EEA, the commercial impact of this AI has also been very limited,¹⁸⁸³ which the Commission considers to further demonstrate the relative weakness of innovation, as compared to DuPont's AIs. BASF has however recently developed Broflanilide, of the carboxide chemical class, which targets chewing insects and is to be launched in 2019-2020. This molecule was not however discovered by BASF, but rather the Japanese company Mitsui Chemicals, with whom BASF co-developed the molecule.
- (2726) Fourth, as regards sucking insects, neonicotinoids are the commercial standard currently, in particular Syngenta with its Thiametoxam. However, it should be noted that neonicotinoids are facing increasing regulatory issues in Europe, and therefore are likely to face significant hurdle in the future for the development of new products. Syngenta has not developed any new sucking insecticides recently.
- (2727) Bayer, along with Syngenta, has historically innovated in sucking insecticides. In addition to the neonicotinoids, Bayer has developed new products for sucking insects, namely Spiromesifen (1994) and Spirotretamat (1998), corresponding to the tetrionic acids chemical class.¹⁸⁸⁴ More recently, Bayer is launching, from 2017 onwards, products containing Flupyradifurone, an AI from the butenolide chemical class. It does however have the same MoA as the neonicotinoids (involving activation of the nicotinic acetylcholine receptor (nAChR agonist)). BASF has also co-developed Inscalis with Meji-Seika, from the pyripyropenes chemical class, although again, this was not a BASF discovered molecule. Other than Isoclast from

¹⁸⁷⁸ [Internal document] (ID1329-598).

¹⁸⁷⁹ [Internal document] (ID06827-18248).

¹⁸⁸⁰ [Internal document] (ID7999), slide 3 [internal document].

¹⁸⁸¹ [Internal document] (ID4384-8).

¹⁸⁸² Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

¹⁸⁸³ The Parties estimate that this accounted for [sales estimate]% of BASF's insecticide sales in the EEA in 2014 (Form CO, part B.II – Insecticides; Annex B.II.20).

¹⁸⁸⁴ Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267).

Dow and Cyazypyr from DuPont, these are the only other recent developments in sucking insecticides.

(2728) As regards Monsanto, as discussed in the patent annex, it did not bring any innovation in the past in insecticides.

(D) Conclusion

(2729) On the basis of the evidence presented in Section V.8.8.2.1, the Commission considers that Dow and DuPont have been closely competing in the past for innovations in insecticides:

(1) Chewing insecticides (notably Lepidopteran insects) with Dow's Spinosyns and Spinoteram vs DuPont's Indoxacarb and Rynaxypyr. DuPont's Rynaxypyr is currently a blockbuster product. Although Bayer developed two insecticides targeting lepidoptera, these were co-developed with Japanese companies and, further, one faced regulatory issues (Flubendiamide) and the other is inferior to Rynaxypyr (Tetraniliprole).

(2) Sucking insecticides (notably Aphids and Thrips) with Dow's Isoclast (Sulfoxaflor) against DuPont's Cyazypyr. Dow's Isoclast corresponds to the most recent innovation in insecticides (2005 discovery), and is considered as a great innovation (in the category of top quality patents in insecticides, see Annex 1). Given that the neonicotinoids are facing regulatory pressure, the only significant additional innovator appears to be Bayer.

(3) BASF has historically been weak in insecticides, as evidenced by the relatively low quality of its patents (see Annex 1). [Content from internal document]. While it is in the process of developing/launching two insecticides (Broflanilide and Inscalis) these were not BASF innovations, but rather co-developments with Japanese companies.

(2730) The Commission also notes that Dow and DuPont have both developed a particular expertise in certain chemical classes:

(1) DuPont with the Anthranilamide chemical class, corresponding to Rynaxypyr and Cyazypyr. [R&D information]. DuPont has also developed the Oxadiazines chemical class, which includes only the AI Indoxacarb.¹⁸⁸⁵

(2) Dow with the the Spinyosyns chemical class, corresponding to the insecticides Spinosad and Spineteram. Dow has also developed the most recent chemical class in insecticides, with the Sulfoximine chemistry in 2005.

8.8.2.2. The Parties have currently lines of research with similar discovery target in insecticides, [targeted insects]

(A) Presentation of DuPont's discovery targets in insecticides

(2731) [Content from internal document; pipeline information].¹⁸⁸⁶

(2732) [Content from internal document].¹⁸⁸⁷ [Pipeline information].¹⁸⁸⁸

¹⁸⁸⁵ Sparks (2013), "Insecticide discovery: an evaluation and analysis", Pesticide Biochemistry and Physiology. See also Form CO, part B.II, annex B.II.17 (ID6748-1267), Table 1.

¹⁸⁸⁶ [Internal document] (ID374), slide 19.

¹⁸⁸⁷ [Internal document] (ID7999).

¹⁸⁸⁸ [Internal document] (ID3665-23).

Figure 152 – [Extract from internal document]

[...]

(B) Presentation of Dow's discovery targets in insecticides

(2733) [R&D information].¹⁸⁸⁹

(2734) [R&D information].¹⁸⁹⁰

(2735) [Content from internal document].¹⁸⁹¹ [R&D information].^{1892,1893}

(2736) [Content from internal document].¹⁸⁹⁴ [R&D information].^{1895,1896}

Figure 153 – [Extract from internal document]

[...]

Source: [Internal document] (ID6082-81)

(C) Conclusion

(2737) [Pipeline information].

8.8.2.3. [The Parties have currently overlapping lines of research and early development products on insecticides, [targeted insects]]

(2738) As discussed in this section, the Parties have currently well-defined lines of research to target [...] insect pests.

(A) DuPont's current lines of research on [targeted insects] is competing against Dow's current lines of research and existing products

(A.i) *DuPont's line of research [pipeline information]*

(2739) The product concept [pipeline information].^{1897,1898,1899}

(2740) [Quote from internal document].¹⁹⁰⁰

(2741) [Pipeline information].^{1901,1902,1903}

(2742) [Pipeline information].

(1) [Pipeline information].¹⁹⁰⁴

(2) [Pipeline information].¹⁹⁰⁵

¹⁸⁸⁹ [Internal document] (ID455-102).

¹⁸⁹⁰ [Internal document] (ID6082-86).

¹⁸⁹¹ [Internal document] (ID6082-86).

¹⁸⁹² [Internal document] (ID6082-81).

¹⁸⁹³ [Internal document] (ID6082-85).

¹⁸⁹⁴ [Internal document] (ID6082-85).

¹⁸⁹⁵ [Internal document] (ID6082-81).

¹⁸⁹⁶ [Internal document] (ID6082-85).

¹⁸⁹⁷ [Internal document], (ID8325), slide 16.

¹⁸⁹⁸ [Internal document] (ID6825-14043) slide 9 [internal document] (ID8327).

¹⁸⁹⁹ [Internal document] (ID8327) (slides 10-12 for example).

¹⁹⁰⁰ [Internal document] (ID06825-14043).

¹⁹⁰¹ [Internal document], (ID8325).

¹⁹⁰² Parties' response to the Commission's request for information RFI 44, question 10.

¹⁹⁰³ [Internal document] (ID06825-14043): [internal document], (ID8325) (slide 3 [internal document]).

¹⁹⁰⁴ [Internal document] (ID06825-14043) (slide 11). [internal document] (ID6827-1084) (slide 15).

- (2743) [Pipeline information].
 (A.ii) *DuPont's line of research [pipeline information]*
- (2744) DuPont has also other lines of research to target [pipeline information]:
 (1) [Pipeline information].^{1906,1907,1908}
 (2) [Pipeline information].¹⁹⁰⁹
- (2745) [Quote from internal document].¹⁹¹⁰
- (2746) [Pipeline information].^{1911,1912}
 (B) Dow's current line of research on [targeted pests] is competing against DuPont's existing product ([...]) and DuPont's lines of research
 (B.i) *[Pipeline information]*
- (2747) [Pipeline information].^{1913,1914}
- (2748) [Pipeline information].¹⁹¹⁵
 (B.ii) *[Pipeline information]*
- (2749) [Pipeline information].¹⁹¹⁶
- (2750) [Pipeline information].
- (2751) [Pipeline information].¹⁹¹⁷
- (2752) [Pipeline information].¹⁹¹⁸
 (B.iii) *[Pipeline information]*
- (2753) [Pipeline information].¹⁹¹⁹
- (2754) [Pipeline information]:
 (1) [Pipeline information].¹⁹²⁰
 (2) [Pipeline information].¹⁹²¹
 (3) [Pipeline information].¹⁹²²

¹⁹⁰⁵ [Internal document] (ID7973-35), slide 22.
¹⁹⁰⁶ [Internal document] (ID3665-92).
¹⁹⁰⁷ [Internal document] (ID6827-1084).
¹⁹⁰⁸ [Internal document] (ID6827-3472).
¹⁹⁰⁹ [Internal document] (ID6885-310). [Internal document] (ID6825-16235).
¹⁹¹⁰ [Internal document] (ID6748-11064).
¹⁹¹¹ [Internal document] (ID6827-1084).
¹⁹¹² [Internal document] (ID6825-16235). [Internal document] (ID3665-92).
¹⁹¹³ [Internal document] (ID1162-310) slide 21.
¹⁹¹⁴ [Internal document] (ID7837-61) slide 21.
¹⁹¹⁵ [Internal document] (ID1162-310) slide 21.
¹⁹¹⁶ [Internal document] (ID6694-2713).
¹⁹¹⁷ [Internal document] (ID6748-16621).
¹⁹¹⁸ [Internal document] (ID6143-56628), slides 12-16.
¹⁹¹⁹ [Internal document] (ID6775-11).
¹⁹²⁰ [Internal document] (ID6775-11).
¹⁹²¹ [Internal document] (ID6775-11).
¹⁹²² [Internal document] (ID6694-2713).

(B.iv) [Pipeline information]

- (2755) [Pipeline information].^{1923,1924}
- (2756) [R&D information].¹⁹²⁵
- (2757) [R&D information].
- (2758) [Content from internal document].
- (2759) [Content from internal document].
- (2760) [Content from internal document].^{1926,1927}

Figure 154 – [Extract from internal document]

[...]

Source: [Internal document] (ID8836-172) slide 39

Figure 155 – [Extract from internal document]

[...]

Source: [Internal document] (ID8836-172)

- (2761) [Pipeline information].^{1928,1929}
- (2762) [Pipeline information].¹⁹³⁰
- (2763) [Pipeline information].¹⁹³¹ [Content from internal document].¹⁹³² [Pipeline information].¹⁹³³
- (2764) [Pipeline information].¹⁹³⁴
- (2765) [R&D information].
 - (1) [Content from internal document].^{1935,1936,1937}
 - (2) [R&D information].¹⁹³⁸

Figure 156 – [Extract from internal document]

[...]

- (2766) [Pipeline information].¹⁹³⁹ [Quote from internal document].¹⁹⁴⁰

¹⁹²³ [Internal document] (ID8836-1736) slide 4.
¹⁹²⁴ [Internal document] (ID8836-172) slide 7.
¹⁹²⁵ [Internal document] (ID8836-1736) slide 44.
¹⁹²⁶ [Internal document] (ID8836-172) slide 39.
¹⁹²⁷ [Internal document] (ID8836-172) slide 39.
¹⁹²⁸ [Internal document] (ID8836-173), slide 7; [internal document] (ID8836-172), slide 9.
¹⁹²⁹ [Internal document] (ID8836-173), slide 15.
¹⁹³⁰ [Internal document] (ID8836-173), slide 13.
¹⁹³¹ [Internal document] (ID8836-173), slide 22-24.
¹⁹³² [Internal document] (ID8836-172), slide 10.
¹⁹³³ [Internal document] (ID8836-172), slide 33.
¹⁹³⁴ [Internal document] (ID8836-174), slides 4-5.
¹⁹³⁵ [Internal document] (ID8836-174), slide 1.
¹⁹³⁶ [Internal document] (ID6748-15804).
¹⁹³⁷ [Internal document] (ID8836-174), slide 24; [internal document](ID6143-8759).
¹⁹³⁸ [Internal document] (ID8836-174), slide 3.
¹⁹³⁹ [Internal document] (ID8836-174), slides 3, 6, 9, 10 and 11 [internal document], slide 16.

(2767) [R&D information].¹⁹⁴¹

(C) Conclusion

(2768) [On the basis of Section V.8.8.2.3, the Commission considers that Dow and DuPont are close competitors in terms of innovations in insecticides, [targeted insects]]. In particular:

(1) [R&D information].

(2) [R&D information]. The Commission also notes that both Dow and DuPont have been important innovators in the past (see Annex 1).

(3) [Pipeline information].

(4) [Pipeline information].

(5) [Pipeline information].

8.8.2.4. [The Parties have currently overlapping lines of research and early pipeline products on insecticides, [targeted insects]]

(A) [Pipeline information]

(2769) [Pipeline information].¹⁹⁴²

(2770) [Pipeline information].^{1943,1944,1945}

(2771) [Pipeline information].¹⁹⁴⁶

(2772) [Pipeline information].¹⁹⁴⁷

(2773) [Pipeline information].¹⁹⁴⁸

(2774) [Pipeline information].

(1) [Pipeline information].

(2) [Pipeline information].

(3) [Pipeline information].¹⁹⁴⁹

(2775) [Pipeline information].

(2776) [Pipeline information].

(2777) [Pipeline information].^{1950,1951}

¹⁹⁴⁰ [Internal document] (ID6143-8759).

¹⁹⁴¹ [Internal document] (ID8836-174), slide 52.

¹⁹⁴² [Internal document] (ID3665-90), slide 10.

¹⁹⁴³ [Internal document] (ID3665-90), slide 32.

¹⁹⁴⁴ [Internal document] (ID6825-30153), slide 6.

¹⁹⁴⁵ Parties' response to the Commission's request for information RFI 44, question 10.

¹⁹⁴⁶ [Internal document] (ID06827-01084) slide 10; [internal document] (ID3665-90), slide 8.

¹⁹⁴⁷ [Internal document] (ID3665-90), slide 30.

¹⁹⁴⁸ [Internal document] (ID3665-90), slide 30; [internal document] (ID06827-01084), slide 10.

¹⁹⁴⁹ [Internal document] (ID1328-454).

¹⁹⁵⁰ [Pipeline information].

¹⁹⁵¹ [Internal document] (ID6696-29708).

Figure 157 – [Extract from internal document]

[...]

Source: [Internal document] (ID455-101) slide 41

(2778) [Pipeline information].¹⁹⁵²

(2779) [Pipeline information].

(1) [Pipeline information].¹⁹⁵³

(2) [Pipeline information].¹⁹⁵⁴

(3) [Pipeline information].^{1955,1956}

(2780) [Pipeline information].

(B) Dow's lines of research on [pipeline information] competing against DuPont's existing product and DuPont's lines of research, [pipeline information]

(B.i) Dow's line of research on the [pipeline information]

(2781) [Pipeline information].

(2782) [Pipeline information].^{1957,1958,1959}

(2783) [Pipeline information].^{1960,1961}

(2784) [Pipeline information].¹⁹⁶²

(2785) [Pipeline information]:¹⁹⁶³

(1) [Pipeline information].

(2) [Pipeline information].

(2786) [Quote from internal document]:

(1) [Pipeline information].^{1964,1965}

(2) [Pipeline information].

(3) [Pipeline information].

¹⁹⁵² [Internal document] (ID3665-90), slide 29.

¹⁹⁵³ [Internal document] (ID3665-90), slide 32.

¹⁹⁵⁴ [Internal document] (ID6353-154), slide 30.

¹⁹⁵⁵ [Internal document] (ID7973-35), slide 24.

¹⁹⁵⁶ [Internal document] (ID7973-35), slide 24. [Internal document].

¹⁹⁵⁷ [Internal document] (ID8836-134).

¹⁹⁵⁸ [Internal document] (ID8836-202) slide 4.

¹⁹⁵⁹ [Internal document] (ID8836-202) slide 14.

¹⁹⁶⁰ [Internal document] (ID8836-145).

¹⁹⁶¹ [Internal document] (ID8836-146).

¹⁹⁶² [Internal document] (ID8836-134) slide 20.

¹⁹⁶³ [Internal document] (ID8836-202).

¹⁹⁶⁴ Parties' response to the Commission's request for information, RFI 54, [internal document].

¹⁹⁶⁵ Parties' response to the Commission's request for information, RFI 54, [internal document].

- (2787) [Pipeline information].
- (2788) [Pipeline information].¹⁹⁶⁶
- (2789) [R&D information].
- (C) Conclusion
- (2790) [On the basis of Section V.8.8.2.4, the Commission considers that Dow and DuPont are close competitors in terms of innovation in insecticides, [targeted insects]]. In particular:
- (1) [R&D information].
 - (2) [R&D information].
 - (3) [R&D information]. The Commission also notes that both Dow and DuPont haven been important innovators in the past (see Annex 1).
 - (4) [Pipeline information].
 - (5) [Pipeline information].
 - (6) [Pipeline information].
 - (7) [Pipeline information].

8.8.2.5. There are fewer alternatives to the Parties' lines of research and early pipeline products

- (2791) The Parties closely monitor competitors' pipelines and patent activity, and test molecules patented by competitors to assess targets and efficacy. [Content from internal document].¹⁹⁶⁷
- (2792) First, the Commission considers that, when analysing the lines of research of competitors in insecticides, it should be kept in mind that Dow and DuPont are particularly important innovators in insecticides, [content from internal document].
- (2793) [R&D information].¹⁹⁶⁸

Figure 158 – [Extract from internal document]

[...]

- (2794) [Content from internal document].¹⁹⁶⁹

Figure 159 – [Extract from internal document]

[...]

- (2795) The Commission also notes that the weakness of BASF in insecticides, [...], is [...] confirmed by the analysis of patents. Indeed, BASF has played in the past a limited role in bringing good quality innovations in insecticides (see Annex 1).
- (2796) [Pipeline information].

¹⁹⁶⁶ [Internal document] (ID6775-12).

¹⁹⁶⁷ [Internal document], pages 152 and 165.

¹⁹⁶⁸ [Internal document] (ID7999), slide 3 [internal document].

¹⁹⁶⁹ [Internal document] (ID455-108).

- (2797) [Pipeline information]. However, as regards BASF, the Commission notes the following:
- (1) BASF has been historically a weak player in bringing good quality innovations in insecticides (see Annex 1);
 - (2) [Pipeline information].
- (2798) [Content from internal document].¹⁹⁷⁰
- (2799) [Content from internal document]. However, the Commission notes that in the past BASF has not been an important player in insecticide [...]. As regards Mitsui, Japanese companies often lack the capability to develop a product for the European market (see Section V.8.6.3.4).
- (2800) [Pipeline information].
- (2801) On the basis of an Article 11(3) Decision, the Commission has also asked the Parties' main competitors to provide their latest pipeline data. [In order to identify their lines of research on insecticides, the Commission has selected their pipelines in discovery, later discovery, or pre-development]. Based on an analysis of the third parties' responses to the Article 11(3) Decision, the Commission has reviewed these different lines of research and their MOAs. [The Commission found nothing to call into question its conclusions that the Parties are important competitive forces in research for insecticides, with closely competing lines of research (or competing line of research of one Party vs. an existing product of the other Party)].
- (2802) [Pipeline information].
- (2803) On the basis of an Article 11(3) Decision, the Commission has also asked the Parties' main competitors to provide their latest pipeline data. [In order to identify their lines of research on insecticides, the Commission has selected their pipelines in discovery, later discovery or pre-development]. Based on an analysis of the third party responses to the Article 11(3) Decision, the Commission has reviewed these different lines of research and their MOAs. [The Commission found nothing to call into question its conclusions that the Parties are important competitive forces in research for insecticides, with closely competing lines of research (or competing line of research of one Party vs. an existing product of the other Party)].
- (2804) [Therefore, given that (i) Dow and DuPont have brought in the past very good quality innovations in insecticides (DuPont with the [name of product] patent, Dow with the [name of product] patent, see Annex 1), (ii) in the past BASF has been historically a weak player in bringing good quality innovations in insecticides (see Annex 1), (iii) [pipeline information], (iv) [pipeline information], the Commission considers that the presence of two other competitors with lines of research in insects would not be enough to offset the likely reduction in innovation competition by the proposed Transaction].

¹⁹⁷⁰ [Internal document] {ID6825-4920}.

8.8.2.6. Conclusion on the Parties overlapping lines of research and early pipeline products in insecticides

(2805) The Commission considers that Dow and DuPont are important and close competitors in research for insecticides with overlapping lines of research in the past and currently. In particular:

- (1) [R&D information].
- (2) Dow and DuPont have developed a significant expertise in the four most recent chemical classes discovered in insecticides, namely the spinosyns (Dow), the sodium channel blockers (DuPont), the diamides/anthranilamide (DuPont), and the Sulfoximines (Dow); DuPont is also currently the new mesoionic chemical class, corresponding to a new MoA.
- (3) Dow and DuPont have been important innovators in the past by bringing good quality innovation (see Annex 1), in particular DuPont.
- (4) Past line of research of Dow and DuPont have led to product competition today in chewing insecticides (Dow's Spinosad/Spinetoram vs DuPont's Rynaxypyr and Indoxacarb) and sucking insecticides (Dow's Isoclast vs DuPont's Cyazypyr).
- (5) [Dow and DuPont have currently overlapping lines of research in insecticides, [pipeline information]].
- (6) [Dow and DuPont have currently overlapping lines of research in insecticides, [pipeline information]].

(2806) [As regards insecticides, based on an analysis of the third party responses to the Article 11(3) Decision, the Commission has reviewed these different lines of research and their MOAs]. The Commission considers that the lines of research developed by competitors are not enough to offset the likely reduction in innovation competition by the proposed Transaction [R&D information].

(2807) [As regards insecticides, the Commission notes that the number of lines of research that could potentially lead to a molecule being registered in the EEA is lower than at worldwide level]. Based on an analysis of the third party responses to the Article 11(3) Decision, the Commission has reviewed these different lines of research and their MOAs. The Commission considers that the lines of research developed by competitors are not enough to offset the likely reduction in innovation competition by the proposed Transaction given that (i) [pipeline information], (ii) [pipeline information], (iii) [pipeline information], (iv) BASF has played in the past a limited role in bringing good quality innovations in insecticides.

(2808) [The Commission also considers that the increasing regulatory pressure on the [product information] chemical class ([product information]) is an aggravating factor in the assessment of the negative effects likely to be faced by consumers with the loss of innovation competition between the Parties, since it is likely that customers will face in the near future a loss of alternatives for insecticides ([product information])].

8.8.3. *The Parties are important and close competitors in the discovery of fungicides with overlapping lines of research and early pipeline products with few other alternatives available*

8.8.3.1. [Pipeline information]

(2809) [Pipeline information].¹⁹⁷¹

(2810) [Pipeline information].¹⁹⁷² [R&D information].

(2811) [R&D information].^{1973,1974,1975,1976,1977}

(2812) [R&D information].

(2813) [Pipeline information].¹⁹⁷⁸ [Content from internal documents].^{1979,1980,1981,1982}

(2814) Both Dow and DuPont aim at capturing significant market shares within a few years.¹⁹⁸³ [Pipeline information].^{1984,1985,1986}

(2815) [Quote from internal document].¹⁹⁸⁷ [Quote from internal document].¹⁹⁸⁸

(2816) [R&D information].

(2817) [R&D information].

8.8.3.2. The Parties have currently overlapping lines of research and early development products in cereals fungicides, [pipeline information]

(2818) [Pipeline information].

(2819) Dow's Inatreq is a project in development of the picolinamide chemical class.¹⁹⁸⁹ It is planned for launch¹⁹⁹⁰ [launch date]. It provides [...] ¹⁹⁹¹ control of septoria in wheat through a novel MoA ([pipeline information]),¹⁹⁹² and also has efficacy on rusts.

¹⁹⁷¹ Form CO, part B3, paragraphs 26, 42, 155, 156-159.

¹⁹⁷² [Internal document] (ID933), page 15. See also [internal document] (ID8836-00194), pages 18-19.

¹⁹⁷³ [Internal document] (ID8001), slide 38; [internal document] (ID7998), slide 15; and [internal document] (ID3665-00021), page 17.

¹⁹⁷⁴ [Internal document] (ID933), page 15.

¹⁹⁷⁵ [Internal document] (ID933), page 15; [internal document] (ID7998), slides 2, 19 and 21-41.

¹⁹⁷⁶ [Pipeline information].

¹⁹⁷⁷ [Internal document] (ID3665-00021), page 35; [internal document (ID3665-00023), page 3; [internal document] (ID7998), slides 2 and 41; [internal document] (ID1329-1187), page 23.

¹⁹⁷⁸ See also [internal document], slide 45.

¹⁹⁷⁹ [Internal document], pages 3, 7, 10 and, in particular, 11.

¹⁹⁸⁰ [Internal document], page 2.

¹⁹⁸¹ [Internal document] (ID00455-00101).

¹⁹⁸² [Internal document], page 2.

¹⁹⁸³ Agreed non-confidential minutes of a call with an institute, 7 September 2016 (ID8738).

¹⁹⁸⁴ [Internal document] (ID8091-00025/ID6353-00091/ID4384-00061/ID3953-00124), [internal document].

¹⁹⁸⁵ [Internal document], page 2.

¹⁹⁸⁶ [Internal document], slide 40.

¹⁹⁸⁷ [Internal document] (ID1329-01186), page 18.

¹⁹⁸⁸ [Internal document], slide 44.

¹⁹⁸⁹ Parties' response to the Commission's request for information RFI 51, questions 4 through 6, and relevant annexes.

¹⁹⁹⁰ [Internal document] (ID8836-00194), page 19).

¹⁹⁹¹ [Internal document], especially slide 45.

¹⁹⁹² [Internal document] (ID6150-20876), slide 42.

Dow plans to register Inatreq for use in cereal crops, and to pursue registrations for other uses (for example on bananas) as identified. [Pipeline information].

- (2820) As its focus is septoria for wheat, which is relevant mostly in Europe, [pipeline information].¹⁹⁹³
- (2821) DuPont's [pipeline information] is a project in development, [launch date]. It is intended to control [...] diseases in cereals [pipeline information].¹⁹⁹⁴
- (2822) [Pipeline information].^{1995,1996,1997} [Launch date].
- (2823) [Pipeline information].¹⁹⁹⁸ [Launch date].
- (2824) [Pipeline information].¹⁹⁹⁹
- (2825) [Pipeline information].²⁰⁰⁰
- (2826) [Pipeline information].
- (2827) [Pipeline information].^{2001,2002,2003}
- (2828) [Pipeline information].²⁰⁰⁴
- (2829) [Pipeline information].²⁰⁰⁵
- (2830) [Pipeline information].
- 8.8.3.3. The Parties have currently overlapping lines of research and early development products in [pipeline information]
- (2831) [Pipeline information].
- 8.8.3.4. The Parties have currently overlapping lines of research and early development products [pipeline information]
- (2832) [Pipeline information].
- (2833) [Pipeline information].
- 8.8.3.5. There are few alternatives to the Parties' lines of research and early pipeline products
- (2834) The Parties closely monitor competitors' pipelines and patent activity, and test molecules patented by competitors to assess targets and efficacy. [R&D information].²⁰⁰⁶

¹⁹⁹³ [Internal document].

¹⁹⁹⁴ [Internal document; pipeline information] (ID8248).

¹⁹⁹⁵ [Internal document], slides 18, 44; see also [internal document], slide 26). [Internal document], slide 11; [internal document], slide 51). See also [internal document] (ID6082-71/ID7088-444), page 42 and [internal document], slide 21.

¹⁹⁹⁶ [Internal document], slide 3.

¹⁹⁹⁷ [Internal document], slide 28.

¹⁹⁹⁸ [Internal document], slides 26 and 30-32.

¹⁹⁹⁹ [Internal document], slides 2 and 3.

²⁰⁰⁰ [Internal document], page 19.

²⁰⁰¹ [Internal document] (ID1331-80).

²⁰⁰² [Internal document], slide 9.

²⁰⁰³ Parties' response to the Commission's request for information RFI 44, question 16 and relevant annexes.

²⁰⁰⁴ [Internal document], pages 2, 30-31.

²⁰⁰⁵ [Internal document], page 8.

²⁰⁰⁶ [Internal document], pages 152 and 165.

- (2835) From these and a number of publicly available sources, it appears that the three large R&D-integrated players BASF, Bayer and Syngenta are developing new products for cereals, [...]:²⁰⁰⁷ at least one next generation DMIs (Revysol/mefentrifluconazole from BASF for 2020) and several SDHIs (Solatenol/benzovindiflupyr already on the market and Adepidyn/pydiflumetofen for 2020 in the EEA from Syngenta, two other projects – including "460" for 2021 – from Bayer).²⁰⁰⁸ Other players like FMC/Isagro (fluindapyr, for 2022, [...])²⁰⁰⁹ also have SDHIs in the pipeline, and are developing new mixtures of existing AIs.
- (2836) While these products appear to have good efficacy, they are few,²⁰¹⁰ [pipeline information].
- (2837) Indeed, the consensual assumption in the industry appears to be that these existing MoAs – in particular SDHIs, which are the leading products – will face growing resistance and lowered efficacy [...].²⁰¹¹
- (2838) For [disease] control, the Parties list only a few competitor pipeline AIs:²⁰¹² [name of product] from [name of company], a new [name of product], as well as another project from [names of product and company]. However, the Commission did not obtain any information confirming that these or other AIs would indeed be in the pipeline for [disease] control in the EEA.
- (2839) [Names of product and company] is apparently derived from the same deferred lead area of chemistry as [names of product and company], another pipeline project. It appears to be an early project [...]. There is currently no indication that it would be planned for EEA registration or launch in the coming years.²⁰¹³
- (2840) For [name of product], the Parties explain that launch was expected for 2015-2016, but it is not yet approved in the EEA, and no application appears to be pending. [In fact, drawing from the general trend of very few fungicides being registered in the EEA, it is very uncertain that any of these AIs will be sold in the EEA]. There are in any event no indications to that effect in the investor presentations where crop protection companies present their pipeline.
- (2841) Most significantly, as is apparent from this analysis, the Parties would thus be the only global R&D-integrated players with new MoAs – a critical competitive factor – on the market. Dow appears to be the only company active in the picolinamide chemical class with a new MoA, [pipeline information].
- (2842) There is no doubt that competitors, with their experience in the industry, have promising products in their pipelines for which they may plan large peak sales. However, the scarcity of new MoAs is compelling and means that the Parties, with two new MoAs [...], are important competitive forces which will likely gain strong market positions in fungicides across the EEA.

²⁰⁰⁷ Form CO, paragraph 161; [internal document] (ID06825-16572), slide 7; [internal document], page 17.

²⁰⁰⁸ Form CO, paragraph 165.

²⁰⁰⁹ [Internal document] (ID1331-00081), slide 50.

²⁰¹⁰ [Internal document] (ID1329-01186), page 19.

²⁰¹¹ [Internal document], slides 19, 27-28 and 34-35; [internal document] page 9, [internal document] page 17; [internal document] (ID6150-20876), slide 36; [internal document] (ID7998), slides 2, 20, 29, 32; [internal document] (ID8836-00194), page 19; [internal document], page 7.

²⁰¹² Parties' response to the Statement of Objections, paragraphs 967-969; Parties' response to the Commission's request for information RFI 44, question 19.

²⁰¹³ See [internal document], pages 27, 30 and 53.

(2843) On the basis of an Article 11(3) Decision, the Commission has also asked the Parties' main competitors to provide their latest pipeline data. In order to identify their lines of research on fungicides, the Commission has selected their pipelines in discovery, later discovery, or pre-development. Based on an analysis of the third party responses to the Article 11(3) Decision, the Commission has reviewed these different lines of research and their MOAs. The Commission found nothing to call into question its conclusions that the Parties are important competitive forces in research for fungicides, with closely competing lines of research (or competing line of research of one Party vs. an existing product of the other Party).

8.8.3.6. Conclusion on the Parties' overlapping lines of research and early pipeline products in fungicides

(2844) In conclusion, the Commission considers that Dow and DuPont are important and close competitors in fungicide innovation, both with promising forthcoming products with new MoAs, which will focus mainly on cereals [pipeline information]. This conclusion is not changed by the review of competitor pipelines carried out by the Commission in the course of the investigation.

8.8.4. *Assessment of the arguments advanced by the Parties in their response to the Statement of Objections.*

8.8.4.1. Assessment of the general arguments made by the Parties

(2845) In their response to the Statement of Objections, the Parties advanced the following general arguments alleging that the Commission's assessment of overlapping lines of research and early pipeline products is flawed.²⁰¹⁴

(2846) First, the Parties argue that for many of the overlapping lines of research or early pipeline products described in the previous sections each party's product is complementary to the product of the other party given that they have different MoAs, different chemical classes or different target spectra.

(2847) Second, the Parties argue that given that early pipeline products face extreme uncertainty about their success, it is not possible to infer any competition harm from overlaps between the Parties. Moreover, the Parties argue that the Commission considers products that were already discontinued for toxicology reasons.

(2848) Third, the Parties argue that there are numerous other competitors with competing pipeline molecules that the Parties expect to be launched in the EEA.

(2849) Fourth, the Parties argue that there cannot be innovation concerns when one Party has lines of research and the other Party has existing products targeting similar pests and crops.

(2850) As regards the first claim, the Commission considers that the Parties' early pipeline products [...] share several key features, namely that they target the same crops and similar pests (in particular they target the same key pests) and have similar times of application and efficacy levels.

(2851) The Commission considers that differences in MoAs or chemical classes, if they are novel, may be an element of differentiation, but not sufficiently strong to justify the absence of significant competitive interaction between the Parties' early pipeline products in a context where these products have many other features in common.

²⁰¹⁴ Parties' response to the Statement of objections, pages 109-167.

- (2852) As regards differences in target spectra, the Commission considers that despite some differences in the overall spectrum, the Parties' early pipeline products present clear overlaps for several targets, defined in particular as crop/pest combinations. More importantly, these overlaps include the same key pests which direct farmers' choices and therefore sales of products.
- (2853) As regards the second claim by the Parties, the Commission considers that despite being at early stages of discovery, these projects have already a strong focus on specific target pests and crops, [content from internal document]. It is therefore already possible to infer closeness between the targets of the products of both Parties. This is true also for products that were in the meantime discontinued, but which support the fact that the Parties were pursuing innovation efforts to target the same innovation space. The Commission notes that the Parties seem to agree with this principle in Annex 1 to the response to the Statement of Objections, where they mention that innovation efforts are important to consider, in particular when they are targeted at the same applications, and even if unsuccessful due to uncertain nature of innovation.²⁰¹⁵
- (2854) As to the argument relating to the fact that these AIs are remote from the market and some of these may not have reached the market, it is important to clarify that, different from the impact on product competition, the effect of these decisions from the Parties on innovation would take place in the short term as a result of the Transaction and in particular as a result of the fact that competing lines of research would be held by the merged entity. In this situation, any decision to discontinue, defer or redirect those products would take place in the short term based on considerations of cannibalisation, with immediate effects on innovation.
- (2855) As regards the third claim, the Commission notes that, in their reports on the data room on competitors' pipeline products, the Parties have counted as alternatives to their own early pipeline products several compounds: (i) which will not be launched in the EEA, (ii) which are in a more advanced stage of development; (iii) which target different pests; (iv) which are part of different product categories (for example non-selective herbicides or pre-plant herbicides, seed treatment). Moreover, the Parties did not consider whether the discovery pipelines of competitors had existing or new chemical classes or MoAs. Therefore, most of these alternatives will not compete strongly or even compete at all against the Parties' early pipeline products analysed in Sections V.8.8.1 to V.8.8.3. The Commission therefore considers that the data room reports submitted by the Parties do not undermine the argument on the lack of alternatives to the Dow and DuPont pipeline projects at the discovery stage.
- (2856) As regards the fourth claim, the Commission notes that a merger affects innovation incentives through the internalisation of the negative effect that innovation has on sales of rival products. A successful innovator will divert profitable sales from its rivals. The diversion of sales may affect both existing rival products (if rivals are making current sales in the market in the absence of any innovation, based on existing products) and future rival products (if rivals are also innovating and therefore may be introducing new and improved products in the future).²⁰¹⁶

²⁰¹⁵ See paragraph 59 of Annex 1 to the Parties' response to the Statement of Objections.

²⁰¹⁶ The diversion of sales between the merging parties becomes an additional opportunity cost of innovation for the merged entity. Following the merger, this new opportunity cost leads to lower incentives to innovate (absent merger-specific efficiencies). This is a standard “unilateral effect” from a

Therefore, the Commission considers that competition between lines of research and existing products should be part of the assessment of innovation competition.

8.8.4.2. Assessment of the specific arguments made by the Parties on herbicides

(A) The arguments raised by the Parties on past innovation competition in herbicides do not undermine the Commission's analysis in the Statement of Objections

(2857) The Parties argue that aminocyclopyrachlor was never launched in the EEA and that [R&D information].

(2858) The Commission considers however that even though ex-post aminocyclopyrachlor was not registered for use in Europe and did not become as successful as expected, there was ex-ante competition between Dow and DuPont at the innovation stage, [...].

(2859) [Pipeline information].

(2860) [Pipeline information].²⁰¹⁷

(2861) The Parties argue that Arylex and DuPont's cereal herbicides will not be close competitors but will be complementary products, for instance as tank-mixing partners, [...].

(2862) The Commission considers however that the fact that AIs may be used as tank-mixing partners does not in itself mean that those AIs do not compete closely. Arylex and DuPont's cereal herbicides have overlapping weed spectrums, which include key weeds such as Lamium and Stellaria Media (see recital (2871)). The Commission is therefore of the view that these products are alternatives for farmers looking to eliminate those key weeds.

(2863) The Parties also submit that, [content from internal document], references to one firm's expectation to take sales from or displace a competitor cannot prove that the firms are close competitors, and that this simply confirms that the firms are active in the same product market. [Content from internal document].

(2864) [Content from internal document].

(2865) [Content from internal document].

(2866) [Content from internal document]²⁰¹⁸.

(2867) The Parties also submit that the field test report [internal document] lists not only [name of product], but also two other Dow products and two [name of company] products against which Arylex was tested.

(2868) However, the Commission considers that the fact that Arylex was also tested against other products does not make [name of product] less important as a benchmark product against which Arylex was tested. This fact does not undermine the view that [name of product] was a key point of reference in the development of Arylex.

merger, similar to the effect of the suppression of price competition between merging parties (see Annex 4 for further details).

²⁰¹⁷ [Internal document], slide 19.

²⁰¹⁸ [Internal document] (ID9304-55), page 13.

- (2869) The Parties submit that the Arylex videos cited in recital (2624) show that Arylex does not compete closely with the DuPont products and that the tests are only relevant for the weeds *Lamium* and *Stellaria Media*.
- (2870) The Commission however considers that the fact that mass-medium communication on Arylex features only DuPont SUs metsulfuron and tribenuron in comparative tests indicates that these are important competing products against which Arylex is positioned. It would not be relevant to compare Arylex with products which a target audience of specialised crop protection customers would not recognise as being close competitors.
- (2871) In addition, the comparative tests on weeds *Lamium* and *Stellaria Media* indicate that these are important key weeds which guide farmers' choices. They also show that these weeds are part of a spectrum overlap where Arylex and the DuPont SUs compete, supporting the Commission's general view that the Parties' products share similar key pests, [...].
- (2872) [Content from internal document].
- (2873) The Parties further argue that the field test report [...] lists not only [name of product] but also other Dow products and a [name of company] product against which Rinskor was tested.
- (2874) However, the Commission considers that the fact that Rinskor was also tested against other products does not make [name of product] less important as a benchmark product against which Rinskor was tested. This fact does not undermine the view that [name of product] was a key point of reference in the development of Rinskor.
- (2875) On the basis of recitals (2857) to (2874), the Commission considers that the Parties did not bring forward any additional arguments that contradict the findings of the Commission in Section V.8.8.1.1 on the Parties' past lines of research in herbicides.
- (B) The arguments raised by the Parties on current research targets in herbicides do not undermine the Commission's analysis in the Statement of Objections
- (2876) The Parties argue that the documents cited by the Commission do not reflect discovery targets. In addition, they submit that, even if their discovery targets coincided, this would not be an indication of specific rivalry, on the basis that their competitors are very likely to target the same resistant weeds. They submit that it is not rivalry but resistance that drives innovation in crop protection.
- (2877) [Content from internal document].
- (2878) [Content from internal document]. This contradicts the claim by the Parties that the targets weeds cited do not refer to research discovery targets in herbicides.
- (2879) The Commission considers that the documents on discovery targets are informative of the characteristics (for example in terms of crops and weeds targeted) of research efforts made by the Parties at the discovery stage, and are precise enough to be used meaningfully to define innovation spaces and to assess innovation competition at the research stage.
- (2880) In addition, the Commission considers that the mere speculation that other competitors may target similar weed spectrums does not preclude specific rivalry between Dow and DuPont. Moreover, it is the Commission's view that while resistance may create new market opportunities for crop protection players, it is rivalry that drives efforts to seize such new opportunities through innovation. The

Commission's investigation described in Section V.8.8.1 has revealed numerous pieces of evidence showing that the Parties have been and are currently conducting research in overlapping innovation spaces.

(2881) On the basis of recitals (2876) to (2880), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.1.2 on the Parties' current lines of research [pipeline information].

(C) The arguments raised by the Parties on current innovation competition in [...] herbicides do not undermine the Commission's analysis in the Statement of Objections

(C.i) [Current innovation competition between the Parties]

(2882) [Pipeline information].

(2883) [Pipeline information].²⁰¹⁹

(2884) [Pipeline information].

(2885) [Pipeline information].

(C.ii) [Current innovation competition between the Parties]

(2886) In various places in the response to the Statement of Objections the Parties made specific comments to argue that there can be no innovation concerns when one Party has lines of research and the other has existing products targeting similar weeds and crops because:

(a) [The lines of research may have novel MoAs or correspond to a new chemical class, and therefore they will complement existing products that will face increasing resistance: they argue that DuPont's compounds' MoAs are complementary to all of Dow's existing cereal herbicides];

(b) The lines of research have different spectrums compared to existing products;

(c) They argue that Dow's existing cereal herbicides, except for Arylex, are all already off-patent and genericised. [They submit that this makes it implausible for the Transaction to have any effect on the Parties' incentive to bring the DuPont compounds forward];

(d) Growing pest resistance and generic competition mean that the Parties will continue to face strong incentives to continue promising lines of research.

(2887) The Commission disagrees for the following reasons.

(2888) [Pipeline information]. While the fact that lines of research may have novel MoAs or be part of a new chemical class or have different spectrums compared to existing products may be an element of differentiation, it is not sufficiently strong to justify an absence of significant competitive interaction between the Parties' early pipeline products/lines of research and existing products, in a context where these lines of research/early pipeline products have many other features in common, in particular by targeting similar weeds and crops with similar levels of efficacy.

²⁰¹⁹

[Internal document].

(2889) Second, as discussed in details in Annex 2 and Section V.6.2.1, generics players are only a partial and often not significant constraint for R&D-integrated players. In particular, even after the loss of patent protection, formal patent rights can be complemented by strategies to lengthen the effective economic life of an AI, for example with the use of supplementary data protection certificates, the introduction of mixtures and the benefits from superior economies of scale and production.

(2890) [R&D information].

(2891) Third, the Commission's investigation has further shown that the use of different MoAs is primarily linked to resistance management. As pointed out by a customer, "[t]he use of different modes of action (MoA) is generally recommended to fight against resistance".²⁰²⁰ Considering that resistance affects some weeds more than others, it is the Commission's view that a farmer would still be able to choose freely among products targeting similar weed spectrums regardless of their MoA if the key weeds he faces are not particularly subject to resistance. This means that, at least in such cases, the Parties' pipeline products would still directly compete with each other if they were launched on the European market.

(C.iii) Herbicides in development by competitors

(2892) The Parties further submit that the Commission is wrong to discount the commercial prospects of Bayer's iofensulfuron and Syngenta's bicyclopyrone on the basis that these pipeline products have existing MoAs. [R&D information].

(2893) However, the Commission notes that, [...], DuPont has several pipeline compounds that offer new MoAs. [Pipeline information]. In addition, Dow's late-development product Rinskor offers a new MoA for rice crops [pipeline information].

(2894) The Parties submit that Dow expects Arylex and Syngenta's bicyclopyrone to compete head-to-head in cereal herbicides, without providing any source for this statement.

(2895) The Commission notes however that, as explained in recital (2692), bicyclopyrone is a cross-spectrum one-shot (late pre-emergence or early post-emergence) herbicide whose key target weeds are [targeted weeds].

(C.iv) Conclusion

(2896) On the basis of recitals (2882) to (2895), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.1.3 on the Parties' current lines of research in [...] herbicides.

(D) The arguments raised by the Parties on current research in rice herbicides do not undermine the Commission's analysis in the Statement of Objections

(D.i) Current innovation competition between the Parties: development-to-development overlap

(2897) The Parties submit that Rinskor and [pipeline information] show only a limited overlap in terms of weed spectrum, arguing that Rinskor is a full cross-spectrum product that controls key broadleaves, grasses, and sedges [...].

²⁰²⁰ Agreed non-confidential minutes of a call with a customer, 17 March 2016 (ID8246).

(2898) [However, the Commission notes that, in spite of differences in overall weed spectrum, both Rinskor and [pipeline information] are effective on various weeds for rice crops].

(2899) [Pipeline information].

(2900) [Pipeline information]. As a result, these two products can justifiably be deemed to target the same market as defined in the market definition section of this Decision.

(D.ii) Current innovation competition between the Parties: development-to-product overlap

(2901) The Parties submit that Dow's penoxsulam belongs to the ALS class which faces substantial resistant while [pipeline information] has a novel MoA. They further argue that penoxsulam will become off-patent in 2017 and will therefore be genericised [launch date].

(2902) [R&D information].

(D.iii) Herbicides in development by competitors

(2903) The Parties submit that other competitors have rice herbicides in development that will compete closely with the Parties.

(2904) In particular, they expect Bayer's triafamone to be launched in all rice geographies, including the EEA.

(2905) [Content from internal document].²⁰²¹ The Commission's investigation of competitors' pipelines has found nothing to contradict this assessment.

(2906) In addition, the Parties seem to suggest that Bayer will also launch iofensulfuron on the EEA market, expecting "*first registrations in 2021-2022*".²⁰²²

(2907) [Content from internal document].²⁰²³ The Commission's investigation of competitors' pipelines has found nothing to contradict this.

(2908) The Parties also seem to suggest that FMC will launch fenquinotrione on the EEA market, expecting "*first registrations in 2020*".

(2909) [Content from internal document].²⁰²⁴ The Commission's investigation of competitors' pipelines has found nothing to contradict this assessment.

(D.iv) Conclusion

(2910) On the basis of recitals (2897) to (2909), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.1.4 on the Parties' current lines of research on rice herbicides.

(E) [Pipeline information]

(E.i) Herbicides in development by competitors

(2911) The Parties submit that the Commission disregards [name of product] efficacy on [disease]. To substantiate this claim, they refer to a promotional document for [name

²⁰²¹ [Internal document] (ID8833-7).

²⁰²² Parties' response to the Statement of Objections, page 124.

²⁰²³ [Internal document] (ID8833-7).

²⁰²⁴ [Internal document] (ID8833-7).

of company/crop] herbicide [name of product], which lists [disease] among the weeds targeted by this product.

(2912) However, the Commission notes that [name of product] is a formulated product containing [number of AIs] other active ingredients, namely [names of AIs]. As the Commission's investigation has not revealed [disease] to be a key target weed of [name of product],²⁰²⁵ it is likely that [name of product] efficacy on [disease] derives from its other constituent AIs. [Pipeline information].

(E.ii) Conclusion

(2913) On the basis of the recitals (2911) and (2912), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in [...].

(F) The arguments raised by the Parties on competitors in herbicides do not undermine the Commission's analysis in the Statement of Objections

(2914) In the response to the Statement of Objections, the Parties argue that the Commission did not properly explain its analysis of the Parties' competitors' discovery pipelines and contest the Commission's assessment that very few products in the discovery or development stage would be able to compete directly with the Parties' products in the foreseeable future.

(2915) As discussed in Section V.8.8.4.1, the Commission disagrees with the methodology used by the Parties in the data room reports submitted for the reasons discussed in paragraph (2855).

(2916) [The Parties further submit that the market investigation showed that customers considered Bayer to be Dow's closest competitor in cereal herbicides and BASF to be Dow's closest competitor in rice herbicides].

(2917) However, the Commission observes that market participants' opinions on closeness of competition are mainly informed by current product offerings and do not fully reflect convergences in product portfolios due to forthcoming products such as Dow's Arylex and Rinskor and DuPont's [pipeline information].

(2918) Also, while Dow and DuPont specialise in broadleaf herbicides, Bayer and BASF do not have a clear focus in terms of weed classes as they currently have portfolios that are more balanced between graminicides and broadleaf herbicides.²⁰²⁶ As for Syngenta, this competitor focuses more on graminicides while Monsanto is mostly present in non-selective herbicides.

(2919) On the basis of recitals (2914) to (2918), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.1.6 on the limited number of alternatives to the Parties' lines of research and early pipeline products [pipeline information].

²⁰²⁵ See the [name of product] entry in the University of Hertfordshire's Pesticide Properties Database, file name [internal document].

²⁰²⁶ [Internal document].

8.8.4.3. Assessment of the specific arguments made by the Parties on insecticides

- (A) The arguments raised by the Parties on research at the discovery stages do not undermine the Commission's analysis in the Statement of Objections
- (2920) In the response to the Statement of Objections, the Parties make two specific comments related to discovery targets' documents used by the Commission in Section V.8.8.2.2. First, [content from internal document].^{2027,2028} On that basis, the Parties seem to suggest that discovery targets are too broad to be meaningfully used to assess innovation competition between the Parties.
- (2921) The Commission disagrees with the Parties for the following reasons.
- (2922) [Content from internal document].
- (2923) Second, in any event, [content from internal document].
- (2924) Third, [content from internal document]. The Commission notes that for some competitors, these pests are targeted by certain competitors (this information was made available to the Parties in the data room), confirming that firms have different research targets for these three types of insects for example.
- (2925) Fourth, [content from internal document].
- (2926) On the basis of recitals (2920) to (2925), the Commission considers that the documents on discovery targets are informative on the characteristics of research efforts made by the Parties at the discovery stage (for example in terms of crops and insects targeted), and are precise enough to be used meaningfully to define innovation spaces ([pipeline information]), and therefore to assess innovation competition at the research stage.
- (B) The arguments raised by the Parties on competitors do not undermine the Commission's analysis in the Statement of Objections
- (2927) In the response to the Statement of Objections, the Parties argue that the Commission did not investigate properly the competitors' pipelines, and in particular they claim that they are numerous actual and potential competitors in insecticides in the EEA.²⁰²⁹ As discussed in Section V.8.8.4.1, the Commission disagrees with the methodology used by the Parties in the data room reports submitted. Therefore, the Commission considers that the Parties did not bring forward any argument that contradicts the findings of the Commission in Section V.8.8.2.5 on the limited number of alternatives to the Parties' lines of research and early pipeline products for [pipeline information] insecticides.
- (2928) As regards the confidential supplementary data room report submitted on [internal document], ("supplementary data room report"), the Commission considers that this report does not contradict the findings of the Commission in the Section V.8.8.2.5 on the limited number of alternatives to the Parties' lines of research for the following reasons.
- (2929) First, all insecticides projects, independently of the stage (discovery, development) and of their geographical relevance (likely to be launched in the EEA or not) are pooled together. On the contrary, in its analysis the Commission considers in

²⁰²⁷ Parties' response to the Statement of Objections, paragraph 402.

²⁰²⁸ Parties' response to the Statement of Objections, paragraph 404.

²⁰²⁹ Parties' response to the Statement of Objections, paragraphs 390-391, paragraph 405.

particular lines of research at the discovery stage and with a prospect of being launched in the EEA.

- (2930) Second, as regards the first and second competitors listed in the data room report, there is no discussion whether the lines of research at the discovery stage are related to new MoAs. In contrast, the Commission has taken into account this characteristic in its analysis, in particular given that the Parties have developed lines of research with new MoAs.
- (2931) Third, the Parties do not consider other characteristics of the competitors mentioned in the data room report, which suggest that they have not been important innovators in the past against the Parties.
- (2932) Fourth, in their counting, the Parties include lines of research related to seed treatment and nematicides, which are not relevant for the Commission's assessment of innovation competition in [pipeline information] insecticides.
- (2933) Fifth, whether these discovery lines of research have prospect to be launch in the EEA is not discussed as well.
- (2934) On the basis of recitals (2929) to (2933), the Commission considers that the confidential supplementary data room report is of limited relevance and does not contradict the findings of the Commission in the Section V.8.8.2.5 on the limited number of alternatives to the Parties' lines of research for the following reasons.
- (2935) As regards BASF, in the response to the Statement of Objections, the Parties mention three insecticide pipelines, [pipeline information]. On that basis, the Parties seem to suggest that BASF is an important innovator in discovery of insecticides based on these past innovations.²⁰³⁰
- (2936) The Commission disagrees with the Parties for the following reasons. As regards [names of products], as discussed in recital (2729)(3), these molecules were not discovered by BASF, [R&D information]. Moreover, according to BASF, registration of [name of product] in the EEA is uncertain. As regards the [name of product], the Parties did not substantiate their claim with any specific facts and no further information has come to the Commission's knowledge during its investigation.
- (2937) Moreover, the Commission also notes that, on the basis of patent shares, BASF is the weakest innovators for new AIs in insecticides with the lowest patent share among the R&D-integrated companies (see Section V.8.7.2.1). In addition, as discussed in Sections V.8.8.2.5, on the basis of [content from internal document].
- (2938) As regards Japanese companies, in the response to the Statement of Objections, the Parties show several examples of pipeline products to argue that Japanese companies are important innovator in insecticides.²⁰³¹ As discussed in Sections V.8.6.3.4 and V.8.7.2.1, the Commission disagrees with the Parties that Japanese companies should be considered as competing against the five R&D-integrated firms for innovations on new AIs in insecticides. This is based on the following reasons: (i) Japanese companies focus their R&D effort for the crops and pests for the Japanese market and their innovations are therefore less relevant for the EEA, (ii) Japanese companies have limited development capabilities that prevent them

²⁰³⁰ Parties' response to the Statement of Objections, paragraph 380.

²⁰³¹ Parties' response to the Statement of Objections, paragraphs 385-386.

from bringing their innovations to customers in the EEA, (iii) they have also a limited turnover and footprint outside of Japan, (iv) they are considered rather as partner by the R&D-integrated firms, (v) only few AIs discovered by Japanese companies are registered in other geographies, (vi) because of limited capabilities, sometimes other companies optimise molecules originally discovered by Japanese companies to adapt them to other needs and obtain a patent, (vii) for AIs developed by Japanese companies and brought to the EEA, around [sales estimate]% of the revenue was related to AIs further (co)developed by one of the five R&D-integrated companies. On that basis, the Commission considers that Japanese companies cannot be treated in the same way as the five R&D-integrated companies, and in particular cannot be considered as competing against the five R&D-integrated companies for innovations in new AIs.

- (2939) In the response to the Statement of Objections, the Parties emphasise a particular internal document, and on that basis they seem to suggest that Japanese companies are important innovators. In particular, this is because two recent chemical classes developed by DuPont, namely the sodium channel blockers (corresponding to the insecticide Indoxacarb) and the diamides (corresponding to the insecticides Rynaxypyr and Cyazypyr), were discovered by Japanese companies [pipeline information].²⁰³²
- (2940) The Commission disagree with the Parties. Actually, in the Commission's view, the fact that the sodium channel blockers and the diamides chemical classes were further developed by DuPont (who actually owns the patents on the products related to these two chemical classes: Indoxacarb, Rynaxypyr, and Cyazypyr) and not by the Japanese companies themselves suggests that Japanese companies were not able to make the additional development steps necessary to develop further these chemical classes to bring their discoveries to the market. This is consistent with their limited development capabilities.
- (2941) [Content from internal document]:
- (a) [Content from internal document].²⁰³³
- (b) [Content from internal document].²⁰³⁴
- (2942) The Commission therefore considers [content from internal document] that: (i) Japanese companies are significantly limited in bringing their discoveries to the market globally, because of the lack of development capabilities, and (ii) the five R&D-integrated companies are the main partners through which their discoveries can be brought to the market, either through licensing/co-development [content from internal document] Japanese companies cannot be considered as competing against the five R&D-integrated companies for the discovery of new AIs in insecticides.
- (2943) As regards FMC, the Parties argue that it is competing against the Parties for innovations on new AIs for insecticides.²⁰³⁵ As discussed in Section V.8.6.3.2, the Commission disagrees since FMC has no discovery capabilities.

²⁰³² Parties' response to the Statement of Objections, paragraphs 380 and 394.

²⁰³³ Because of the previous consolidations in the crop protection industry, the Commission consider Novartis ([content from internal document]) as being part of Syngenta.

²⁰³⁴ [Internal document] (ID1328-454).

²⁰³⁵ Parties' response to the Statement of Objections, paragraph 431.

- (2944) As regards Syngenta, the Parties essentially argue that it is an important innovator based on the following:
- (a) Syngenta's [name of product] is a successful product and there is no "*compelling evidence of its likely exit*".²⁰³⁶
 - (b) Syngenta's agreement with DuPont on the licensing of Rynaxypyr and Cyazypyr [...] is unlikely to negatively affect the incentives of Syngenta to develop competing innovations to these two insecticides.²⁰³⁷
- (2945) The Commission finds that these arguments are unfounded.
- (2946) First, as discussed in Sections V.6.4.5, V.6.4.6, and V.8.8.2.5, [R&D information].²⁰³⁸
- (2947) Second, the licensing and supply agreements between Syngenta and DuPont on Rynaxypyr and Cyazypyr [agreement information].
- (2948) As regards Bayer, the Parties essentially argue that it will remain an important innovator based on the following:
- (a) On [pipeline information] insecticides, Bayer's [name of product] is a successful product,²⁰³⁹ and Bayer has a pipeline called [name of pipeline].²⁰⁴⁰
 - (b) On [pipeline information] insecticides, the fact that Bayer's [name of product] has the same MOA as the [name of product] is irrelevant and is not under regulatory pressure.²⁰⁴¹
- (2949) The Commission disagrees with the Parties for the following reasons.
- (2950) As regards [pipeline information] insecticides, as discussed in Sections V.6.4.3.2 and V.6.4.5.4, Bayer's [name of product] has had regulatory issues [R&D information]. The Commission therefore considers that the argument of the Parties do not undermine the Commission's view that Bayer has been and will continue to be in the future a limited alternative to the innovations developed by Dow and DuPont [pipeline information].
- (2951) As regards [pipeline information] insecticides, the Commission expressly acknowledges that, [pipeline information], "*the only significant additional innovator appears to be Bayer*" in [pipeline information] insecticides.²⁰⁴² The Commission's reference to the fact that [name of product] has the same MoA as the [name of product] is not "*an apparent suggestion that it will face regulatory issues*", but rather that this molecule is less novel than the Parties' innovations in [pipeline information] insecticides.²⁰⁴³
- (2952) On the basis of recitals (2927) to (2951), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the

²⁰³⁶ Parties' response to the Statement of Objections, paragraphs 373 and 380.

²⁰³⁷ Parties' response to the Statement of Objections, paragraph 380.

²⁰³⁸ Parties' response to first Letter of Facts (Annex 1), paragraph 9.

²⁰³⁹ Parties' response to the Statement of Objections, paragraph 373.

²⁰⁴⁰ Parties' response to the Statement of Objections, paragraph 380.

²⁰⁴¹ Parties' response to the Statement of Objections, paragraph 380.

²⁰⁴² See recitals (2729)(2).

²⁰⁴³ See recital (2727).

Commission in Section V.8.8.2.5 on the limited number of alternatives to the Parties' lines of research and early pipeline products for [pipeline information] insecticides.

(C) The arguments raised by the Parties on [pipeline information] insecticides do not undermine the Commission's analysis in the Statement of Objections

(2953) The Commission notes that in the response to the Statement of Objections, the Parties did not comment on most of the evidence discussed in Section V.8.8.2.3.

(2954) The comments of the Parties on innovations by competitors are already addressed above.

(C.i) Past innovation competition between the Parties

(2955) In the response to the Statement of Objections, the Parties argue there is no evidence of past innovation competition between DuPont's [name of product] and Dow's [name of product] because they have different spectrum of activity, in particular because of a different activity on [targeted pest].²⁰⁴⁴ However, the Commission disagrees since: (i) while products may have differences in the overall spectrum, the products can still present clear overlaps for several targets, defined in particular as crop/pest combinations (see also Section V.8.8.4.1), and (ii) as discussed in Sections V.8.8.2.3 and V.6.4.5 to V.6.4.6, both products from Dow and DuPont are targeting in particular [targeted pest] insects, for example for [targeted crop], evidence that was not contested in the response to the Statement of Objections.

(C.ii) [Current innovation competition between the Parties]

(2956) The Parties submit that [pipeline information].²⁰⁴⁵ However, the Commission disagrees since: (i) while lines of research and early pipeline products may have differences in the overall spectrum, they can still present clear overlaps for several targets, defined in particular as crop/pest combinations (see also Section V.8.8.4.1), and (ii) as discussed in Section V.8.8.2.3, these lines of research and early pipeline products from Dow and DuPont are targeting in particular [targeted pest] insects, which is not contested by the Parties in the response to the Statement of Objections. [Pipeline information]. However, as discussed in Section V.8.8.4.1, the Commission disagrees, in particular because both lines of research are targeting the same [targeted pest] insects.

(2957) The Parties submit that [pipeline information]. However, the Commission disagrees since: (i) while lines of research and early pipeline products may have differences in the overall spectrum, they can still present clear overlaps for several targets, defined in particular as crop/pest combinations (see also Section V.8.8.4.1), and (ii) as discussed in Section V.8.8.2.3, these lines of research and early pipeline products from Dow and DuPont are targeting in particular [targeted pest] insects, which is not contested by the Parties in the response to the Statement of Objections. The fact that [pipeline information] have different MoA and [pipeline information] a novel chemistry do not change the conclusion that these lines of research are competing in innovation by targeting similar insects and crops, as discussed in Section V.8.8.2.3.

(2958) In the response to the Statement of Objections, the Parties also submit that Dow has no research candidate related to the [pipeline information] chemistry, where DuPont

²⁰⁴⁴ Parties' response to the Statement of Objections, paragraph 395.

²⁰⁴⁵ Parties' response to the Statement of Objections, paragraph 412.

is active [pipeline information].²⁰⁴⁶ In the Statement of Objections, the Commission relies in particular on evidence from [content from internal document].²⁰⁴⁷ While the Parties submit that Dow has no discovery candidate related to the [pipeline information] chemistry, [pipeline information]. The Commission therefore considers that this evidence suggests that Dow is pursuing innovation efforts in this particular chemistry, where DuPont is currently active with the [pipeline information].

(2959) The Parties also submit that [pipeline information].²⁰⁴⁸ However, the Commission disagrees since [pipeline information] follow-on line of research based on [...] previous lines of research shows a continuous research effort of [pipeline information], in particular to target [targeted pest] insects, as discussed in Section V.8.8.2.3. [Pipeline information].

(C.iii) [Current innovation competition between the Parties]

(2960) [Pipeline information].²⁰⁴⁹ In particular, the Parties consider that this statement does not show that Dow and DuPont are competitors in the "antitrust sense". The Commission disagrees since [name of company] mentions only [name of company] as a competitor, nobody else, therefore suggesting that this [name of company] line of research is particularly close to [name of company] insecticides, and in particular for the innovation space of [targeted pest] insects in [targeted crop].

(2961) The Parties argue that there cannot be innovation concerns when one Party has lines of research and the other Party has existing products targeting similar insects and crops because:

- (a) The lines of research may have novel MoAs or correspond to a new chemical class, and therefore they will complement existing products that will face increasing resistance.
- (b) The lines of research have different spectrums compared to existing products.
- (c) The existing products will be off-patent in the near future ([names of products]) and will therefore become generics.
- (d) Growing pest resistance, threats of regulation, and generic entry, mean that the Parties will continue to face strong incentives to continue the promising lines of research.

(2962) Based on these four arguments, the Parties argue [pipeline information], the lines of research would still be continued post-Transaction.²⁰⁵⁰ The Commission disagrees for the following reasons.

(2963) First, as discussed in Section V.8.8.2.3, [pipeline information]. [The fact that lines of research may have different or novel MoAs or corresponds to a new chemical class or have different spectrums compared to existing products, while it may be elements of differentiation, it is not sufficiently strong in this case to justify an absence of significant competitive interaction between the Parties' early pipeline products/lines of research and exiting products, in a context where these lines of research/early pipeline products and existing products have many other features in common, in

²⁰⁴⁶ Parties' response to the Statement of Objections, paragraph 414.

²⁰⁴⁷ See Section V.8.8.3.3.

²⁰⁴⁸ Parties' response to the Statement of Objections, paragraph 415.

²⁰⁴⁹ Parties' response to the Statement of Objections, paragraph 418.

²⁰⁵⁰ Parties' response to the Statement of Objections, paragraphs 419-420.

particular by targeting similar insect and crops with similar level of efficacy (see Sections V.8.8.3.3 for a detailed discussion of the evidence in insecticides)]. The Commission notes that in the response to the Statement of Objections, the Parties did not comment on most of the evidence discussed in Section V.8.8.3.3.

- (2964) Second, as discussed in details in Annex 2 and Section V.6.2.1, generics players are only a partial and often not significant constraint for R&D-integrated players. In particular, even after the loss of patent protection, formal patent rights can be complemented by strategies to lengthen the effective economic life of an AI, for example with the use of supplementary data protection certificates, the introduction of mixtures, and the benefits from superior economies of scale and production.
- (2965) Third, as regards Dow's existing insecticides [names of products], the Commission is not aware of any evidence on file on resistance issue or regulatory pressure faced by these [...] insecticides. The Parties did not bring specific evidence in the response to the Statement of Objections.
- (2966) Moreover, [product information].²⁰⁵¹
- (2967) [Sales and margin estimates].
- (2968) Fourth, as regards DuPont's existing insecticide [name of product], the Commission is not aware of any evidence on file on regulatory pressure. Moreover, the Parties did not bring specific evidence in the response to the Statement of Objections. While the Commission recognises that [name of product] may face some resistance issue in the future, the Commission considers that it is unlikely to be sufficiently important such that [name of product] would become an ineffective product with limited sales in the future, [sales and margin estimates].²⁰⁵²
- (2969) Contrary to what the Parties suggest, [sales and margin estimates].

(C.iv) Conclusion

- (2970) On the basis of recitals (2953) to (2969), the Commission considers that the Parties did not bring forward any additional arguments or facts in the response to the Statement of Objections that contradict the findings of the Commission in Section V.8.8.2.3 on [pipeline information] insecticides ([pipeline information]), that the Parties: (i) were close competitors in the past by innovating against each other, and (ii) are currently close competitors based on overlap between lines of research/early pipeline products or between a line of research/early pipeline and an existing product, [pipeline information].
- (D) The arguments raised by the Parties on [pipeline information] insecticides do not undermine the Commission's analysis in the Statement of Objections
- (2971) The Commission notes that in the response to the Statement of Objections, the Parties did not comment on most of the evidence discussed in Section V.8.8.2.4.
- (2972) The comments of the Parties on innovations by competitors are already addressed above.

²⁰⁵¹ [Internal document] (ID10430).

²⁰⁵² [Internal document] (ID4384-8).

(D.i) Past innovation competition between the Parties

(2973) The Parties submit that Dow's [name of product] and DuPont's [name of product] are not evidence of past innovation competition between the Parties because these products have a different spectrum, in particular for [targeted pests].²⁰⁵³ However, the Commission disagrees since: (i) while products may have differences in the overall spectrum, the products can still present clear overlaps for several targets, defined in particular as crop/pest combinations (see also Section V.8.8.4.1), and (ii) as discussed in Sections V.6.4.5 to V.6.4.6 and V.8.8.2.4, both products from Dow and DuPont are targeting in particular some [targeted pest] species, [targeted crop].

(D.ii) The Parties [R&D information] insecticides with products based on strong innovations

(2974) [In the response to the Statement of Objections, the Parties seem to suggest that innovation concerns are unlikely in insecticides given that the Parties have [product information].]²⁰⁵⁴ However, the Commission disagrees for the following reasons.

(2975) First, both Dow and DuPont [product information] insecticides, which explain that [product information].²⁰⁵⁵

(2976) [Second, as discussed in Annex 1 and in Section V.8.7.2.1, the [patent information] patent of both Dow and DuPont correspond to insecticides: Dow with the patent on [name of product] and DuPont with the patent on [name of product]. This suggests that Dow and DuPont are important innovators in insecticides]. The evidence discussed in Sections V.6.4.5 to V.6.4.6 and V.8.8.3.4 also show that Dow and DuPont are targeted similar [targeted pest] species and crops with these two innovations, suggesting that they are close innovation competitors, while other companies ([name of product]) are likely to exit the market.

(D.iii) [Current innovation competition between the Parties]

(2977) In the response to the Statement of Objections, [pipeline information]. However, the Commission disagrees since (i) while these lines of research and early pipeline products may have differences in the overall spectrum, they can still present clear overlaps for several targets, defined in particular as crop/pest combinations (see also Section V.8.8.4.1), and (ii) as discussed in Section V.8.8.2.4, these lines of research and early pipeline products from Dow and DuPont are targeting in particular [targeted pest] insects, which is not contested by the Parties in the response to the Statement of Objections.

(2978) The Parties also submit that [pipeline information].²⁰⁵⁶ The Commission disagrees since it important to consider innovation efforts made by the Parties to assess innovation competition, [pipeline information] shows the continuous research effort of Dow in [pipeline information] insecticides, in particular to target [targeted pest]. The Commission notes that the Parties seem to agree with this principle in Annex 1 to the response to the Statement of Objections, where they mention that innovation efforts are important to consider, in particular when they are targeted at the same

²⁰⁵³ Parties' response to the Statement of Objections, paragraph 397.

²⁰⁵⁴ Parties' response to the Statement of Objections, paragraph 421-422.

²⁰⁵⁵ See Section V.8.8.2.4 and V.6.4.

²⁰⁵⁶ Parties' response to the Statement of Objections, paragraph 426.

applications, and even if unsuccessful due to uncertain nature of innovation.²⁰⁵⁷ As regards the argument of the Parties that [pipeline information] have different spectrums [targeted pest], the Commission disagrees since despite having a different spectrum [targeted pest], these [pipeline information] lines of research still present a clear overlap on [targeted pest], which was not contested by the Parties in the response to the Statement of Objections.

(2979) In addition, the Parties argue that there cannot be innovation concerns because of the threat of generics, threat of regulatory pressure on existing products, and pest resistance.²⁰⁵⁸ However, the Commission considers this argument as being irrelevant in the context of competition between [pipeline information].

(D.iv) [Current innovation competition between the Parties]

(2980) The Parties argue that there cannot be innovation concerns when one Party has lines of research and the other has existing products targeting similar insects and crops because:²⁰⁵⁹

- (a) The lines of research may have novel or different MoAs compared to existing products, and therefore they will complement existing products that will face increasing resistance;
- (b) The lines of research have different spectrums compared to existing products;
- (c) The existing products will be off-patent in the near future ([product information]) and will therefore become generics;
- (d) Growing pest resistance, threats of regulation, and generic entry, means that the Parties will continue to face strong incentives to continue the promising lines of research.

(2981) [Pipeline information]. The Commission disagrees for the following reasons.

(2982) First, [pipeline information].

(2983) Second, the fact that lines of research may have different or novel MoAs or different spectrums compared to existing products, while it may be elements of differentiation, it is not sufficiently strong in this case to justify an absence of significant competitive interaction between the Parties' early pipeline products/lines of research and exiting products, in a context where these lines of research/early pipeline products and existing products have many other features in common, in particular by targeting similar insect and crops with similar level of efficacy ([...]). The Commission notes that in the response to the Statement of Objections, the Parties did not comment on most of the evidence discussed in Section V.8.8.2.4.

(2984) Third, as discussed in details in Annex 2 and Section V.6.2.1, generics players are only a partial and often not significant constraint for R&D-integrated players. In particular, even after the loss of patent protection, formal patent rights can be complemented by strategies to lengthen the effective economic life of an AI, for example with the use of supplementary data protection certificates, the introduction of mixtures, and the benefits from superior economies of scale and production.

²⁰⁵⁷ Paragraph 59 of Annex 1 to the Parties' response to the Statement of Objections.

²⁰⁵⁸ Parties' response to the Statement of Objections, paragraphs 424-425.

²⁰⁵⁹ Parties' response to the Statement of Objections, paragraphs 427-428.

(2985) Fourth, as regards Dow's existing insecticides [name of product] and DuPont's insecticides [name of product], the Commission is not aware of any evidence on file on resistance issue or regulatory pressure faced by these [...] insecticides, [product information]. The Parties did not bring specific evidence in the response to the Statement of Objections.

(2986) Moreover, [sales and margins estimates].²⁰⁶⁰

(2987) Last, [sales and margin estimates].²⁰⁶¹

(D.v) Conclusion

(2988) On the basis of recitals (2971) to (2987), the Commission considers that the Parties did not bring forward any additional arguments or facts in the response to the Statement of Objections that contradict the findings of the Commission in Section V.8.8.2.4 on [pipeline information] insecticides ([pipeline information]), that the Parties: (i) were close competitors in the past by innovating against each other, and (ii) are currently close competitors based on overlap between lines of research/early pipeline products or between a line of research/early pipeline and an existing product, [pipeline information].

8.8.4.4. Assessment of the specific arguments made by the Parties on fungicides

(A) The arguments raised by the Parties on current research in cereal fungicides do not undermine the Commission's analysis in the Statement of Objections

(2989) As discussed in Section V.8.8.4.1, the Parties in essence reiterate earlier allegations that their pipeline molecules for cereal disease control are neither important nor close competitors and in fact do not significantly overlap because they have different spectra, MoAs and planned launch dates. [R&D information].

(2990) However, [pipeline information].

(2991) In any event, [pipeline information].

(2992) In fact, as explained in Section V.6.6.3, relevant fungicide product markets are defined on the basis of specific crop/disease combinations. Added spectrum is therefore largely irrelevant to specific competitive assessments.

(2993) Second, the Parties provide no argument or evidence in support of their claim that molecules with different MoAs are complementary rather than substitutable. [Pipeline information].

(2994) Third, [pipeline information].

(2995) Fourth, [pipeline information].

(2996) On the basis of recitals (2989) to (2995), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.3.2 on the Parties' current lines of research in cereal fungicides, [pipeline information].

²⁰⁶⁰ [Internal document] (ID4384-8).

²⁰⁶¹ [Internal document] (ID10694).

(B) The arguments raised by the Parties [targeted pest] do not undermine the Commission's analysis in the Statement of Objections

(2997) As discussed in Section V.8.8.4.1, the Parties in essence argue that these early discovery projects face a high level of uncertainty as to their target crops and fungi, and a strong likelihood of failure. [Pipeline information].

(2998) However, the Commission notes that decisions to discontinue, defer or reorient overlapping projects have immediate effects on innovation, regardless of the likelihood of each project eventually reaching the market.

(2999) Moreover, [pipeline information].

(3000) On the basis of recitals (2997) to (2999), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.3.3 [pipeline information].

(C) The arguments raised by the Parties [pipeline information] do not undermine the Commission's analysis in the Statement of Objections

(3001) As discussed in Section V.8.8.4.1, [pipeline information].

(3002) The Parties also argue that early discovery projects face a high level of uncertainty as to their target crops and fungi, and a strong likelihood of failure. Therefore, no reliable analysis could be made on that basis.

(3003) The Parties [pipeline information].

(3004) However, the Commission notes that the Parties provide no argument or evidence in support of their claim that molecules with different MoAs are complementary rather than substitutable. [Pipeline information].

(3005) The Commission also notes regarding early discovery projects that decisions to discontinue, defer or reorient overlapping projects have immediate effects on innovation, regardless of the likelihood of each project eventually reaching the market.

(3006) Moreover, the fact that [pipeline information].

(3007) On the basis of recitals (3001) to (3007), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.3.4 [pipeline information].

(D) The arguments raised by the Parties on competitors in fungicides innovation do not undermine the Commission's analysis in the Statement of Objections

(3008) As discussed in Section V.8.8.4.1, the Parties argue in their response to the Statement of Objections that the Commission did not properly explain its analysis of the Parties' competitors' pipelines and contest the Commission's assessment that very few lines of research and pipeline products would be able to compete directly with the Parties'. On the contrary, they allege that there are many strong pipeline products from competitors, including several with novel MoAs. The Parties also allege that the Commission would apply a dual standard by assessing the Parties' pipeline candidates on the basis of target crops and fungi, but not doing the same for competing pipelines and only looking at their MoAs.

(3009) However, the Commission notes that competitor pipelines are analysed in Section V.8.8.3.5. The Parties do not provide new evidence putting in doubt the finding that there are few alternative lines of research or early pipeline products.

- (3010) Indeed, the examples of competing products provided by the Parties are typically in development or already on the market.
- (3011) Moreover, these examples do not contradict the finding that the Parties will likely be the only two global R&D-integrated players to have proprietary new MoAs [pipeline information], thus making them important and close competitors in spite of competition from older MoA products from the current market leaders. In particular, the Parties provide no evidence contradicting the finding that current market leaders – BASF, Bayer and Syngenta – do not currently have new MoAs for cereal [targeted diseases] in their pipeline.
- (3012) Furthermore, as discussed in Section V.8.8.4.1, a number of the competing products – particularly those with new MoAs – listed by the Parties in their response to the Statement of Objections refer to molecules targeting crop/disease combinations which are not assessed in the Decision.
- (3013) Finally, the Parties' last allegation – that the Commission would not look at the target spectra of competing pipeline products – is evidently contradicted by the preceding recital, as well as the Commission's assessment of competing pipeline products, which only takes into consideration products targeting the crop/disease combinations assessed in the present Decision.
- (3014) On the basis of recitals (3008) to (3013), the Commission considers that the Parties did not bring forward any additional argument that contradicts the findings of the Commission in Section V.8.8.3.5 on the limited number of alternatives to the Parties' lines of research and early pipeline products for cereal [targeted diseases].

8.9. Post-Transaction the merged entity would have incentives to reduce innovation efforts on overlapping lines of research and early pipeline products thus leading to a significant impediment to effective innovation competition on the innovation spaces where the Parties currently compete

8.9.1. Introduction

- (3015) According to paragraph 38 of the Horizontal Merger Guidelines "*effective competition may be significantly impeded by a merger between two important innovators, for instance between two companies with 'pipeline' products related to a specific product market*".
- (3016) Moreover, in line with paragraph 28 of the Horizontal Merger Guidelines, the higher the substitutability between the Parties' products, the more likely it is that the Parties would reduce innovation post-Transaction.
- (3017) Against this background, the Commission refers to economics theory suggesting that a merger bringing together two competing early pipeline products (or lines of research) or an early pipeline product (or line of research) positioned to compete with an existing product may lead to a reduction on the efforts to continue with those overlapping early pipeline products (or lines of research).
- (3018) This can be the case if the early pipeline product (or line of research) of one of the merging parties was likely to capture significant revenues from the competing product of the other merging party (be it another early pipeline product – or line of research - or products currently marketed). This adverse externality is internalised post-merger – from the perspective of each innovator, the expected loss of profits on the products of the other merging firm adds to the opportunity cost of innovating –, making it more likely that an early pipeline product (or line of research) is

suppressed, deferred or re-directed (particularly in the presence of significant development and commercialisation costs).

- (3019) Consumers are harmed in this case by both the loss of product variety, and the reduced intensity of future product market competition in the markets where the discontinued/deferred/redirected early pipeline product would have been introduced but for the merger. This effect applies both in the short-term, notably in relation to existing early pipeline products and current lines of research, and over time, in relation to any future R&D efforts (see Annex 4 for additional details on the nature of these effects).
- (3020) Against this theoretical background, the Commission considers that the actual likelihood of the said effects being brought about by the Transaction, which involves two large and independent innovators in the crop protection industry, is corroborated by the [...] report submitted by the Parties stating that cannibalisation concerns could affect post-Transaction innovation incentives when a Party's early pipeline product overlaps with the other Party's existing product portfolio. Similar cannibalisation concerns could also arise if a Party's early pipeline product overlaps with an early pipeline product of the other Party, and even if future innovation (discovery) by each of the Parties is expected to give rise to overlapping new pipeline products.
- (3021) According to Section V.8.8, each Party holds several lines of research and early pipeline products in innovation spaces where the other Party also independently holds lines of research and early pipeline products (as well as current products). This implies that the Transaction would significantly increase the cannibalisation effects associated to combining the lines of research and early pipeline products.
- (3022) Because of the risk of the increased losses from cannibalisation that the Transaction would be likely to bring, the Commission considers that the Transaction would likely reduce the incentives for the merged entity to continue with both lines of research and early pipeline products with the same intensity as each of the Party would in the absence of the Transaction. In fact, as the potential future products would be part of the same portfolio, the increased post-Transaction cannibalisation risk would reduce the incentives for innovation of the merged entity when it has to make decisions on which early pipeline products to advance from discovery to development.
- (3023) Moreover, and as explained in more detail in Section V.8.10, [post-merger integration information].
- (3024) [...], the Commission considers that for the innovation spaces where the Parties have overlapping lines of research and early pipeline products, the merged entity would have fewer incentives to put the same level of effort on innovation as the Parties would independently put, but for the Transaction. This would be likely to result in several of the Parties' early pipeline products (and eventually lines of research) being discontinued, deferred, or simply redirect.
- (3025) The Commission may not be able to identify precisely which early pipeline products or lines of research the Parties would likely discontinue, defer or re-direct. However, the Commission finds it probably that the early pipeline products and lines of research described in Sections V.8.9.2 to V.8.9.4 are the candidates for a likely reduction of innovation effort given the closeness of innovation competition between the Parties on the targeted innovation spaces. In fact, discontinuation of an early pipeline product or line of research is more likely to occur the higher the expected

sales which that early pipeline product from the merged entity would capture (if launched) from another existing or future product of the merged entity.

- (3026) The Commission finds that the fact that it would be for the Parties, post-Transaction and after analysing each other's lines of research and early pipeline products, to determine for which ones they would reduce the innovation effort does not reduce the likelihood that some highly innovative early pipeline products and lines of research would be discontinued, deferred or redirected. [R&D information]. Post-Transaction, given the increase in cannibalisation associated to the overlapping lines of research [post-merger integration information], the Parties would be likely to step up the efforts to identify the lines of research and the early pipeline products where to reduce their combined innovation efforts.
- (3027) The Commission moreover observes that, because the Parties are close competitors for most of their current lines of research and early pipeline products, it is probable that the reduction of innovation efforts by the merged entity would affect a large number of innovation spaces.
- (3028) The Parties argue in their response to the Statement of Objections that the Commission fails to adequately consider that the Parties cost saving plans are designed to eliminate redundant and duplicative manufacturing capabilities and not pipeline products.²⁰⁶²
- (3029) Contrary to this claim, the Commission finds instead, on the basis of several documents from the Parties, that [post-merger integration information].
- (3030) [Content from internal document].
- (3031) [Content from internal document].²⁰⁶³
- (3032) [Content from internal document].²⁰⁶⁴
- (3033) In an initial presentation to investors, the Parties already mentioned the objective to "*rationalize and prioritize spending as it relates to breeding, biotechnology and discovery programs*" and "*[e]liminate duplicative R&D programs including breeding, traits and chemical discovery*" (see Figure 160).

²⁰⁶² Parties' response to the Statement of Objections, page 29.


²⁰⁶³ For instance, [Internal document] (ID7830-39521), slide 22.

²⁰⁶⁴ [Internal document], (ID6614-12).

Figure 160 – Cost savings public announcement to investors

\$1.3B of Agriculture Cost Synergies

Agriculture
Net Sales: ~\$16B¹




~\$10B + ~\$6B

Agriculture

Agricultural Sciences

INDUSTRY LEADERS FOCUSED ON CORE COMPETENCIES

- World's leading production agriculture business with most comprehensive, balanced and diverse seed and crop protection portfolio with exceptional opportunity for growth
- Robust innovation pipeline of germplasm, biotech traits and crop protection technologies that enable the delivery of a broader suite of stronger products to the market
- Enhanced scale and multiple routes-to-market allow broader reach of complementary offerings and enable deeper customer intimacy that will drive increased grower productivity and profitability globally




Headquarters: Wilmington, Delaware
Credit Profile: Generally consistent with DuPont profile as of Dec. 11, 2015
Cost Synergies:

- Capitalize on DuPont's industry leading seed production processes to enhance field efficiencies and lower unit production costs
- Strategically optimize current production capacity and footprint
- Common crop protection chemistries to drive productivity and scale advantage for capacity and site optimization
- Global manufacturing optimization of synthesis and formulation operations
- Utilizing world-class capabilities in R&D to rationalize and prioritize spending as it relates to breeding, biotechnology and discovery programs
- Streamline back office operations, including IT, customer service and credit
- Global optimization of R&D
- Optimize sales & marketing footprints and go-to-market globally

Growth Synergies:

- Enhance customer value proposition through broader choice of offerings
- Combine technologies and develop new formulations to provide a broad choice of products to customers globally
- Utilize DuPont's advantaged direct to grower and both company's distributor/retail routes-to-market to access larger planted area and expanded customer base
- Drive broader, deeper multi-brand and product strategies to increase cross-sell opportunities





Note: Numbers may not sum due to rounding.
¹ Based on Dow's and DuPont's Net Sales as reported in each company's 2015 Form 10-K filing.

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Significant Cost Synergy Opportunities

	Agriculture	Material Science	Specialty Products
Business Synergies	<ul style="list-style-type: none"> Drive seed production and go-to-market cost efficiencies Eliminate duplicative R&D programs including breeding, traits and chemical discovery Enhance supply chain and global site optimization 	<ul style="list-style-type: none"> Optimize global footprint across manufacturing, sales and R&D facilities Capture feedstock / hydrocarbons synergies Enhance operational excellence in production cost efficiencies 	<ul style="list-style-type: none"> Leverage R&D spend (programs, resources, sites) in the electronics space Optimize manufacturing in the electronics space Leverage raw materials buy in key market segments
Corporate Synergies	<ul style="list-style-type: none"> Reduce corporate and leveraged services costs Realization of significant procurement synergies 		
Total Cost Synergies	~\$1.3B	~\$1.5B	~\$0.3B

Transaction Synergies are Above and Beyond Dow and DuPont Standalone Cost Reduction Programs

	<p>\$700 million in cost reductions to be realized in 2016¹</p> <ul style="list-style-type: none"> Business and corporate costs
	<p>3-year, \$1 billion productivity plan (2015-2017)</p> <ul style="list-style-type: none"> \$300 million to be realized in 2016 (prior to expected transaction close)



¹ Realize DuPont's prior guidance on cost savings.

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Source: <http://www.dowdupontunlockingvalue.com/for-shareholders#faq>

- (3034) [Content from internal document]. This is confirmed by the second slide of Figure 160 where it is directly stated the objective of eliminating duplicative R&D chemical discovery programs.
- (3035) [Post-merger integration information].
- (3036) In this respect, the Commission refers to one competitor explaining that "*[t]he Dow and DuPont biotechnology pipelines compete head-to-head. They are one of the few biotech companies in the EEA. They contain overlapping input and output traits in development for corn, soybeans and cotton, as well as crop protection. Maintaining this standalone competition is essential for ensuring that incentives remain strong to continue existing and prospective product development programs. Such competition is particularly crucial for innovation in an industry where the probability of commercial success is relatively low. [...]. The merger will undoubtedly limit rivalry highlights the likely harm to actual and potential innovation competition from a Dow-DuPont merger, even when using a simple count of technologies introduced. Any reduction in competition is therefore likely to harm innovation, farmers, and consumers.*"²⁰⁶⁵
- (3037) The Commission notes that although in Table 68 to Table 70 it includes both overlaps between current products (or about to be launched products) and lines of research and early pipeline products, the innovation theory of harm applies only to the later. The first are included only for illustration of closeness of past innovation between the Parties.

8.9.2. *Herbicides*

- (3038) As explained in Section V.8.8.1 and summarised in Table 68, the Parties have overlapping lines of research and early pipeline products in herbicides, [targeted crops/weeds]. Moreover, each Party already holds existing products in these innovation spaces which, post-Transaction, would overlap with the other Party's current innovation efforts. In this respect, Table 68 summarises the overlaps relating to the Parties' innovation spaces of specific product lines in herbicides.

Table 68 – Spaces of overlap between the Parties innovation efforts in herbicides

[...]

- (3039) As described in Section V.8.8.1, for each of these overlapping innovation spaces the Commission considers in particular that:
- (1) Dow and DuPont have been important innovators in herbicides in the past, especially for products [targeted crops/weeds].
 - (2) DuPont and Dow currently have overlapping lines of research and early pipeline products, namely for herbicides [targeted crops/weeds].
 - (3) DuPont's and Dow's recent and current lines of research and early pipeline products correspond to new MoAs or new chemical classes, [pipeline information].
 - (4) As regards herbicides for [targeted crops/weeds], there are a limited number of alternative lines of research and early pipeline products to the Parties and even more limited when considering new MoAs.

²⁰⁶⁵

Questionnaire to Crop Protection Competitors (Q2b), question 132.1 (ID9445).

(5) In the case of innovation for products for cereals, pipeline products from competitors do not seem to include [pipeline information].

(6) [Pipeline information].

8.9.3. *Insecticides*

(3040) As explained in Section V.8.8.2 and summarised in Table 69, the Parties have overlapping lines of research and early pipeline products in insecticides, [targeted pests]. Moreover, each Party already holds existing products in these innovation spaces which, post-Transaction, would overlap with the other Party's current innovation efforts. In this respect, Table 69 summarises the overlaps relating to the Parties' innovation spaces of specific product lines in insecticides.

Table 69 – Spaces of overlap between the Parties innovation efforts in insecticides²⁰⁶⁶

[...]

(3041) As described in Section V.8.8.2, for each of these overlapping innovation spaces the Commission considers in particular that:

(1) Dow and DuPont have been in the past important innovators in insecticides (see also Section V.8.7.2.1 and Annex 1), both for chewing insects (DuPont's with its Rynaxypyr insecticides and Dow with the Spinosad/Spinetram insecticides) and sucking insects (DuPont with the Cyazypyr insecticides and Dow with the Isoclast insecticides).

(2) [DuPont and Dow have currently overlapping lines of research, that is to say targeting similar pests and crops].

(3) [Pipeline information].

(4) [As regards insecticides, there are a limited number of alternative lines of research and early pipeline products to the Parties [pipeline information]].

(5) [As regards insecticides, while competitors seem to have more lines of research and early pipeline products, the Commission notes that the number of alternative lines of research and early pipeline products that could potentially lead to molecule registered in the EEA is lower than at the worldwide level, and [pipeline information]]. Moreover, BASF has also played a limited role in the past in bringing good quality innovations in insecticides, both Dow and DuPont have been important innovators in the past [pipeline information]. Therefore, it would be unlikely that the existence of these competitors' lines of research and early pipeline products are enough to offset a reduction of innovation by the Parties.

(3042) [Pipeline information].²⁰⁶⁷ [Quote from internal document].

Figure 161 – [Extract from internal document]

[...]

(3043) [Pipeline information].²⁰⁶⁸ [Quote from internal document].

²⁰⁶⁶ [Targeted crops].

²⁰⁶⁷ [Internal document] (ID6825-14043), slides 9 and 16.

²⁰⁶⁸ Parties' response to the Statement of Objections, paragraph 418.

- (3044) The Commission finds this justification unconvincing, in particular in light of the fact that this DuPont's line of research is targeting an innovation space where Dow is already active with its [names of products] insecticides (see Section V.8.8.4.3), and therefore the Transaction would create an overlap in this innovation space. As discussed in Section V.8.9.1, this would reduce the incentives for the merged entity to continue with this line of research.
- (3045) [Pipeline information].²⁰⁶⁹ [Content from internal document].
- (3046) First, [pipeline information].
- (3047) Second, [R&D information].²⁰⁷⁰ [Quote from internal document].²⁰⁷¹ [R&D information].
- (3048) Third, [content from internal document].^{2072,2073,2074} [R&D information].
- (3049) [Content from internal document].

8.9.4. *Fungicides*

- (3050) As explained in Section V.8.8.3 and summarised in Table 70, the Parties have overlapping lines of research and early pipeline products in fungicides, in particular for cereals [...]. Moreover, each Party already holds existing products in these innovation spaces which, post-Transaction, would overlap with the other Party's current innovation efforts. In this respect, Table 70 summarises the overlaps relating to the Parties' innovation spaces of specific product lines in fungicides.

Table 70 – Spaces of overlap between the Parties innovation efforts in fungicides

[...]

- (3051) As described in Section V.8.8.3, for each of these overlapping innovation spaces the Commission considers in particular that:
- (1) In the case of innovation for products for cereals [targeted disease], there are few other competitors competing in this space (namely mainly BASF, Syngenta and Bayer) [pipeline information].
 - (2) Most significantly, no competing early pipeline product from the current market leaders (namely BASF, Bayer and Syngenta) has a new MoA, contrary to the Parties, whose forthcoming products both have a new MoA. The consensual assumption in the industry appears to be that the existing MoAs – in particular SDHIs, which are the leading products – will face growing resistance and lowered efficacy [pipeline information].
 - (3) In the case of innovation for [targeted disease] control, two other competitors appear to have early pipeline products ([names of competitors]), both with very good efficacy. However, it is very uncertain that any of these two products will be sold in the EEA.

²⁰⁶⁹ Parties' response to the first Letter of Facts, (paragraphs 153-156). See also submission [internal document], paragraphs 11-12.

²⁰⁷⁰ [Internal document], comments attached to slide 2 (ID6825-7145).

²⁰⁷¹ [Internal document], slide 5 (ID6825-7145).

²⁰⁷² [Internal document]. Source: [Parties'] response to the Request for Information 7, question 1.

²⁰⁷³ [Internal document]. Source: [Parties'] response to the Request for Information 7, question 1.

²⁰⁷⁴ [Internal document]. Source: [Parties'] response to the Request for Information 7, question 1.

(4) Moreover, the Parties would be the only global R&D-integrated players with proprietary new MoAs – a critical competitive factor – on the market.

(5) [Pipeline information].

8.9.5. *Conclusion on merged entity incentives to reduce innovation efforts on overlapping lines of research and early pipeline products*

(3052) Given the high cost of development of an AI and the cannibalisation risk of commercialising overlapping products, [post-merger integration information], the Commission considers that in the absence of adequate remedies, post-Transaction it would be likely that the Parties would reduce the innovation efforts on overlapping lines of research and early pipeline products of the Parties, which would be likely to result in some of these not being advanced to the development stage, deferred or redirected, and accordingly significantly reduce effective innovation competition in such innovation spaces.

(3053) Although it cannot identify precisely which early pipeline products or lines of research the Parties would likely discontinue, defer or redirect, and thus on which innovation spaces there would be a significant reduction of innovation competition, the Commission considers that given that the Parties are close competitors for most of their current lines of research and early pipeline products it is likely that the reduction of innovation efforts by the Parties would significantly affect a large number of innovation spaces, and accordingly significantly reduce effective innovation competition in such innovation spaces.

8.10. Post-Transaction the merged entity would have lower incentives to achieve the same overall level of innovation as the Parties pre-Transaction thus leading to a significant loss of effective innovation competition in the industry

8.10.1. *Introduction*

(3054) As explained in Section V.8.4, the Commission finds that in the crop protection industry rivalry at the innovation stage is a crucial driver of the incentives to innovate. The threat of a competing innovator taking away market share and revenue from an undertaking that is active in innovation drives the latter's innovation efforts. On the contrary, the Commission finds that in the absence of such a rivalry pressure on innovation efforts, the cannibalisation effects are likely to act as disincentives to innovate.

(3055) On this premise, the Commission considers that on highly concentrated innovation-driven industries with very high barriers to entry such as the crop protection industry, the internalisation of the effects of innovation competition between the parties of a merger between important innovators would likely lead to noticeable reductions in the innovation efforts of the parties in relation to any future products that would otherwise be introduced in the absence of the transaction.

(3056) In the case of the Transaction, the Commission considers that a first form of harm to innovation competition would likely be the discontinuation of overlapping lines of research and early pipeline products which target the same innovation spaces. This effect would likely be a short-term effect of the Transaction for those overlapping lines of research and early pipeline products that would likely be discontinued, deferred or redirected very soon after the merger is implemented as a result of the integration efforts following the Transaction. The Commission finds it reasonable

that the integration efforts are [post-merger integration information]. This short-term effect of the Transaction on innovation has been discussed in Section V.8.9.

- (3057) The Commission finds that a second form of harm would result from the lower overall incentives of the merged entity to innovate as compared to the merging parties separately before the transaction. This is likely to be a medium and long term structural effect of the transaction going beyond the mere discontinuation of current innovation projects. The concern here is that in the medium and long-term, because of the lack of rivalry incentives to innovate, the merged entity would pursue less discovery work, less lines of research, less development and registration work and ultimately bring less innovative AIs to the market than the merging parties would have done absent the transaction.
- (3058) Since this second form of harm on innovation competition is structural and long-term, it is likely to be significantly larger than the first. This is because it is not just concerned with the discontinuation of currently ongoing lines of research and early pipeline products, but with the overall innovation efforts and outputs year after year in the industry.
- (3059) In the crop protection industry, like in other industries lowered innovation incentives can manifest themselves in (i) lower innovation efforts reflected for example in less financial resources, less scientists, less physical assets devoted to innovation, and (ii) lower internal innovation output targets.
- (3060) In this section the Commission will therefore examine whether the Transaction would be likely to lead to less innovation efforts and lower innovation output targets, and ultimately to less innovation.

8.10.2. Evidentiary value of post-integration planning documents

- (3061) In merger control the investigation of the likely incentives of merging parties post-transaction is not easy to carry out. The likely effects of any transaction must be inferred from a variety of sources of evidence of such effects. In its assessment of mergers the Commission routinely relies on internal documents that undertakings prepare in the ordinary course of business. Such documents allow the Commission to gain better insight into companies' incentives. They often allow the Commission to verify factual claims made by the Parties and data they submit.
- (3062) As regards high level strategic documents on a planned merger, the merging companies know in advance that documents such as presentations to the board of directors preparing decisions on a merger will have to be submitted to competition authorities assessing the competitive effects of the merger.
- (3063) They are thus often careful not to include in such high level documents statements on post-integration plans which would attract increased scrutiny of the merger by competition authorities.
- (3064) In attributing the probative value to specific internal documents, the Commission therefore takes into account the timing and context in which they were prepared to distinguish 'contemporaneous' or highly probative sources of information from statements with less probative value. In particular, internal documents prepared in the ordinary course of business, for example before the merger was agreed upon or without the knowledge of the preliminary competition concerns, will typically have higher probative value than internal documents prepared for or influenced by the Commission's merger review.

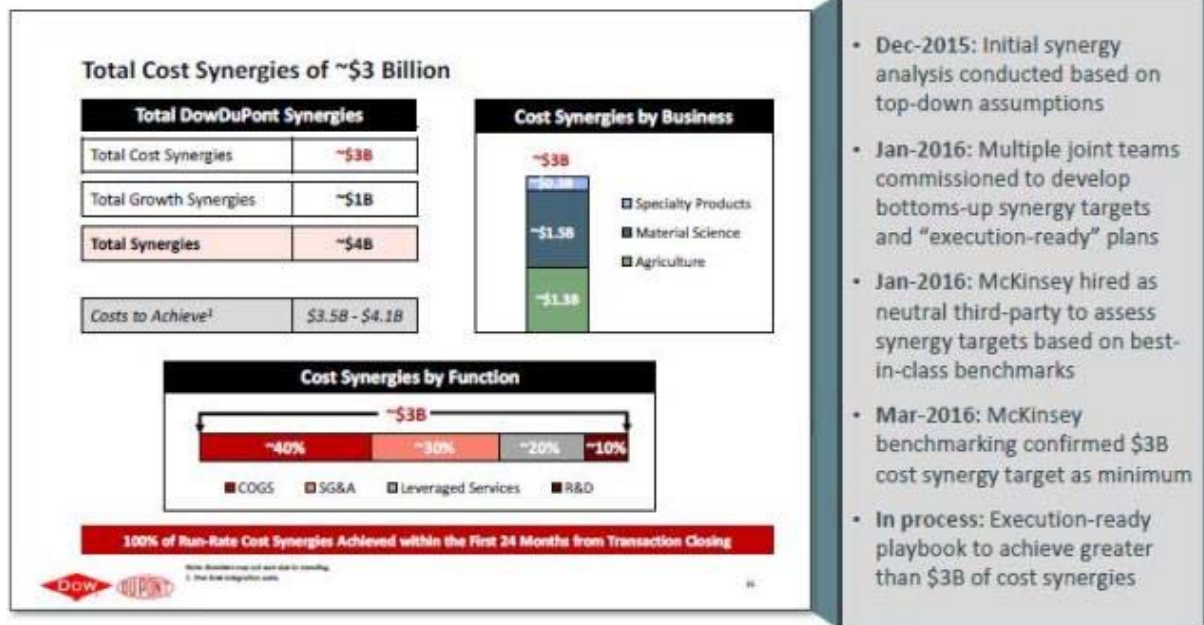
- (3065) The Commission must therefore be careful when it wants to draw conclusions for its investigation from this kind of high level strategy documents.
- (3066) By contrast detailed post-integration planning and synergy documents produced at working level within the post-integration planning team which are produced in the ordinary course of business are in principle a better source of evidence to assess future incentives than high level board presentations.
- (3067) [Post-merger integration information].
- (3068) However, a first important limitation of the probative value of such post-integration planning documents is that they reflect just plans, which can easily and usually without significant additional costs be changed once a merger is authorised.
- (3069) A second important limitation of their probative value is that the content of this body of evidence can also be strategically influenced or modified by the merging parties in particular with a view to influencing the inferences which competition authorities draw from those documents. Where such behaviour is detected, the Commission has to carefully assess all internal documents submitted by the merging parties and otherwise obtained by the Commission in the course of its investigation and then to evaluate how much evidentiary value can be attached to exculpatory evidence contained in those documents.
- (3070) [Post-merger integration information].

8.10.3. *Timetable of synergy targets*

- (3071) On December 2015, the Parties communicated to investors that they aimed for USD 1.3 billion cost savings in the agriculture part of the business (including both the crop protection and the seeds business). In addition, the Parties aimed at USD 0.5 billion growth synergies in agriculture. The synergies of the Transaction are therefore set from the beginning to be more focus on cost cutting than on creating value (more than 70% of the announced synergies are cost-based).

Figure 162 – External communication on the synergies associated to the Transaction

Synergy Planning Progress To-Date Confirms a Minimum of \$3 Billion of Cost Synergies



Source: <http://www.dowdupontunlockingvalue.com/for-shareholders#faqs>

(3072) [Post-merger integration information].²⁰⁷⁵

Figure 163 – [Extract from internal document]

[...]

(3073) [Quote from internal document].²⁰⁷⁶

(3074) [Post-merger integration information].²⁰⁷⁷

Figure 164 – [Extract from internal document]

[...]

(3075) [Post-merger integration information].²⁰⁷⁸

(3076) [Post-merger integration information].

(3077) [Quote from internal document].²⁰⁷⁹

(3078) [Post-merger integration information; quote from internal document].²⁰⁸⁰

(3079) [Date], the Commission held a State of Play meeting with Dow and DuPont to present the preliminary serious doubts as regards the impact of the Transaction. In

²⁰⁷⁵ [Internal document] (ID6695-4707), slides 97.

²⁰⁷⁶ [Internal document] (ID7829-922).

²⁰⁷⁷ [Internal document] (ID6695-4707), slides 103.

²⁰⁷⁸ [Internal document] (ID7830-22191). [Internal document].

²⁰⁷⁹ [Internal document] (ID6143-26544).

²⁰⁸⁰ [Internal document] (ID6826-16145).

particular, among several other issues, the Commission discussed with the Parties its concerns on the potentially negative impact of the integration planning of the Parties as regards its incentives and ability to innovate post-Transaction.

(3080) [Post-merger integration information].

(3081) [Post-merger integration information].²⁰⁸¹

(3082) [Post-merger integration information].²⁰⁸²

8.10.4. [Post-merger integration information]

(3083) The Parties argue in the response to the Statement of Objections that the integration planning [post-merger integration information]. According to the Parties, the Commission fails to grasp the realities of business integration planning. [post-merger integration information].²⁰⁸³

(3084) In light of the evidence in file, the Commission considers however that documents produced after the State of Play [post-merger integration information].

(3085) **First**, [post-merger integration information].

(3086) In particular, [date], in pre-notification, the Commission had two meetings with the Parties' representatives (one with Dow and one with DuPont) in relation to R&D in crop protection. The aim of those meetings was for the Commission to better understand the R&D processes of each of the Parties. [...].

(3087) During those meetings, in the spirit of transparency, the Commission explained to the Parties that the impact of the Transaction on R&D and innovation would be an important part of the upcoming assessment of the Transaction. [...].

(3088) [Quote from internal document].²⁰⁸⁴

(3089) [Post-merger integration information].

(3090) [Date], the Commission had a State of Play with the Parties to present its preliminary serious doubts on the impact of the Transaction, namely on the innovation incentives of the merged entity.

(3091) [Quote from internal document].²⁰⁸⁵ [Post-merger integration information].

(3092) [Post-merger integration information].

(3093) [Content from internal document].

(3094) **Second**, [post-merger integration information].

(3095) In fact, [content from internal document].²⁰⁸⁶

(3096) [Content from internal document].²⁰⁸⁷

²⁰⁸¹ [Internal document] (ID7590-22).

²⁰⁸² Parties' response to the Commission's request for information RFI 55.

²⁰⁸³ Parties' response to the Statement of Objections pages 169-175.

²⁰⁸⁴ [Internal document] (ID8204).

²⁰⁸⁵ [Internal document] (ID6143-8496). [Internal document].

²⁰⁸⁶ [Internal document] (ID6143-12477).

²⁰⁸⁷ [Internal document] (ID6614-12), slide 1.

- (3097) [Post-merger integration information].²⁰⁸⁸ [Quote from internal document].
- (3098) [Post-merger integration information].²⁰⁸⁹
- (3099) [Post-merger integration information].²⁰⁹⁰
- (3100) [Quote from internal document].²⁰⁹¹
- (3101) [Post-merger integration information].
- (3102) [Post-merger integration information].
- (3103) **Third**, [post-merger integration information]²⁰⁹².
- (3104) [Post-merger integration information].
- (3105) [Quote from internal document].²⁰⁹³
- (3106) [Post-merger integration information].²⁰⁹⁴
- (3107) [Post-merger integration information].
- (3108) [Post-merger integration information].
- (3109) **Fourth**, [quote from internal document],²⁰⁹⁵ [post-merger integration information].
- (3110) [Post-merger integration information].
- (3111) [Post-merger integration information].²⁰⁹⁶
- (3112) [Content from internal document].²⁰⁹⁷
- (3113) [Post-merger integration information]²⁰⁹⁸.
- (3114) **Fifth**, [post-merger integration information].²⁰⁹⁹ [Quote from internal document].²¹⁰⁰
- (3115) **Sixth**, [post-merger integration information].
- (3116) [Quote from internal document].²¹⁰¹
- (3117) [Quote from internal document].²¹⁰²
- (3118) However, [post-merger integration information].
- (3119) Moreover, [quote from internal document].²¹⁰³
- (3120) [Quote from internal document].²¹⁰⁴

²⁰⁸⁸ [Internal document] (ID6143-61809) and [internal document] (ID6143-66621).

²⁰⁸⁹ [Internal document] (ID6143-61809).

²⁰⁹⁰ [Internal document] (ID6747-3838), slide 3.

²⁰⁹¹ [Internal document] (ID7590-20), slide 49.

²⁰⁹² [Internal document] (ID6747-3794).

²⁰⁹³ [Internal document] (ID7240).

²⁰⁹⁴ Parties' submission [post-merger integration information] entitled [...].

²⁰⁹⁵ [Internal document] (ID7590-22).

²⁰⁹⁶ [Internal document] (ID7829-12079).

²⁰⁹⁷ [Internal document] (ID7944).

²⁰⁹⁸ [Internal document] (ID7829-12008).

²⁰⁹⁹ Parties' response to the Commission's request for information RFI 55.

²¹⁰⁰ Parties' response to the Commission's request for information RFI 55.

²¹⁰¹ [Internal document] (ID8668).

²¹⁰² [Internal document] (ID8958-2).

²¹⁰³ [Internal document] (ID8668).

²¹⁰⁴ [Internal document] (ID7239).

(3121) On the basis of Section V.8.10.4, the Commission concludes [post-merger integration information].

8.10.5. *Likely impact of the Transaction on the merged entity's ability and incentives to innovate*

8.10.5.1.[Post-merger integration information]

(3122) The Commission takes note of the fact that [post-merger integration information].

(3123) In fact, as described in the next section, [post-merger integration information].

(3124) Moreover, [post-merger integration information].²¹⁰⁵

8.10.5.2.The Transaction would lead to significantly lower innovation efforts

(A) [Post-merger integration information]

(3125) The Commission finds that [post-merger integration information].

(3126) First of all, [post-merger integration information].²¹⁰⁶

Figure 165 – [Extract from internal document]

[...]

(3127) [Post-merger integration information].²¹⁰⁷

(3128) The Parties argue that the identified cost savings are designed to eliminate redundant and duplicative capabilities and do not result in any reduction in innovation.

(3129) [Post-merger integration information].

(3130) [Post-merger integration information].

(3131) [Post-merger integration information].²¹⁰⁸

Table 71 – [...]

[...]

(3132) [Post-merger integration information].²¹⁰⁹

Table 72 – [...]

[...]

(3133) [Post-merger integration information].²¹¹⁰

(3134) [Post-merger integration information].

(3135) [Post-merger integration information].²¹¹¹

Figure 166 – [Extract from internal document]

[...]

(3136) [Quote from internal document].²¹¹² [Post-merger integration information].

²¹⁰⁵ [Internal document], slide 126 (ID7590-50).

²¹⁰⁶ [Internal document] (ID7590-44), slide 22.

²¹⁰⁷ [Internal document] (ID7590-44), slide 4.

²¹⁰⁸ [Internal document] (ID6826-16145).

²¹⁰⁹ [Internal document] (ID6826-16145).

²¹¹⁰ [Internal document] (ID6826-16145).

²¹¹¹ [Internal document] (ID7830-34975), slide 22.

(3137) In this respect, the Commission refers to [content from internal document].²¹¹³ [Post-merger integration information].

Figure 167 – [Extract from internal document]

[...]

(3138) [Post-merger integration information].

(3139) Finally, [post-merger integration information].

(3140) As described in Section V.8.7.1 [post-merger integration information].^{2114,2115}

(3141) [Content from internal document].²¹¹⁶

Figure 168 – Merged entity's synergies timing

[...]

(3142) [Content from internal document].

(3143) [Post-merger integration information].

(3144) [Post-merger integration information].

(B) [Post-merger integration information]

(3145) [Post-merger integration information].²¹¹⁷

Figure 169 – [Extract from internal document]

[...]

(3146) [Post-merger integration information].²¹¹⁸

(3147) First, [post-merger integration information].

(3148) Second, [quote from internal document].²¹¹⁹ [Post-merger integration information].

(C) [Post-merger integration information]

(3149) The Commission refers to several internal documents [content from internal documents].

(3150) [Quote from internal document].²¹²⁰

(3151) [Quote from internal document].²¹²¹

(3152) [Quote from internal document].²¹²²

(3153) [Quote from internal document].²¹²³

²¹¹² [Internal document] (ID7830-34975), slide 21.

²¹¹³ [Internal document].

²¹¹⁴ [Internal document] (ID5273-18), slide 11.

²¹¹⁵ [Internal document] (ID6694-6487), slide 11.

²¹¹⁶ [Internal document] (ID7575-23).

²¹¹⁷ [Internal document] (ID6143-66061).

²¹¹⁸ Parties' response to the Statement of Objections, pages 185-187.

²¹¹⁹ [Internal document] (ID1327-169).

²¹²⁰ [Internal document] (ID7590-31).

²¹²¹ [Internal document] (ID6143-26792).

²¹²² [Internal document] (ID6747-3439).

²¹²³ [Internal document] (ID6143-66061).

- (3154) [Quote from internal document].²¹²⁴
 (3155) [Content from internal document].
 (3156) [Post-merger integration information].
 (D) [Post-merger integration information]
 (3157) [Content from internal document].²¹²⁵

Table 73 – [...]

- [...]
 (3158) [Post-merger integration information].
 (3159) [...].²¹²⁶
 (3160) [Post-merger integration information].
 (3161) [Post-merger integration information].
 (3162) [Post-merger integration information].
 (3163) [Post-merger integration information].
 (3164) [Post-merger integration information].
 (3165) [Post-merger integration information].
 (3166) [Post-merger integration information].
 (3167) [Post-merger integration information].
 (3168) [Content from internal document].
 (3169) [Quote from internal document].²¹²⁷
 (3170) [Quote from internal document].²¹²⁸
 (3171) [Post-merger integration information].
 (3172) [Post-merger integration information].
 (3173) [Post-merger integration information].
 (3174) [Post-merger integration information].
 (3175) [Post-merger integration information].²¹²⁹

Table 74 – [...]

- [...]
 (3176) [Post-merger integration information].
 (3177) [Post-merger integration information].

²¹²⁴ [Internal document] (ID6143-18906).
²¹²⁵ [Internal document] (ID6826-16145).
²¹²⁶ Agreed non-confidential minutes of a meeting with a competitor, 7 November 2016 (ID9399).
²¹²⁷ [Internal document] (ID6143-18828).
²¹²⁸ [Internal document] (ID6747-4725), slide 17.
²¹²⁹ [Internal document] (ID6143-62373).

(E) [Post-merger integration information]

(3178) [Post-merger integration information].²¹³⁰

(3179) [Content from internal document].²¹³¹ [Post-merger integration information].

Figure 170 – [Extract from internal document]

[...]

(3180) [Post-merger integration information].

(3181) According to one competitor, "[c]utting R&D costs are an easy tool to achieve short-term impact on the results of a company. A certain cut in the FTEs of a combined R&D group following a merger is normal given the presence of redundancies. [...]."²¹³²

Table 75 – [...]

[...]

Source: Data provided by the Parties, response to the Commission's request for information RFI 57, question 1

(3182) [Post-merger integration information].

(3183) [Post-merger integration information].

(3184) [Post-merger integration information].

(3185) [Quote from internal document].²¹³³

(3186) [Post-merger integration information].²¹³⁴

Figure 171 – [Extract from internal document]

[...]

(3187) [Content from internal document].²¹³⁵

Table 76 – [...]

[...]

(3188) [Post-merger integration information].²¹³⁶

(3189) [Post-merger integration information].

(1) [post-merger integration information];

(2) [post-merger integration information];

(3) [post-merger integration information].

(3190) [Post-merger integration information].

(3191) [Post-merger integration information].

²¹³⁰ [Internal document] (ID7578-44), slide 23.

²¹³¹ [Internal document] (ID7590-20), slide 50.

²¹³² Agreed non-confidential minutes of a meeting with a competitor, 7 November 2016 (ID9399).

²¹³³ [Internal document] (ID7829-4984).

²¹³⁴ [Internal document] (ID7944), slide 23.

²¹³⁵ [Internal document] (ID6747-3410).

²¹³⁶ [Internal document] (ID7944), slide 23.

- 8.10.5.3.[Post-merger integration information]
- (3192) [Post-merger integration information].
- (3193) [Post-merger integration information].²¹³⁷
- (3194) [Post-merger integration information].^{2138,2139}
- (3195) [Post-merger integration information].
- (3196) **First**, [post-merger integration information].
- (3197) The Parties argue in the response to the Statement of Objections that [post-merger integration information].
- (3198) [Post-merger integration information].
- (3199) **Second**, [post-merger integration information].^{2140,2141}
- (3200) The Parties argue in the response to the Statement of Objections that [post-merger integration information].
- (3201) [Post-merger integration information].²¹⁴²

Figure 172 – [Extract from internal document]

[...]

- (3202) [Quote from internal document].²¹⁴³ [Post-merger integration information].²¹⁴⁴
- (3203) [Quote from internal document].²¹⁴⁵
- (3204) **Fourth**, [post-merger integration information].
- (3205) [Post-merger integration information].²¹⁴⁶
- (3206) **Fifth**, [post-merger integration information].
- (3207) [Post-merger integration information].²¹⁴⁷
- (3208) [Post-merger integration information].
- (3209) [Post-merger integration information].
- (3210) **Sixth**, [post-merger integration information].
- (3211) [Quote from internal document].²¹⁴⁸ [post-merger integration information].
- (3212) [Content from internal document].²¹⁴⁹

²¹³⁷ See for example [internal document] (ID7080-2168), slide 30.

²¹³⁸ Parties' response to the Statement of Objections, pages 182-185.

²¹³⁹ Parties' submission entitled [...]. See also Parties' submission entitled [...].

²¹⁴⁰ [Internal document] (ID6696-29505), slide 7 [quote from internal document].

²¹⁴¹ Source: Commission estimates based on data provided by the Parties, response to the Commission's request for information RFI 26.

²¹⁴² [Internal document] (ID7992), slide 7.

²¹⁴³ [Internal document] (ID6825-11150), slide 33.

²¹⁴⁴ [Internal document] (ID6825-27589), slide 23.

²¹⁴⁵ [Internal document] (ID6143-20754).

²¹⁴⁶ [Internal document] (ID7079-2069), [internal document] (ID6143-6598), [internal document] (ID7080-2922).

²¹⁴⁷ [Internal document] (ID6143-65181).

²¹⁴⁸ [Internal document] (ID6143-61809).

- (3213) [Quote from internal document].²¹⁵⁰
- (3214) [Internal document].²¹⁵¹
- (3215) **Seventh**, the Commission considers that these findings also seem to be in line with what happened following past mergers, for instance upon Bayer's acquisition of Aventis Crop Science: "*[w]hen Bayer purchased Aventis, it purchased 3 pipelines. 10 years after the acquisition (2012) it had the highest output of new innovations. Following a merger, it can be said that output could increase, but it would then decline if the merged entity combined its R&D centres*".²¹⁵²
- (3216) Other market participants observed that "*R&D costs for DowDuPont are expected to decrease in order to realize required synergies, leading to fewer new AIs being developed*",²¹⁵³ and that "*[w]hen major multinationals of the industry merged in the past, they sought to save money not simply by growing their portfolios and improving their channels to the market. They also lowered their costs by cutting out redundant capacities. These are in the first place the underperforming parts of their R&D teams and then other parts of the organisations where the combined departments offer enhanced economies of scale. This is what will probably happen also in the case of Dow and DuPont*".²¹⁵⁴
- (3217) **Eight**, although as argued by the Parties in the response to the Statement of Objections, the majority of customers and around half of the competitors did not expect a reduction of innovation after the Transaction, during the market investigation, some market participants expressed concerns as regards the impact of the Transaction on innovation output.
- (3218) In particular, one customer said: "*[t]he monopoly of only 4-5 large CP manufacturers. is not good! Research spending of the two will decrease to only 50% after the merger*".²¹⁵⁵ Another customer added that "*less competing R&D-integrated product manufacturers will lead to higher prices and less R&D spend on new solutions in the longer term*".²¹⁵⁶
- (3219) A competitor explained that "*[o]n a mid-to-long term, the innovation rate will reduce due to selection of fewer new AIs for development. Those AIs will have a higher sales potential and the market will not have to be shared with other payers, meaning less choices*".²¹⁵⁷ Another competitor stated: "*[m]erger will limit number of new compounds to be develop because company will select only the ones that will not canibalize each other*".²¹⁵⁸ Another competitor explained that "*[a]s regards these companies more specifically, there are lines of chemistry in which they have been innovating, and that will probably not be abandoned, but instead, under exploited*".

2149 [Internal document] (ID6143-65983), slide 2: [quote from internal document].

2150 [Internal document] (ID5271-163).

2151 [Internal document] (ID6143-18906).

2152 Agreed non-confidential minutes of a call with a competitor, 5 April 2016 (ID8248).

2153 Response of a competitor to Questionnaire to Crop Protection Competitors (Q2a), question 135 (ID4230).

2154 Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

2155 Questionnaire to Crop Protection Customers (Q1i), question 99.1 (ID1944). Courtesy translation from German: "*Die Monopolbildung von nur noch 4-5 großen PSM-Herstellern ist nicht gut!!!!!!!!!!!! Die Forschungsausgaben von zwei werden nach der Fusion zusammen nur noch 50% betragen.*"

2156 Questionnaire to Crop Protection Customers (Q1j), question 99.1 (ID4349).

2157 Questionnaire to Crop Protection Competitors (Q2a), question 132.1 (ID4230).

2158 Questionnaire to Crop Protection Competitors (Q2b), question 132.1 (ID3776).

*(...) the merged enterprise will not be able to fully exploit the combined portfolios without cannibalising one another, as they were previously in severe competition”.*²¹⁵⁹ Another competitor stated that *"post-merger, the merged entity will never be the sum of each of Dow and DuPont in R&D: there will be a loss of investment in R&D as a result of the merger and, consequently, a reduction of the number of new active ingredients that would be produced by the merged entity".*²¹⁶⁰

- (3220) Some crop protection institutes and stakeholders expressed similar concerns. One of these market participants stated that *"[w]e are afraid that the merger means less interest on the development of effective substances in particular for minor crops."*²¹⁶¹ Another one stated that *"[t]wo companies would try to put more products out on the market than one, to be more competitive. After the Merger there's less competition and thus less products being released"*.²¹⁶²
- (3221) A Contract Research Organisation stated that *"there could be a concern that synergies are being pushed on the R&D side and that this may lead to a decline in R&D investment. It can be expected that companies with competing R&D projects will face the question to put them on hold or abandon them"*.²¹⁶³
- (3222) The Commission accordingly concludes that it is likely that post-Transaction the Parties would set lower output targets as compared to the combined target of the individual Parties pre-Transaction. [Post-merger integration information].

8.10.5.4. Conclusion on the likely impact of the Transaction on the merged entity's ability and incentives to innovate

- (3223) [Content from internal document]. Based on this, the Commission concludes that it is more likely than not that post-Transaction the merged entity would have lower incentives to achieve the same innovation output levels as the two Parties pre-Transaction as a result of the loss of competition between the Parties.

Table 77 – R&D input and output pre and post-Transaction

[...]

- (3224) [Post-merger integration information].

8.10.6. Unlikely sufficiently strong countervailing reaction of innovation competitors

8.10.6.1. The combination of efforts of players with discovery capabilities and of players with development capability would not offset the reduction of output resulting from the Transaction

- (3225) The Parties have advanced the argument that post-Transaction, in light of the fact that there exist other companies active in R&D discovery and companies with development capabilities, there would still be a route to market for AIs which are discovered, even besides the global R&D-integrated players.
- (3226) **First**, the Commission observes that this argument does not offset the likely loss of molecules from the Parties which are the result of overlapping lines of research and are not yet being developed.

²¹⁵⁹ Agreed non-confidential minutes of a call with a competitor, 15 July 2016 (ID8259).

²¹⁶⁰ Agreed non-confidential minutes of a call with a competitor, 13 September 2016 (ID7128).

²¹⁶¹ Questionnaire to Crop Protection Stakeholders (Q3a), question 12.1 (ID2917).

²¹⁶² Questionnaire to Crop Protection Testing Partners (Q3b), question 12.1 (ID2651).

²¹⁶³ Agreed non-confidential minutes of a call with a CRO, 7 November 2016 (ID9574).

- (3227) **Second**, the Commission notes that the argument mainly relies on the availability of molecules discovered by other players, in particular Japanese companies, whose molecules could be developed by R&D companies with development capabilities but without discovery activities.
- (3228) As regards AIs discovered by Japanese companies, as explained at Section V.8.6.3.4, they focus on domestic needs and crops, and are in principle not an alternative to AIs targeting other markets, and in particular Europe.
- (3229) Moreover, this has to be combined with the consideration that the abilities of companies which are not active at discovery level, such as FMC as discussed at Section V.8.6.3.2, do not have the same significance as the innovation capabilities of integrated players, as companies that have to in-licence molecules to develop cannot independently decide and direct their innovation effort.
- (3230) **Third**, the Commission finds that the market investigation provided some evidence that already today not all the discovery output translates into new product launches in the absence of sufficient incentives and capabilities of crop protection companies to develop these products. This suggests that there are constraints to the development capabilities which affect the innovation output.
- (3231) Isagro, for instance, indicated that "*[u]p to 2012, non-prioritised molecules have been shelved. From 2012 onwards they are licensed-out or postponed (in very limited cases)*".²¹⁶⁴ Syngenta also explained that "*[i]f the risk is perceived as too high, or the benefit too low, to allocate resources to the molecule compared to allocating those resources to other competing projects, the molecule may be delayed, shelved, or identified as a candidate for out-licensing or co-development*".²¹⁶⁵ BASF also declared that "*[d]evelopment of non-prioritized molecules can be delayed to a point in time when the total number of newly discovered AIs is lower. However, considering that delays in market introduction are generally linked to significant reductions in NPV, a delayed development can result in the project being no longer attractive. Shelving becomes the natural consequence. Outsourcing or co-development are also additional, albeit less attractive options to overcome resource bottlenecks*".²¹⁶⁶ According to FMC, "*FMC believes that not all the available active ingredients which are discovered and have interesting properties are then developed, due to constraints to the development capabilities in the crop protection industry. (...) In the industry, there can be and there are molecules which sit idle. If a company has 20 molecules and have resources to develop 10 they do not necessarily seek a co-development. Sometimes they seek for a co-development but the molecules end up languishing at the discovery company.*"²¹⁶⁷
- (3232) In this respect, one should note that the lack of incentives can also consist of an insufficient profitability outlook for potential development candidates.

²¹⁶⁴ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8215).

²¹⁶⁵ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

²¹⁶⁶ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

²¹⁶⁷ Agreed non-confidential minutes of a call with FMC, 10 October 2016 (ID8898).

- (3233) **Fourth**, the Commission considers in the same vein that both molecules discovered in-house from a firm's own R&D organisation and potential in-licensing candidates for development are subject to prioritisation decisions, as the resources and capabilities of crop protection companies as regards the potential development of a molecule tend to be limited.
- (3234) The prioritisation process, both of in-house discovered molecules and of in-licensed molecules, has been described by competitors. *"A prioritisation takes place within the portfolio management framework. (...) The molecule is ranked against other development candidates on technical feasibility & risk, commercial attractiveness, strategic/portfolio fit"*.²¹⁶⁸ Bayer clarified that *"[i]n-licensed opportunities are evaluated with the same criteria as internally discovered compounds. Resources are allocated accordingly taking into account a full portfolio view"*.²¹⁶⁹ Sumitomo also indicated that: *"[t]here is a prioritisation taking place (...) Non-prioritised molecules are promoted further development stage in later year or sometimes licensed out"*.²¹⁷⁰ Also according to BASF, *"[d]ue to resource constraints though, it is not possible to promote an unlimited number of new molecules, therefore prioritization is normally applied"*.²¹⁷¹
- (3235) As explained in Section V.8.6.5, on top of financial constraints, there are bottlenecks such as *"field biology capacity, product safety and regulatory capacity, formulation, production and supply capacity"*.²¹⁷² The availability of third party research organisations can grant some flexibility, but cannot by itself be sufficient to increase the number of AIs that can be moved into development by competitors. As explained by Syngenta²¹⁷³, *"[u]se of third party research organizations does not allow us to move more active ingredients into development. The resources available (financial or functional) and the total capacity of our commercial operations to manage the new AI are internally constrained"*. Similarly for Bayer: *"[t]he availability of CROs does not affect the number of active ingredients we plan to develop in any given year"*.²¹⁷⁴ BASF indicated²¹⁷⁵ that *"the ability to develop new active ingredients is linked to the capability to carry out regulatory and biology studies, which require a dedicated set up in terms of research stations, laboratories and personnel and represent the company fixed costs. Such capabilities cannot be rapidly established, increased or decreased without investment or restructuring measures"* and that the use of CROs has major limitations *"the availability of third party research*

²¹⁶⁸ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

²¹⁶⁹ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

²¹⁷⁰ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8219).

²¹⁷¹ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

²¹⁷² Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

²¹⁷³ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276).

²¹⁷⁴ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

²¹⁷⁵ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

organizations is not in itself a means to move more active ingredients into development (...)".²¹⁷⁶

- (3236) **Fifth**, the Commission considers that, while it can be argued that were there to be a molecule with promising efficiency profit prospects, this molecule could still be developed by existing players, it is likely that, in light of the constraints described, and because of prioritisation, such a molecule would be developed at the expense of another molecule, thus not offsetting the loss of output.
- (3237) Competitors indicated, for instance, that the decision to in-license an AI discovered by another company normally "*has to be financed and resourced within the overall R&D allocated budget*".²¹⁷⁷
- (3238) On the basis of Section V.8.10.6.1, the Commission considers that the availability of R&D companies active on discovery and companies with development capabilities would be unlikely to offset the loss of innovation output resulting from the Transaction.
- 8.10.6.2. It is unlikely there would be sufficiently strong countervailing reaction of innovation competitors to profitably defeat the reduction of competition from the Parties
- (3239) As explained in Section V.8.10.1 the Commission considers it likely that the Transaction would significantly reduce innovation competition between the Parties and would result in a loss of competitive pressure on others to innovate.
- (3240) By analogy to paragraphs 32 and following of the Horizontal Merger Guidelines, the loss of competitive pressure resulting from the Transaction needs to be assessed against the likelihood that other competitors would react to the Transaction by increasing their innovation efforts and output and make up for the loss of innovation brought about by the Transaction.
- (3241) The Parties argued that competitors would react by increasing or maintaining current levels of innovation. According to the Parties, there are several innovation competitors in the industry (the Big 5 integrated players plus Monsanto, FMC, Kumiai, Mitsui, other Japanese competitors, etc.) and there is intense innovation competition. Moreover, the Parties argued that R&D budgets of innovation players have not decreased and there is no causal link between industry consolidation and level of innovation.
- (3242) The evidence gathered by the Commission does not show that, in the past, third-party R&D-integrated players increased their R&D expenditure and R&D targets following a concentration. On the contrary, as described in Section V.8.5, past consolidation of the industry seems to have harmed innovation competition in the crop protection industry, since innovation output has decreased while consolidation as well as firms profitability has increased in the crop protection industry. This view is confirmed by the statements of various authoritative sources from within the industry, including from the Parties, and industry observers who say that

²¹⁷⁶ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

²¹⁷⁷ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8276). See also Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

consolidation has contributed to fewer AIs being launched. [Quote from internal document].²¹⁷⁸

- (3243) The Commission considers that competitors are unlikely to increase their innovation efforts post-Transaction so as to profitably defeat the reduction of competition from the Parties for the reasons listed in recitals (3244) to (3261) and described in more detail in Section V.8.6.5.
- (3244) **First**, the Commission finds that it is a standard and well established prediction in economic models of oligopoly with high entry and expansion barriers that non-merging parties stand to benefit from the direct reduction of competition between the merging parties and therefore do not face incentives to collectively offset it completely (see Annex 4). According to paragraph 24 of the Horizontal Merger Guidelines, "*[n]on-merging firms in the same market can also benefit from the reduction of competitive pressure that results from the merger.*" The following facts confirm that the crop protection industry is characterised by the conditions under which this results is verified.
- (3245) **Second**, the Commission stresses that there are only three other players close competitors to the Parties, namely Bayer, Syngenta and BASF. All the others are distant competitors as regards innovation competition and can thus not replicate the innovation output of the Parties.
- (3246) The Japanese companies, although active in discovery, focus mainly in domestic crops and pests, do not have the necessary field testing and registration capabilities and expertise on Europe, do not have the same financial and sales scale as the Big 5 and in case of promising applications for Europe tend to choose as a route co-development agreements involving one of the Big 5 (see Section V.8.6.3.4).
- (3247) Moreover in the recent past, the Japanese agrochemical industry has experienced a significant reduction of the number of companies, from 26 in 2000 to 17 in 2010 ([internal document]). The Commission observes that, in the same period, Japanese firms also decreased their innovation outputs, measured by the number of AIs launched.²¹⁷⁹ Table 52, in Section V.8.6.3.4, shows that the average number of AIs launched by Japanese firms decreased from 4.0 over 1995-2000 to 3.5 over 2000-2005, to 2.7 over 2005-2010 and to 2.0 over 2010-2015, on a worldwide basis, and from 1.8 to 1.3, 1.2 and 0.3 in the EEA. There appears to be a lag of 5 to 10 years between the decrease in the number of firms and the decrease in the number of AIs launched.

Figure 173 – Evolution of the number of Japanese companies between 1950 and 2010

[...]

Source: [Internal document], slide 34 (ID7080-3334)

- (3248) Monsanto and FMC do not have discovery assets (see Section V.8.6.3.1 and V.8.6.3.2). For instance, over the last 15 years, Monsanto has not registered any new AI and appears to be only working on molecules acquired from third parties. FMC has launched only few products in the last years developed by other companies

²¹⁷⁸ [Internal document] (ID1329-961).

²¹⁷⁹ [Internal document] (ID7079-2347).

and cannot target its R&D effort autonomously and, thus cannot compete on innovation in an as targeted and effective way as a fully integrated player.

- (3249) **Third**, the Commission notes that the three main competitors of the Parties have differentiated innovation assets and capabilities, and are thus not equally able to innovate in the same innovation spaces (see recitals (2367) to (2374) on Section V.8.6.5).
- (3250) For instance, for each of the innovation spaces where the Parties currently overlap, analysed in Section V.8.8, there are few (if any) other competitors able to bring products with similar quality.
- (3251) More generally, if the merged entity would reduce its innovation efforts in any innovation space where the Parties would be active, it is unlikely that all the other R&D-integrated players would be able to bring a new product to the space with equal quality and in a similar time frame. For instance, as described in Section V.8.7.2.1, BASF has been a weak innovator in herbicides and insecticides. Syngenta has innovated mainly in graminicides, which is a different segment from broadleaf weeds where Dow and DuPont are active, and thus it is a distant innovator to Dow and DuPont.
- (3252) **Fourth**, the Commission considers that competitors have limited capacity to innovate into the whole crop protection space, mainly due to financial constraints as well as capacity limitation in discovery and in development (see recitals (2375) to (2388) on Section V.8.6.5). In particular, R&D companies in the crop protection market are constrained to invest a maximum percentage of their sales in R&D. In addition, they face a bottleneck in having the facilities and regulatory experts able to plan, organise and access the necessary multiple field studies in order to compile a successful regulatory and biology study.
- (3253) Therefore, if as expected the Parties reduce innovation efforts it would be unlikely that competitors would increase their innovation output capacity to sufficiently profitably defeat the reduction of competition from the Parties, also because capacity expansion is expensive.
- (3254) **Fifth**, the Commission finds that competitors would be unlikely to have the incentive to compete aggressively with the Parties as regards innovation given the high level of common shareholdings among the main players in the industry.
- (3255) As explained in Section V.8.6.4, one firm contemplating today, to increase innovation competition will have a downward impact on its current profits and will also have a downward impact on the (expected future) profits of its competitors. This, in turn, will negatively affect the value of the portfolio of shareholders who hold positions in this firm and in its competitors. Therefore, in the context of innovation competition, the reaction of competitors to a decrease in innovation effort by the merged entity is likely to be more limited than if these competitors were independent from the firm resulting from the proposed Transaction.
- (3256) **Sixth**, the Commission understands that the market investigation has provided indications that the R&D effort and resources devoted to innovation may also be influenced from benchmarking at industry level. In this respect, a reduction of the R&D effort of the merged entity may even be followed by other R&D competitors.

(3257) For instance, Bayer indicated that the total R&D budget in crop protection "is derived based on delivering against Bayer's business model, external guidance given to our stakeholders and benchmarking with competitors".²¹⁸⁰ BASF elaborated on the concept, explaining that "R&D companies in the crop protection market (...) invest a certain percentage of their sales in R&D, which is within a similar range across the same industry (...). A significant deviation from this guardrail is possible but unlikely for two main reasons: - Firstly, an R&D company which would invest significantly more or significantly less than industry average over a certain period of time would be questioned by the financial markets and by its shareholders. Above average expenditures would translate in reduced profitability and possibly reduced dividends and stock value".²¹⁸¹

(3258) [Post-merger integration information].

(3259) **Seventh**, the Commission holds that a majority of competitors responding to the market investigation expect that, as a result of the Transaction, the R&D investment by the global R&D-integrated companies would either remain at the same level or decrease.

(3260) In particular, when only considering respondents who replied, less than 20% of responding customers indicated that, as a result of the Transaction, R&D investment by the global R&D-integrated companies would not increase.²¹⁸²

(3261) [Post-merger integration information].²¹⁸³

(3262) On the basis of Section V.8.10.6.2, the Commission considers that it is unlikely that there would be sufficiently strong countervailing reaction of innovation competitors to profitably defeat the reduction of competition from the Parties.

8.10.7. *Conclusion on merged entity incentives to achieve the same overall level of innovation as the Parties pre-Transaction*

(3263) The Commission concludes that post-Transaction the Parties would likely have reduced incentives to innovate. [Post-merger integration information].

(3264) The Commission further considers that it would be unlikely that there would be sufficiently strong countervailing reaction of competitors to profitably defeat this reduction on innovation between and by the Parties.

8.11. Countervailing efficiency claims by the Parties have not been proved nor substantiated

(3265) When evaluating the overall likely impact of a transaction, the Commission assesses the impact on efficiencies that need to be substantiated by the parties. For the Commission to take account of efficiency claims in its assessment of the merger and be in a position to reach the conclusion that as a consequence of efficiencies, there are no grounds for declaring the merger to be incompatible with the internal market,

²¹⁸⁰ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8352).

²¹⁸¹ Competitor's response to the Commission's request for information to competitors on R&D Capabilities (ID8336).

²¹⁸² Questionnaire to Crop Protection Competitors (Q2a and Q2b), question 59 and 60. The calculation does not include respondents who did not reply or who replied 'I don't know'.

²¹⁸³ [Internal document] (ID8668).

the efficiencies have to (i) benefit consumers, (ii) be merger-specific and (iii) be verifiable.²¹⁸⁴

- (3266) The Parties suggested that there are several efficiencies associated to the Transaction.
- (3267) **First**, the Parties argue that the Transaction would allow the effects of spillovers to be internalised. Spillovers would arise whenever innovation by one of the Parties benefits the other, for example by reducing the costs associated with its own innovations. A merger may thus increase the reward to innovation by reducing information spillovers to competing firms and hence imitation, thus increasing the appropriability of the returns to innovation.
- (3268) **Second**, the Parties argue that the Transaction would increase the return to innovation by allowing the merged entity to capture greater sales and hence appropriate more of the value of innovation if this is proportional to sales.
- (3269) **Third**, the Parties argue that the Transaction would allow a firm to capture a greater value of its innovation by combining it with complementary products offered by the other merging party (and vice versa), in ways which were not feasible pre-Transaction. In this context, the merged entity would have a higher expected NPV of innovations as it has a greater pool of its own AIs from which it can select for mixtures with the new AI, thereby providing it with greater certainty regarding the efficacy and likely success of mixtures involving the innovated product.
- (3270) [R&D information]. To the extent that the Transaction would allow the Parties access to alternative mixture inputs internally, the dependence on third parties would be reduced. In this case, the associated rents would then be retained by the merged entity, and the returns to the Parties from their innovation efforts would be enhanced, increasing investment incentives.
- (3271) **Fourth**, the Parties argue that Transaction would allow the merged entity to eliminate any redundant duplication of assets between the Parties, retaining the capabilities of whichever party is stronger in each area of R&D. It may also utilise existing assets more efficiently – if different assets are used at different stages of an AI’s journey through the pipeline, then developing a larger number of AIs would allow the merged entity to ensure that its assets are not under-used.
- (3272) **Fifth**, the Parties argue that the Transaction would allow them to combine complementary strengths. [R&D information].
- (3273) [Post-merger integration information].
- (3274) The Parties argue that the first three channels listed in recitals (3267) to (3270) should not be assessed as a merger-specific efficiency. Instead, these effects should be considered within the overall competitive assessment of the Transaction, in order to determine whether the Transaction may or may not reduce innovation.
- (3275) At the outset, the Commission notes that according to its assessment, all the channels set out by the Parties rely on *merger efficiencies*. This is because each of the channels is based on a mechanism conceptually distinct from the loss of competition between the Parties brought about by the merger itself. In other words, these channels are not necessarily specific to a merger or linked to the elimination of competition between the Parties. While a reduction in imitation (or free-riding) by

²¹⁸⁴ Horizontal Merger Guidelines, paragraph 78.

rival firms may, for example, generate an offsetting pro-innovation effect (by allowing the merging parties to internalise a positive externality that was not being internalised absent the merger), it can be logically distinguished from the effect of the loss of competition between the Parties. This is because a reduction in imitation risk does not automatically follow from a loss of competition between the Parties. The reduction in this risk can - at least in principle - be achieved by strong (enforcement of) IPR, high degree of secrecy or other business strategies by the industry participants.²¹⁸⁵

- (3276) Following these claims, the Commission has invited the Parties, [date], to submit any efficiency claim as soon as possible in order to be able to assess it within the limited time of the merger procedure. [Date], the Commission reiterated this invitation.
- (3277) On [...] the Parties made a submission [...]. In this submission the Parties argue that post-Transaction the merged entity would benefit from the following factors:
- (1) [Post-merger integration information].
 - (2) [Post-merger integration information].
 - (3) [Post-merger integration information].
 - (4) [Post-merger integration information].
 - (5) The Transaction would allow the Parties to build upon their respective competencies in order to advance innovative computational models. [Post-merger integration information].
 - (6) [Post-merger integration information].
 - (7) [Post-merger integration information].
 - (8) The merged entity would benefit from improved scalability to support its innovation activities.
- (3278) Finally, the Commission takes note that the Parties argue in the response to the Statement of Objections that the criteria that the Commission has established for an efficiency defense to succeed with respect to product and price competition simply cannot apply to innovation competition, where it is impossible to prove and quantify, such as, pass-on.
- (3279) In that respect, the Commission notes first these synergies are not supported by any internal document from the Parties. [Content from internal document].²¹⁸⁶

Figure 174 – [Extract from internal document]

[...]

- (3280) Second, according to paragraph 86 of the Horizontal Merger Guidelines, "*[e]fficiencies have to be verifiable such that the Commission can be reasonably certain that the efficiencies are likely to materialise, and be substantial enough to counteract a merger's potential harm to consumers*". All the efficiencies alleged by the Parties depend on future strategic decisions by the companies and on detailed

²¹⁸⁵ By analogy, the US Horizontal Merger Guidelines explicitly discuss the ability by a merged entity to appropriate a greater share of the benefits resulting from innovation as a possible efficiency, noting that licensing and intellectual property conditions may be important factors to consider (see page 31).

²¹⁸⁶ [Internal document] (ID7830-33269).

knowledge of companies' assets and capabilities and of the function of the industry and its dynamics. They likely take place in the long-term based on a complex and long chain of events. The efficiencies are thus difficult for the Commission to verify on its own and the submissions by the Parties do not provide any concrete evidence on how these efficiencies are being planned and how much they would improve the productivity of the merged entity.

- (3281) The Commission further notes that according to paragraph 80 of the Horizontal Merger Guidelines, "*[c]ost reductions, which merely result from anti-competitive reductions in output, cannot be considered as efficiencies benefiting consumers*". This would be the case of most of the synergies related to cost savings with R&D, since as explained in Section V.8.10.5 they would reduce the ability of the merged entity to compete in innovation.
- (3282) Third, according to paragraph 85 of the Horizontal Merger Guidelines, "*[e]fficiencies are relevant to the competitive assessment when they are a direct consequence of the notified merger and cannot be achieved to a similar extent by less anticompetitive alternatives*". The Parties have not provided any evidence that these efficiencies can only be achieved with the Transaction. On the contrary, it seems that a number of these alleged benefits can be achieved through other means (for example R&D agreements) and do not require a merger between the Parties.
- (3283) Finally, according to paragraph 79 of the Horizontal Merger Guidelines, "*efficiencies should be substantial and timely, and should, in principle, benefit consumers in those relevant markets where it is otherwise likely that competition concerns would occur*". The Parties have not provided any evidence that these efficiencies would be passed on to consumers to a sufficiently large extent.
- (3284) In the absence of any substantiated submission and proof, the Commission cannot assess whether the claimed efficiencies are likely, verifiable, merger-specific and beneficial to consumers. Accordingly, the Commission cannot conclude that the alleged efficiencies would countervail the reductions of innovation competition that are likely to result from the Transaction.

8.12. The Transaction would likely have a significant impact on effective innovation competition which would likely result in significant harm to consumers

- (3285) As discussed in Sections V.8.8.4.2 and V.8.10, the Commission considers that it is likely that the Transaction would significantly reduce the incentives of the merged entity to innovate as compared to the combined innovation effort of the Parties pre-Transaction. The reduced innovation incentives would manifest themselves in the form of:
- (1) Immediate reduction of incentives to continue with existing lines of research and early pipeline products (either by curtailing, re-orientating or deferring). This is case of early pipeline products and lines of research that are likely to capture significant revenues from the competing product of the other Party (be it another early pipeline product or a current product). This adverse externality is internalised post-Transaction, making it more likely that the early pipeline product or line of research would be suppressed. Consumers would be harmed in this case by both the loss of product variety, and the reduced intensity of future product market competition in the markets where the discontinued, deferred or redirected product would have been introduced but for the Transaction. Although the consumer harm would only be directly felt in the

future, when this product would have been introduced in the market, it would result of a short term reduction of innovation effort by the merged entity translated in the immediate discontinuity, deferment or redirection of an early pipeline product.

- (2) Reduction of incentives to develop in the longer term the same number of new products as the combined targets of the Parties absent the Transaction. By internalising the impact of innovation competition between the Parties, the Transaction by merging two significant and close innovators would also lead to lower innovation efforts, in relation to products that have not yet been discovered at the time of the Transaction. This would harm consumers both by reducing future product variety and future product market competition in markets where the Parties would have innovated but for the Transaction
- (3286) The Commission finds it likely that the harm to innovation competition would be significant on both accounts.
- (3287) As with the standard non-coordinated effects in price competition, non-coordinated effects in innovation competition are expected to be more pronounced if the merger brings together two out of a limited number of large, qualitatively and highly effective R&D-integrated players. Effects are also stronger if the merging parties are close competitors in terms of their likely innovation trajectories or in the product markets targeted with their innovation.
- (3288) As discussed in Section V.8.7, the investigation shows that pre-Transaction the Parties are very active and important innovation competitors at industry level. Within the Parties, DuPont seems to be the most innovative player given its past record of new AIs launched, not only in terms of number but also quality, [post-merger integration information].
- (3289) The Commission finds that not only the Parties are important innovators at an industry level, for many innovation spaces, the investigation also shows that the Parties have been in the past, and are likely to continue to be in the future, close and important innovation competitors. There are several markets in which the Parties have launched or are launching/currently developing competing products to steal revenue from each other. They have also several early pipeline products and lines of research which would likely take away revenue from each other in the future. Moreover, their lines of research and early pipeline projects are likely to be very important for the farmers concerned and there are fewer other alternatives available or having similar lines of research and early pipeline products.
- (3290) [Post-merger integration information].
- (3291) The elimination of one independent player resulting from the Transaction and the consequent reduction of innovation output by the merged entity would take place in a context of a crop protection industry already characterised by oligopolistic competition in terms of innovation (see Section V.8.6). In fact, following successive waves of consolidations there are now only five R&D-integrated players, being the barriers to entry and expansion very high at both discovery and development level. When considering each innovation space where the Parties are active, the number of alternatives is even lower (see Section V.8.6.5 and Section V.8.8).

- (3292) In addition, the Commission's investigation suggests that rival R&D-integrated players would have no incentives to significantly increase their innovation efforts so as to profitably defeat the reduction of innovation competition by the Parties (see Section V.8.10.6).
- (3293) The Commission therefore concludes that the likely reduction of innovation effort by the merged entity as compared with the Parties pre-Transaction would have a significant impact on effective innovation competition, not only at the level of the innovation spaces where the Parties currently overlap but also at the industry level.
- (3294) The Commission considers that the immediate significant harm to innovation competition which would result in a decreased in innovative products being introduced in the downstream markets, would significantly harm consumers on markets where these products would compete in the future, including markets where one or both of the Parties are not currently present, as a result of reduction of variety as well as product market competition.
- (3295) This is even more likely to be the case given that innovation has been significantly declining in the industry in the last years while consolidation has been increasing, with a particular incidence in Europe (see Section V.8.5). This Transaction, by bringing together two of the few players with strong capabilities for innovations focussed in Europe, would thus affect even more the European market.
- (3296) According to the Horizontal Merger Guidelines, efficiencies brought about by a merger may counteract the effects on competition and in particular the potential harm to consumers that it might otherwise have. However, the Commission considers that the Parties have not substantiated and proven verifiable and significant merger specific synergies in innovation which would outweigh the competitive harm (see Section V.8.11).

8.13. Conclusion

- (3297) In line with Sections V.8.1 to V.8.12, the Commission considers that the Transaction would be likely to significantly impede effective competition as regards innovation both in innovation spaces where the Parties lines of research and early pipeline products overlap and overall in innovation in the crop protection industry.

SECTION VI: SEEDS AND GENE EDITING

1. SEEDS

1.1. Definition of relevant markets in seeds

1.1.1. Product market definition

- (3298) In the Syngenta/Monsanto Decision, the Commission made a distinction between (i) the upstream market for the trading, usually through exchanges and licences, of seed varieties (parental lines and hybrids) and (ii) the downstream market for the trading of seeds. Moreover, the Commission identified separate relevant product markets for each crop seed so that, for example, sunflower seeds constitute a product market separate from those for other seeds.²¹⁸⁷

²¹⁸⁷ See Commission Decision in Case M.5675 – Syngenta/Monsanto's Sunflower Seed Business (2010), recital 76.

- (3299) The Parties propose a similar classification and distinguish between (i) exchange and licensing of seed varieties; and (ii) trading of seeds.
- (3300) The majority of respondents to the market investigation agree with this approach. Indeed, different players are active upstream and downstream in the seeds business and have different drivers and different commercial approaches.²¹⁸⁸ In the market for the trading of seed varieties, the main players are seed companies and breeders, whereas in the downstream market, distributors or farmers are the key stakeholders. Moreover, the majority of respondents to the market investigation indicated that the various types of seeds are not mutually substitutable since customers are likely to grow different crops for particular purposes or to meet specific needs.²¹⁸⁹
- (3301) On the basis of recitals (3298) to (3300), the Commission takes the view that a distinction can be made between (i) the upstream market for the trading of seed varieties and (ii) the downstream market for the commercialisation of seeds, with a further segmentation for each type of crop seeds. The Commission leaves open whether the market could be further segmented on the basis of whether seeds are genetically modified.²¹⁹⁰ The competitive analysis and effects of the Transaction would not be affected by further segmentations.

1.1.2. *Geographic market definition*

- (3302) In the Syngenta/Monsanto Decision,²¹⁹¹ the Commission found that the market for the trading of seed varieties is at least EEA-wide in scope, while the commercialisation of seeds instead takes place at the national level.
- (3303) Respondents to the market investigation support this approach. As regards the trading of seed varieties, a majority of respondents to the market investigation that expressed a view indicated that licences are usually granted on an at least EEA-wide basis. Furthermore, the breeding of varieties is conducted having regard to the specific agro-climatic conditions in Europe and not on a global basis.²¹⁹² As regards the commercialisation of seeds, a significant number of respondents indicated that the conditions of sale differ significantly among Member States: (i) usually seeds are tailored to the agro-climatic conditions of the countries in which they are sold²¹⁹³ (ii) seed producers largely opt for national registration²¹⁹⁴ and (iii) the price of seeds sold to the distribution channel, as well as to end customers, varies significantly among Member States.²¹⁹⁵

²¹⁸⁸ Questionnaire to Customers Seeds (Q5), question 7; Questionnaire to Competitors Seeds (Q6), question 8; Questionnaire to Stackholders Seeds (Q7b), question 4.

²¹⁸⁹ Questionnaire to Customers Seeds (Q5), question 8; Questionnaire to Competitors Seeds (Q6), question 9; Questionnaire to Stackholders Seeds (Q7b), question 5.

²¹⁹⁰ The Parties' activities do not overlap in the sale of GM seeds. DuPont, but not Dow, sells a limited amount of GM maize seeds in Europe.

²¹⁹¹ See Commission Decision in Case M.5675 – Syngenta/Monsanto's Sunflower Seed Business (2010), recital 118.

²¹⁹² Questionnaire to Customers Seeds (Q5), question 11 and Questionnaire to Competitors Seeds (Q6), question 12.

²¹⁹³ Questionnaire to Customers Seeds (Q5), question 14; Questionnaire to Competitors Seeds (Q6), question 16.

²¹⁹⁴ Questionnaire to Customers Seeds (Q5), question 15; Questionnaire to Competitors Seeds (Q6), question 17.

²¹⁹⁵ Questionnaire to Customers Seeds (Q5), question 17; Questionnaire to Competitors Seeds (Q6), question 20.

(3304) On the basis of recitals (3302) and (3303), the Commission will assess the likely effects of the Transaction on the markets for the trading of seed varieties at the EEA level and the markets for the commercialisation of seeds at the national level.

1.2. Assessment of non-coordinated effects in seeds

1.2.1. Trading of seed varieties

(3305) Dow and DuPont both currently licence seed varieties to third parties for use in Europe. DuPont licenses maize, oilseed rape and sunflower seed varieties to third parties. Dow licenses cotton, maize and sunflower seed varieties to a number of seed companies, [names of competitors].

(3306) Therefore, the Transaction gives rise to horizontal overlaps in relation to the licensing of maize and sunflower seed varieties. However, the Parties have relatively small maize and sunflower seed variety trading activities in the EEA and estimate that their combined share amounts to less than [10-20]% in each market.

(3307) The Commission thus concludes that the Transaction would not give rise to any affected horizontal markets in relation to the trading of seed varieties.

1.2.2. Trading of seeds

(3308) In the downstream market for the trading of seeds, the Transaction gives rise to affected markets in relation to maize, sunflower and cotton seeds.

1.2.2.1. Maize

(3309) Maize seeds are the single most traded crop seeds at the worldwide level and in Europe. In 2014, maize seed sales amounted to approximately USD [sales estimate] and represent approximately [sales estimate]% of total seed sales worldwide.²¹⁹⁶ In Europe, 2014 maize seed sales amounted to approximately USD [sales estimate] and represented approximately [sales estimate]% of total seed sales.²¹⁹⁷

(3310) At the worldwide level, DuPont is the second largest supplier of maize seeds after Monsanto, the market leader. Dow is the fifth maize seed supplier worldwide and its sales are mainly driven by GMO maize varieties.

Table 78 – Maize seed sales worldwide (2014)

[...]

Source: Phillips McDougall Study – Seeds Service, October 2015

(3311) In Europe,²¹⁹⁸ DuPont ([20-30]%) is the leading maize seed supplier, followed by Monsanto ([10-20]%), KWS ([10-20]%), Limagrain ([10-20]%), Syngenta ([5-10]%), RAGT ([0-5]%), and Euralis ([0-5]%). Dow is the tenth largest maize seed supplier in Europe with a share of sales of approximately [0-5]%

(3312) In the overall market for the commercialisation of maize seeds (including conventional and GM), the Transaction gives rise to affected markets in eleven EEA

²¹⁹⁶ Phillips-McDougall Study, Seeds Service, May 2015, page 20.

²¹⁹⁷ Phillips-McDougall Study, Seeds Service, May 2015, page 23.

²¹⁹⁸ Data available to the Parties includes in the definition of Europe non-EU Member States, including Russia, Turkey, and the Ukraine.

Member States: Austria, Bulgaria, Croatia, Hungary, Italy, Poland, Portugal, Romania, Slovakia, Slovenia and Spain.²¹⁹⁹

Table 79 – Affected markets in maize

2015	DuPont	DAS	Combined	Monsanto	KWS	Limagrai n	Syngenta	RAGT	Euralis
Austria	[20-30]%	[0-5]%	[20-30]%	[30-40]%	[10-20]%	[0-5]%	[5-10]%	[5-10]%	[5-10]%
Bulgaria	[50-60]%	[0-5]%	[50-60]%	[20-30]%	[5-10]%	[0-5]%	[0-5]%		[0-5]%
Croatia	[40-50]%	[0-5]%	[40-50]%	[10-20]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	
Hungary	[30-40]%	[0-5]%	[30-40]%	[30-40]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	
Italy	[50-60]%	[0-5]%	[50-60]%	[10-20]%	[5-10]%	[0-5]%	[10-20]%		
Poland	[20-30]%	[0-5]%	[20-30]%	[0-5]%	[10-20]%	[5-10]%	[5-10]%	[0-5]%	[5-10]%
Portugal	[50-60]%	[0-5]%	[50-60]%	[10-20]%	[0-5]%	[5-10]%	[5-10]%		
Romania	[20-30]%	[0-5]%	[20-30]%	[10-20]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	
Slovakia	[20-30]%	[0-5]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[5-10]%	[0-5]%	
Slovenia	[50-60]%	[0-5]%	[50-60]%	[10-20]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Spain	[40-50]%	[0-5]%	[40-50]%	[30-40]%	[0-5]%	[5-10]%	[0-5]%		

Source: Kleffman

(A) Austria

- (3313) The Commission considers that the Transaction would not significantly impede effective competition with respect to the trading of maize seeds in Austria. This is for the following reasons.
- (3314) First, the Parties' combined share would be only [20-30]%. Moreover, the market share increment brought about by the Transaction is only [0-5]%.
(3315) Second, the Parties face several competitors holding material market shares, such as Monsanto, KWS and Syngenta.
(3316) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²⁰⁰ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction

²¹⁹⁹ DuPont, but not Dow, is active in the sale of GM maize seeds in Europe. Therefore, the Parties' activities do not overlap in the sale of GM maize seeds in Europe. Moreover, sales of GM maize seeds in Europe are *de minimis* and taking into account both GM and non-GM maize seeds does not materially affect the assessment of the likely effects of the Transaction on the maize markets.

²²⁰⁰ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

would have no impact or a positive impact on the trading of maize seeds in Austria.²²⁰¹

(B) Bulgaria

- (3317) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Bulgaria. This is for the following reasons.
- (3318) First, the Parties' combined share would be [50-60]%. However, the market share increment brought about by the Transaction is only [0-5]%.
- (3319) Second, the Parties face several competitors holding material shares, such as Monsanto, KWS and Limagrain. Therefore, the Transaction would not create or strengthen a dominant position.
- (3320) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²⁰² Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Bulgaria.²²⁰³

(C) Croatia

- (3321) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Croatia. This is for the following reasons.
- (3322) First, the Parties' combined share would be [40-50]%. However, the market share increment brought about by the Transaction is only [0-5]%.
- (3323) Second, the Parties face several competitors holding material market shares, such as Monsanto and KWS.
- (3324) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²⁰⁴ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would not have an impact on the trading of maize seeds in Croatia.²²⁰⁵

(D) Hungary

- (3325) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Hungary. This is for the following reasons.
- (3326) First, the Parties' combined share would be [30-40]%. However, the market share increment brought about by the Transaction is only [0-5]%.

²²⁰¹ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

²²⁰² Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²⁰³ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

²²⁰⁴ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²⁰⁵ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

(3327) Second, the Parties face several competitors holding material shares, such as Monsanto, Syngenta and Limagrain.

(3328) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²⁰⁶ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Croatia.²²⁰⁷

(E) Italy

(3329) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Italy. This is for the following reasons.

(3330) First, the Parties' combined share would be [50-60]%. However, the market share increment brought about by the Transaction is only [0-5]%.

(3331) Second, the Parties face several competitors holding material market shares, such as Monsanto, Syngenta and KWS. Therefore, the Transaction would not create or strengthen a dominant position.

(3332) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²⁰⁸ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Italy.²²⁰⁹

(F) Poland

(3333) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Poland. This is for the following reasons.

(3334) First, the Parties' combined share would be only [20-30]%. Moreover, the market share increment brought about by the Transaction is only [0-5]%.

(3335) Second, the Parties face several competitors holding material market shares, such as KWS, Limagrain and Syngenta.

(3336) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²¹⁰ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Poland.²²¹¹

²²⁰⁶ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²⁰⁷ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

²²⁰⁸ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²⁰⁹ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

²²¹⁰ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²¹¹ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

(G) Portugal

- (3337) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Portugal. This is for the following reasons.
- (3338) First, the Parties' combined share would be [50-60]%. However, the market share increment brought about by the Transaction is only [0-5]%.
- (3339) Second, the Parties face several competitors holding material market shares, such as Monsanto, Limagrain and Syngenta. Therefore, the Transaction would not create or strengthen a dominant position.
- (3340) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²¹² Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Portugal.²²¹³

(H) Romania

- (3341) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Romania. This is for the following reasons.
- (3342) First, the Parties' combined share would be only [20-30]%. Moreover, the market share increment brought about by the Transaction is only [0-5]%.
- (3343) Second, the Parties face several competitors holding material market shares, such as Monsanto, KWS and Syngenta.
- (3344) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²¹⁴ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Romania.²²¹⁵

(I) Slovakia

- (3345) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Slovakia. This is for the following reasons.
- (3346) First, the Parties' combined share would be only [20-30]%. Moreover, the market share increment brought about by the Transaction is only [0-5]%.
- (3347) Second, the Parties face several competitors holding material market shares, such as Monsanto, Limagrain and KWS.

²²¹² Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²¹³ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

²²¹⁴ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²¹⁵ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

(3348) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²¹⁶ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Slovakia.²²¹⁷

(J) Slovenia

(3349) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in in Slovenia. This is for the following reasons.

(3350) First, the Parties' combined share would be [50-60]%. However, the market share increment brought about by the Transaction is only [0-5]%.

(3351) Second, the Parties face several competitors holding material market shares, such as Monsanto, Limagrain and Syngenta. Therefore, the Transaction would not create or strengthen a dominant position.

(3352) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²¹⁸ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Slovenia.²²¹⁹

(K) Spain

(3353) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of maize seeds in Spain. This is for the following reasons.

(3354) First, the Parties' combined share would be [40-50]%. However, the market share increment brought about by the Transaction is only [0-5]%.

(3355) Second, the Parties face several competitors holding material market shares, such as Monsanto, Limagrain and Syngenta. Therefore, the Transaction would not create or strengthen a dominant position.

(3356) Third, a majority of respondents to the market investigation indicated that Dow's maize seed varieties [product information].²²²⁰ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of maize seeds in Spain.²²²¹

²²¹⁶ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²¹⁷ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

²²¹⁸ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²¹⁹ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

²²²⁰ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²²¹ Questionnaire to Customers Seeds (Q5), question 58; Questionnaire to Competitors Seeds (Q6), question 87.

1.2.2.2. Sunflower

- (3357) In 2014, sunflower seed sales amounted to approximately USD [sales estimate] and represented approximately [sales estimate]% of total seed sales worldwide.²²²² In the Union, in 2014, sunflower planted area amounted to approximately [sales estimate] hectares and the sunflower production was around [sales estimate] tons.²²²³
- (3358) In Europe,²²²⁴ DuPont is the second largest sunflower seed supplier ([10-20]%), after Syngenta ([30-40]%). It is followed by Limagrain ([10-20]%), Euralis ([5-10]%), Novi Sad ([0-5]%), Maisaidour ([0-5]%), RAGT ([0-5]%) and Caussade Semences ([0-5]%). Dow only has [sales estimate] sales of sunflower seeds in Europe.
- (3359) In the overall market for the commercialisation of sunflower seeds, the Transaction gives rise to affected markets in six EEA Member States: Bulgaria, Hungary, Italy, Romania and Spain.

Table 80 – Affected markets in Sunflower

2015	DuPont	DAS	Combined	Syngenta	Limagrain	Euralis	RAGT
Bulgaria	[30-40]%	[0-5]%	[30-40]%	[20-30]%	[10-20]%	[0-5]%	-
Hungary	[20-30]%	[0-5]%	[20-30]%	[50-60]%	[5-10]%	[0-5]%	[0-5]%
Italy (2014)	[20-30]%	[0-5]%	[20-30]%	[40-50]%	[10-20]%	-	-
Romania	[30-40]%	[0-5]%	[30-40]%	[20-30]%	[10-20]%	[5-10]%	[0-5]%
Spain	[10-20]%	[0-5]%	[20-30]%	[20-30]%	[10-20]%	[20-30]%	[0-5]%

Source: *Kleffman; for Italy, Gfk*

(A) Bulgaria

- (3360) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of sunflower seeds in Bulgaria. This is for the following reasons.
- (3361) First, the Parties' combined share would be [30-40]%. However, the market share increment brought about by the Transaction is only [0-5]%.
- (3362) Second, the Parties face several competitors holding material market shares, such as Syngenta and Limagrain.
- (3363) Third, a majority of respondents to the market investigation indicated that Dow's sunflower seed varieties [product information].²²²⁵ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of sunflower seeds in Bulgaria.²²²⁶

²²²² Phillips-McDougall Study, Seeds Service, May 2015, page 20.

²²²³ Phillips-McDougall Study, Seeds Service, December 2015, page 150.

²²²⁴ Data available to the Parties includes in the definition of Europe non-EU Member States, including Russia, Turkey, and the Ukraine.

²²²⁵ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²²⁶ Questionnaire to Customers Seeds (Q5), question 57; Questionnaire to Competitors Seeds (Q6), question 86.

(B) Hungary

- (3364) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of sunflower seeds in Hungary. This is for the following reasons.
- (3365) First, the Parties' combined share would be only [20-30]%. Moreover, the market share increment brought about by the Transaction is only [0-5]%.²²²⁷
- (3366) Second, the Parties face several competitors holding material market shares, such as Syngenta, Limagrain and RAGT.
- (3367) Third, a majority of respondents to the market investigation indicated that Dow's sunflower seed varieties [product information].²²²⁷ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would not have an impact on the trading of sunflower seeds in Hungary.²²²⁸

(C) Italy

- (3368) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of sunflower seeds in Italy. This is for the following reasons.
- (3369) First, the Parties' combined share would be only [20-30]%. Moreover, the market share increment brought about by the Transaction is only of less of [0-5]%.²²²⁹
- (3370) Second, the Parties face several competitors holding material market shares, such as Syngenta, Limagrain and Momont (KWS).
- (3371) Third, a majority of respondents to the market investigation indicated that Dow's sunflower seed varieties [product information].²²²⁹ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would not have an impact on the trading of sunflower seeds in Italy.²²³⁰

(D) Romania

- (3372) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of sunflower seeds in Romania. This is for the following reasons.
- (3373) First, the Parties' combined share would be [30-40]%. However, the market share increment brought about by the Transaction is only [0-5]%.²²³⁰
- (3374) Second, the Parties face several competitors holding material market shares, such as Syngenta, Limagrain and Euralis.

²²²⁷ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²²⁸ Questionnaire to Customers Seeds (Q5), question 57; Questionnaire for Competitors Seeds (Q6), question 86.

²²²⁹ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²³⁰ Questionnaire to Customers Seeds (Q5), question 57; Questionnaire for Competitors Seeds (Q6), question 86.

(3375) Third, a majority of respondents to the market investigation indicated that Dow's sunflower seed varieties [product information].²²³¹ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would not have an impact on the trading of sunflower seeds in Romania.²²³²

(E) Spain

(3376) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of sunflower seeds in Spain. This is for the following reasons.

(3377) First, the Parties' combined share would be only [20-30]%. Moreover, the market share increment brought about by the Transaction is only [0-5]%.²²³³

(3378) Second, the Parties face several competitors holding material market shares, such as Syngenta, Euralis and Limagrain.

(3379) Third, a majority of respondents to the market investigation indicated that Dow's sunflower seed varieties [product information].²²³³ Moreover, a majority of respondents to the market investigation that expressed a view indicated that the Transaction would not have an impact on the trading of sunflower seeds in Spain.²²³⁴

1.2.2.3. Cotton

(3380) In 2014, cotton seed sales amounted to approximately USD [sales estimate] and represented approximately [sales estimate]% of total seed sales worldwide.²²³⁵ Europe accounted for [sales estimate]% of total cotton seeds sale, approximately USD [sales estimate].²²³⁶

(3381) At the worldwide level, Dow is the third cotton seed supplier worldwide (USD [sales estimate]), after Monsanto (USD [sales estimate]) and Bayer (USD [sales estimate]) respectively.

Table 81 – Cotton seed sales worldwide (2014)

[...]

Source: Phillips-McDougall Study, Seeds Service, October 2015, page 14

(3382) In the overall market for the commercialisation of cotton seeds, the Transaction gives rise to an affected market in one Member State: Greece.

Table 82 – Affected market in Cotton

2014	DuPont	DAS	Combined	Bayer	Monsanto	House of Spirou
Greece	[30-40]%	[0-5]%	[30-40]%	[20-30]%	[10-20]%	[10-20]%

Source: Gfk

²²³¹ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²³² Questionnaire to Customers Seeds (Q5), question 57; Questionnaire for Competitors Seeds (Q6), question 86.

²²³³ Questionnaire to Customers Seeds (Q5), question 20; Questionnaire to Competitors Seeds (Q6), question 44.

²²³⁴ Questionnaire to Customers Seeds (Q5), question 57; Questionnaire for Competitors Seeds (Q6), question 86.

²²³⁵ Phillips-McDougall Study, Seeds Service, December 2015, page 197.

²²³⁶ Phillips-McDougall Study, Seeds Service, December 2015, page 200.

(A) Greece

- (3383) The Commission considers that the Transaction would not significantly impede effective competition with respect to the sale of cotton seeds in Greece. This is for the following reason.
- (3384) First, the Parties' combined share would be approximately [30-40]%. However, the market share addition brought about by the Transaction is modest as Dow holds a share of less of [0-5]%.²²³⁷
- (3385) Second, the Parties face several competitors holding material market shares, Bayer, Monsanto and House of Spirou.
- (3386) Third, [product information].
- (3387) Fourth, all respondents to the market investigation that expressed a view indicated that the Transaction would have no impact or a positive impact on the trading of cotton seeds in Greece.²²³⁷

1.2.3. *Vertical overlaps*

- (3388) Dow and DuPont are active in the upstream market for the trading of seed varieties as well as in the downstream market for the trading of seeds. This vertical relationship gives rise to vertically affected markets for each of cotton, maize, oilseed rape, and sunflower seeds. Such affected markets would be susceptible to raise competition concerns should they be likely to lead to a material foreclosure of competitors in the upstream market for the licensing of seed varieties or in the downstream market for the trading of seeds.²²³⁸
- (3389) In assessing the likelihood of an anti-competitive foreclosure scenario, according to the Commission's Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings ("Non-Horizontal Merger Guidelines"), it is necessary to examine, first, whether the merged entity would have the ability to foreclose access to upstream markets by reducing its sales and to the downstream markets by reducing its purchases from its rivals.²²³⁹
- (3390) According to the Non-Horizontal Merger Guidelines, for foreclosure to be a concern, a vertical merger must involve a company which is an important supplier, in the case of input foreclosure, or an important customer, in the case of customer foreclosure, with a significant degree of market power.²²⁴⁰
- (3391) Neither of these conditions is satisfied. The merged entity would be unlikely to have the ability or the incentive to engage in a foreclosure strategy and, in any event, such strategy is unlikely to have a significant detrimental effect on consumers. Input and customer foreclosure are discussed separately below.

²²³⁷ Questionnaire to Customers Seeds (Q5), question 60; Questionnaire to Competitors Seeds (Q6), question 89.

²²³⁸ Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings ("Non-Horizontal Merger Guidelines"), OJ C 265/07, page 6, paragraphs 29 and 30.

²²³⁹ Non-Horizontal Merger Guidelines, paragraphs 32 and 59.

²²⁴⁰ Non-Horizontal Merger Guidelines, paragraphs 35 and 58.

1.2.3.1. Input foreclosure

- (3392) Dow and DuPont are not significant licensors of seed varieties to third parties in Europe. This is reflected in the Parties' share in the upstream market for the licensing of seed varieties which they estimate to be below [5-10]% in the EEA for each of the crops giving rise to vertically affected markets.
- (3393) Moreover, in each of the vertically affected markets there are a number of seed competitors that are currently licensing to third parties their seed varieties, including Monsanto, KWS Limagrain, Syngenta, Euralis, RAGT, and Maisadour.
- (3394) It must also be noted that the licensing from third parties of seed varieties for the main seed manufacturers is not an important aspect of their business. As one competitor pointed out, under Union rules the so called breeder exception allows seed companies to rely on the germplasm of competitors for crossing and selection so that the need to in-license is often limited to the instances in which finished varieties are needed to fill a portfolio gap.²²⁴¹
- (3395) Moreover, seed companies tend to rely on their own seed varieties more than in the past, with the possible exception of sunflower seeds, and aim at in-licensing seed varieties only to meet specific needs. Indeed competitors that responded to the market investigation indicated that the in-licensing of seed varieties is of low or medium importance for their activities in the EEA.²²⁴²
- (3396) It follows from recitals (3392) to (3395) that it is unlikely that the merged entity would have the ability to engage in input foreclosure post-Transaction.
- (3397) Even if the merged entity were to no longer license seed varieties to third parties, such strategy would be unlikely to have a significant detrimental effect on consumers in the EEA.
- (3398) As discussed above, the Parties are not significant licensors of seed varieties and a number of seed competitors are active in the licensing of seed varieties in the EEA. This is reflected in the relatively modest share held by the Parties for the out-licensing of seed varieties which is estimated to be below [5-10]% for each of cotton, maize, oilseed rape, and sunflower.
- (3399) Moreover, a majority of competitors that expressed a view and are in-licensing maize seed varieties from Dow or DuPont do not expect the Transaction to have an impact on their existing agreements.²²⁴³
- (3400) Finally, a majority of competitors that expressed a view in the market investigation indicated that the combination of Dow and DuPont's seed varieties would be likely to have no impact or a positive impact on the number, quality, and price of seed varieties that would come to the market in the EEA.²²⁴⁴

1.2.3.2. Customer foreclosure

- (3401) Dow and DuPont are not significant licensees of seed varieties. In line with the industry trend described above, they mainly rely on their proprietary seed varieties and in-license seed varieties mainly in the context of cross-licensing agreements.

²²⁴¹ Questionnaire to Competitors Seeds (Q6), question 24.

²²⁴² Questionnaire to Competitors Seeds (Q6), question 23.

²²⁴³ Questionnaire to Competitors Seeds (Q6), question 80.

²²⁴⁴ Questionnaire to Competitors Seeds (Q6), questions 82, 83 and 84.

Indeed, the Parties indicate that their share of demand for seed varieties is limited and, in any event, [0-5]% in each of the vertically affected markets.

- (3402) Moreover, there are several global and local seed companies active in the EEA which are current or potential in-licensors of seed varieties, including Monsanto, KWS Limagrain, Syngenta, Euralis, RAGT, Maisadour, Bayer, and Euralis.
- (3403) Even if the merged entity were to no longer in-license seed varieties from third-parties, such strategy would be unlikely to have a significant detrimental effect on consumers in the EEA.
- (3404) As discussed above, the Parties are not significant licensees of seed varieties and a number of seed competitors are current or potential in-licensors of seed varieties in the EEA.
- (3405) Finally, as discussed above, a majority of competitors that expressed a view in the market investigation indicated that the combination of Dow and DuPont's seed varieties would be likely to have no impact or a positive impact on the number, quality, and price of seed varieties that would come to the market in the EEA.²²⁴⁵

1.2.3.3. Conclusion on vertical overlaps

- (3406) On the basis of recitals (3388) to (3405) and the available evidence, the Commission concludes that the Transaction would not significantly impede effective competition with respect to the vertical relations between the upstream markets for the trading of seed varieties and the downstream markets for the trading of seeds because it is unlikely that they would give rise to input or customer foreclosure in relation to the in-licensing of seed varieties.

2. SEED GENE EDITING

2.1. Parties' activities in seed gene editing

- (3407) Dow and DuPont are both developing gene editing technologies. In particular, Dow is developing EXZACT Precision Technology (EXZACT), a zinc finger nuclease technology (ZFN), whereas DuPont is developing the CRISPR/Cas9 technology.
- (3408) In 2008, Dow entered into an exclusive licence agreement with Sangamo BioSciences for the use of ZFNs in plants. Dow has since invested [R&D information]²²⁴⁶ in the development of the EXZACT technology to include, among others, targeted gene addition and gene stacking capabilities²²⁴⁷. [R&D information].
- (3409) DuPont has been developing its CRISPR-Cas technology since 2012. DuPont's CRISPR/Cas9 is based on third party licenses and collaborations as well as proprietary IPRs.

²²⁴⁵ Questionnaire to Competitors Seeds (Q6), questions 82, 83 and 84.

²²⁴⁶ Dow's expenditure on the development of the EXZACT technology amounts to [...] at the end of 2015. The development cost does not include expenditure for the deployment of the technology. See Parties' response to the Commission's request for information RFI 20.7

²²⁴⁷ Gene stacking refers to the combination of two or more genes into a single crop.

2.2. Definition of relevant markets in seeds gene editing

- (3410) In its past merger decisions, the Commission has not yet assessed the market definition in relation to gene editing. The Commission has however assessed in past decisions markets for the licensing of production technologies.²²⁴⁸
- (3411) Genome editing is a type of genetic engineering in which DNA is inserted, deleted or modified in the genome of an organism using engineered nucleases, or "molecular scissors". Engineered nucleases can create site-specific double-stranded breaks at desired locations in a genome. The induced double-stranded breaks can then be repaired resulting in targeted mutations of the genome. In agriculture, gene editing technologies can be used to develop crop varieties that have desirable characteristics, such as disease resistance, drought tolerance, yield improvement, or improved product composition.
- (3412) Gene editing technologies can be used to insert genes from the same species (native traits) or from other species (GM traits) in the genome of a given crop. When used to import native traits, gene editing technologies can accelerate breeding programmes, bringing traits from "exotic" varieties that are not well-adapted to a particular geography into varieties that are well-adapted to a given area. Therefore, gene editing can improve the overall genetic diversity of a crop and allow breeders to rely on a broad class of native traits that might otherwise not be as readily accessible through traditional breeding approaches. There is discussion in Europe on the scope of the current legislation and its applicability to products developed with these new techniques.²²⁴⁹
- (3413) There are currently four main families of engineered nucleases being developed for application in crops: meganucleases, ZFNs, transcription activator-like effector-based nucleases (TALENs), and the CRISPR-Cas system.
- (3414) For the purpose of this Decision the exact scope of the relevant product market for gene editing can be left open since the Transaction would not significantly impede effective competition in the internal market irrespective of whether the different families of engineered nucleases are considered to belong to the same relevant product market.
- (3415) As regards the scope of the relevant geographic market, because gene editing technologies are being developed for deployment worldwide it is likely that it is worldwide in scope. However, for the purpose of this Decision the exact scope of the relevant geographic market for gene editing can be left open since the Transaction would not significantly impede effective competition in the internal market under any alternative relevant geographic market definition.

²²⁴⁸

See Commission Decision in Case M.5406 – IPIC/Man Ferrostaal AG (2009).

²²⁴⁹

The applicable EU-legislation for placing on the market of GMOs is in place. Where products fall under the scope of the GMO legislation, all the corresponding provisions for approving authorisation for different uses are applicable, whether produced in the EU or imported.

2.3. Assessment of non-coordinated effects in seed gene editing

2.3.1. *The Parties products are not close competitors and may even be considered complementary*

- (3416) There are two major categories of double-stranded break technologies based on the means by which the technology recognises nucleic acid sequences in a genome: protein-based technologies and nucleotide (gRNA)-based technologies.
- (a) Protein-based genome editing technologies recognise genomic locations through a protein-nucleic acid interaction, and include TALENs, TALER, Arcus, Meganuclease, and EXZACT.
 - (b) Nucleotide-guided technologies recognise genomic locations through a nucleic acid-nucleic acid interaction, and include CRISPR/Cpf1, Argonaute, T-Gee, RTDS, KeyBase, and CRISPR/Cas9.
- (3417) The Parties argue that CRISPR/Cas9 and EXZACT do not compete closely with each other, in that the former is used predominantly for gene deletion and modification, while EXZACT is used predominantly for gene stacking/trait insertion.
- (3418) According to the Parties, ZFN is a high precision (and high cost) technology. This makes ZFN good for trait insertion, where precision is crucial. In contrast, ZFN is not well suited for gene editing, where the aim is to target many spots in the genome for editing or testing (instead of inserting a specific gene sequence that is responsible for a particular trait). CRISPR is lower precision (and also lower cost) technology. CRISPR is therefore suited for gene editing but not well suited gene stacking/trait insertion.
- (3419) [Quote from internal document].²²⁵⁰
- (3420) According to one competitor, "*CRISPR/Cas has the advantage over Zn Fingers for most applications: more flexible, inherent double strand cutting ability and fewer restrictions on targeted sequence. However, if one intends to accomplish an editing step without introduction of foreign nucleic acid, Zn Fingers would be suitable while CRISPR/Cas9 always need RNA associated with it.*"²²⁵¹
- (3421) Another competitor stated that "*Zinc Finger technology is far more complicated to use compared to CRISPR technology: much more difficult to be designed and also their delivery is more complex*"²²⁵².
- (3422) One research institute explained that "*Zinc Finger Nucleases and CRISPR/Cas9 are very different technologies for gene editing. Each one brings different features but in general the Broad Institute considers that CRISPR/Cas9 has several advantages which makes researchers very excited about it*".²²⁵³
- (3423) One scientific article on gene editing also explains that "*[t]he most rapidly emerging tool is a bacterial monomeric DNA endonuclease, known as Cas9 (CRISPR-associated protein 9), which can be targeted to a specific genomic sequence by an easily engineered 20 base pair (bp) RNA guide sequence that binds to its DNA target by Watson-Crick base-pairing Because of their large size, and the requirement for a*

²²⁵⁰ [Internal document] (ID6519-744).

²²⁵¹ Competitor's response to the Commission's request for information on gene editing (ID6530).

²²⁵² Competitor's response to the Commission's request for information on gene editing (ID6460).

²²⁵³ Agreed non-confidential minutes of a call with a competitor, 13 October 2016 (ID8510).

pair of proteins recognising anti-parallel DNA strands to induce a DSB, ZFNs and TALENs are less suited to multiplex gene editing".²²⁵⁴

(3424) Parties' documents and competitors' statements support the fact that ZFN and CRISPR/Cas9 are not similar technologies and may even be complementary in terms of a company portfolio.

2.3.2. *There are several alternative gene editing tools available which are at least as good as ZFN*

(3425) The Parties submit that the Transaction would not raise competition concerns in relation to the combination of Dow's and DuPont's gene editing technologies. In particular, the Parties consider that there are several other gene editing technologies available that compete on an equal footing with EXZACT and CRISPR/Cas9 and that other companies have introduced or will soon introduce seeds developed with gene editing technologies.

(3426) Based on information provided by the Parties, there are currently several companies, including seed companies, that are developing gene editing technologies for agriculture. The main efforts by seed competitors in the development of gene editing technologies are described below.

(3427) **Bayer.** Bayer CropScience entered into collaboration with Celectis in 2006 for access to Celectis' proprietary meganuclease technology for use in plant research and product development. Bayer extended the partnership in 2014 to access the TALENs technology for gene stacking and targeted mutagenesis applications and for collaborating to develop commercial canola traits. Bayer also has collaboration with Precision BioSciences around meganucleases and has successfully used the technology for trait stacking in cotton.

(3428) **Calyxt.** Calyxt uses TALENs technology developed by Celectis and at the University of Minnesota and is currently conducting field testing on improved starch potato seeds as of 2015.

(3429) **Cibus.** Cibus is a US-based company that has developed the Rapid Trait Development System (RTDS), a plant and microbial platform for precision gene editing and advanced non-transgenic breeding. RTDS enables site-specific edits of native traits with no introduction of foreign DNA. Cibus has launched its first commercial crop, SU Canola, a non-transgenic canola tolerant to sulfonylurea herbicides in the US.

(3430) **Limagrain.** In 2009, Celectis and Limagrain entered into a non-exclusive licence agreement on the use of the I-SceI meganuclease, an engineered nuclease, in plants.

(3431) **Monsanto.** Monsanto has access to the TALENs technology from the Two Blades Foundation and has generated TALENs recombinase hybrids for targeted transgene insertion in crops.

(3432) **Syngenta.** On 30 April 2016, Precision BioSciences announced that it has been working with Syngenta to develop advanced agricultural products using its proprietary ARCUS technology, a fully-synthetic engineered nuclease. Researchers at Syngenta have successfully used ARCUS to insert genes into desired locations in

²²⁵⁴ Belhaj, Chaparro-Garcia, Kamoun, Patron and Nekrasov (2015), "Editing plant genomes with CRISPR/Cas9", *Current Opinion in Biotechnology*, 32:76–84.

the corn genome. Moreover, Syngenta entered into a non-exclusive license agreement with the Two Blades Foundation in 2012 to access the TALENs technology for commercial use in certain crop plants.

- (3433) Others (Precision BioSciences, The Broad Institute, Cibus, Calyxt, Two Blades, etc.) are actively trying to license their technology. For example, KWS announced they licensed Two Blades technology and currently have positions open for gene editing. Additionally, Limagrain has a minority stake in KeyGene. The Broad Institute recently licensed its CRISPR technology to Monsanto.
- (3434) The Commission also considers, in light of the results of the market investigation, that there is a large number of alternatives.²²⁵⁵
- (3435) According to the results of the market investigation the Commission further considers that CRISPR is the current best technology available for gene editing. In one scientific article it is stated that "*[t]he major advantage of the CRISPR/Cas technology over ZFNs and TALENs is that the method does not require elaborate design and time-consuming assembly of individual DNA-binding proteins. In contrast, the CRISPR/Cas system is versatile and only requires a single Cas9 nuclease that can be programmed by engineering the sgRNA*".²²⁵⁶
- (3436) [Content from internal document].²²⁵⁷
- (3437) As for ZFN, competitors and the scientific literature on gene editing consider it to be equivalent or even inferior to some of the alternative technologies available. In particular one competitor explained that "*TALEN technology appears to come after the CRISPR technology but seems to be better than Zinc Finger*".²²⁵⁸ Scientific articles on these technologies also explain that "*there are more possible TALEN target sites (223) than ZFN target sites (3) in the gene pair, making TALEN the more flexible approach*".²²⁵⁹
- (3438) The Commission thus considers that despite CRISPR/Cas9 being currently the best gene editing technology, there are several other alternatives that the Parties' competitors have access to, including similar CRISPR/Cas9 technologies from other sources. Moreover, the ZFN of Dow does not seem to be the only or even the best alternative available to DuPont's CRISPR/Cas9.

2.3.3. *The Transaction would not be likely to diminish the Parties' incentives to license gene editing technologies to seed competitors*

- (3439) During the market investigation some competitors argued that the Transaction could reduce the Parties' incentives to license gene editing technologies to rival seed companies or, in any event, to license them at terms that would be less attractive than those offered pre-Transaction.
- (3440) According to one competitor, the Transaction would reduce its ability to leverage the separate ownership of the EXZACT and CRISPR/Cas9 technologies in its

²²⁵⁵ Competitors' response to the Commission's request for information on gene editing.

²²⁵⁶ Belhaj, Chaparro-Garcia, Kamoun, and Nekrasov (2013), "Plant genome editing made easy: targeted mutagenesis in model and crop plants using the CRISPR/Cas system", *Plant Methods*, 9-39.

²²⁵⁷ Parties' response to the Commission's request for information RFI 11, question 7.

²²⁵⁸ Competitor's response to the Commission's request for information on gene editing (ID6460).

²²⁵⁹ Sprink, Metje and Hartung (2015), "Plant genome editing by novel tools: TALEN and other sequence specific nucleases", *Current Opinion in Biotechnology*, 32:47-53.

negotiations with Dow and DuPont and therefore limit its ability to obtain the best possible terms for licensing agreements with Dow or DuPont.²²⁶⁰

(3441) The Commission considers this to be unlikely given that, as discussed in the previous section, there are other alternatives available in the market that competitors can use in order to leverage their negotiation positioning.

(3442) For instance, the TALENS technology is available for licensing from entities responsible for its development. According to one of these entities "*2Blades has been active in licensing its rights in the TALEN technology to a range of companies since 2011, including Life Technologies, Syngenta, Monsanto, Bayer, KWS, Mendel, DuPont-Pioneer, Cellectis and others.*"²²⁶¹

(3443) The same is true for institutes developing CRISPR technologies. According to one of these institutes, it "*is open to license its CRISPR/Cas9 technology on a non-exclusive basis outside the field of human therapeutics.*"²²⁶²

(3444) Moreover, [content from internal document]. However, many companies have not shown interest in this license. According to one of the main competitors of the Parties, "*as regard to Zinc Finger we have no interest.*"²²⁶³

2.3.4. *The Transaction would be unlikely to strengthen the Parties' IPR portfolio in relation to CRISPR/Cas technologies*

(3445) Although one competitor argued that "*[DuPont] has a strong IP portfolio for breeding major crop seeds through gene editing*" and that post-Transaction "*the new entity would have a dominant position in these new breeding technologies*",²²⁶⁴ the Commission considers that post-Transaction the merged entity will likely not have a materially stronger IPR portfolio for CRISPR/Cas technologies.

(3446) In fact, Dow's technology does not impede the development or use of CRISPR/Cas technology by others. Dow has no patents on the actual CRISPR enzymes, that is to say Dow could not impede the development or use of the technology. In contrast, there has been an exponential proliferation of CRISPR patent filings, with CRISPR journal publications increasing as well (324 articles in the last two years).

(3447) Indeed, there are several agricultural companies that use CRISPR technology for the development of plant products without any need of licensing Dow's IP (and Dow does not, and could not, restrict or prevent them from using CRISPR technology). Moreover, [content from internal document].

2.4. **Conclusions on gene editing**

(3448) For the reasons set out in Section VI.2.3.2 and the available evidence, the Commission considers that the Transaction would not significantly impede effective competition with respect to gene editing technologies.

²²⁶⁰ Questionnaire to Competitors Seeds (Q6), question 79.1.

²²⁶¹ Competitor's response to the Commission's request for information on gene editing (ID6830).

²²⁶² Agreed non-confidential minutes of a call with a competitor, 13 October 2016 (ID8510).

²²⁶³ Competitor's response to the Commission's request for information on gene editing (ID6460).

²²⁶⁴ Agreed non-confidential minutes of a call with a competitor, 10 June 2016 (ID8252).

SECTION VII: BUNDLING AND TYING IN CROP PROTECTION AND SEEDS

- (3449) During the Commission's investigation, concerns have been raised by stakeholders in relation to the risk that the combination of Dow's and DuPont's activities may increase the Parties' ability and incentives to foreclose competitors from access to the downstream distribution channel through the implementation of bundling and technical tying strategies.²²⁶⁵
- (3450) As regards the bundling of Dow's and DuPont's crop protection products and the bundling of crop protection products and seeds, the Commission has come to the view that it is not necessary for the purpose of this Decision to reach a conclusion on whether the Parties would have the ability and incentives to engage in a bundling strategy and on whether such a strategy would have a material effect on access to the distribution channel for the Parties' competitors. Indeed, the Parties' modest presence in the fungicides business and the limited size of the nematicides markets in the EEA as well as the scope of competition concerns identified in relation to herbicides and insecticides imply that any remedy addressing such concerns would *de facto* also address any concerns relating to a potential bundling strategy. This is because the overlaps in the downstream markets for herbicides and insecticides in the EEA would be mostly removed.
- (3451) In relation to concerns that the Parties post-Transaction could offer seeds and crop protection products optimised to be used together to the detriment of certain of their competitors who would not be able to replicate such a strategy, the Commission considers that the merged entity's ability to implement such strategies would not be significantly improved because any remedy addressing the concerns identified in relation to herbicides and insecticides would mostly eliminate the overlaps in the downstream markets for crop protection in the EEA and Dow is not adding a significant overlap in the seed markets in the EEA.

SECTION VIII: MATERIAL SCIENCE

- (3452) Material science refers to products, notably, performance plastics and material/chemicals that are derived from classical petrochemical products. The Parties sell performance plastics and materials/chemicals, which derive from the polymerisation of ethylene and propylene and are ultimately used in the packaging, transportation and construction industries.
- (3453) The activities of the Parties result in several horizontal overlaps (see Section VIII.1) and vertical links (see Section VIII.2). In particular, the Transaction concerns three horizontally affected markets, namely (i) acid co-polymers, (ii) ionomers, and (iii) maleic anhydride ("MAH") grafted polymers.

²²⁶⁵ Among others, Questionnaire to Customers Seeds (Q5), question 49; Questionnaire to Competitors Seeds (Q6), question 75; Questionnaire to Crop Protection Customers (Q1), question 87; Questionnaire to Crop Protection Competitors (Q2), question 72; Questionnaire to Competitors Seeds (Q6), question 68; Questionnaire to Customers Seeds (Q5), question 42; Questionnaire to Customers Seeds (Q5), question 49.3; Questionnaire to Competitors Seeds (Q6), question 75.3.

1. HORIZONTAL OVERLAPS

1.1. Acid Co-Polymers

1.1.1. Overview of the acid co-polymer market

- (3454) Ethylene is one of the base chemicals that belong to the olefin group (for example ethylene, propylene, butadiene, etc.). Polyethylene (“PE”) is a thermoplastic belonging to a group of polyolefins that also includes polypropylene. PE is derived from ethylene through a process of polymerisation, whereby PE-resins (such as acid co-polymers) are produced. During the polymerisation process, monomers are reacted with each other to produce long chains of repeated series of monomers, called polymers.
- (3455) PE, together with polypropylene, are among the world’s most widely used plastics. PE resins are used in downstream manufacture of consumer goods, namely films, packaging, bottles (for example, for milk and water), plastic bags, water and gas pipes, insulation for wire and cable, moulded products and other end uses.
- (3456) Within PE resins, three main families can be identified with varying characteristic properties:
- (a) Low density polyethylene (“LDPE”), which is manufactured by high pressure processes, that is to say in high-pressure autoclave or tubular reactors by free radical polymerisation;
 - (b) High density polyethylene (“HDPE”), which is manufactured by low pressure processes, that is to say gas-phase, solution and slurry processes; and
 - (c) Linear low density polyethylene (“LLDPE”), developed as a low-pressure manufacturing alternative to the high pressure LDPE processes.
- (3457) The Transaction concerns notably LDPE products manufactured by high pressure processes, in particular, acid co-polymers and ionomers.
- (3458) Acid co-polymers are produced through high pressure polymerisation of ethylene and a monomer, either (i) glacial acrylic acid (“GAA”), which results in ethylene acrylic acid (“EAA”) co-polymers; or (ii) glacial methacrylic acid (“GMAA”), which results in ethylene methacrylic acid (“EMAA”) co-polymers.
- (a) GAA is a clear, colourless liquid with a characteristic acrid odour. It is miscible with water, alcohols and ethers. It is produced by further purification of crude acrylic acid (“CAA”) either by additional crystallisation or distillation. Dow and DuPont use GAA in the production of their EAA co-polymers, sold under the brands Primacor (Dow) and Nucrel (DuPont).
 - (b) GMAA is produced by purifying crude methacrylic acid (“MAA”). The bulk of MAA is produced for the manufacturer’s own use, as it cannot be used as an end product. Rather, all producers process it into other methacrylic products, mainly GMAA. DuPont uses GMAA in the production of its EMAA co-polymers, sold under the brand Nucrel.

- (3459) Acid co-polymers are used in applications such as high performance sealants,²²⁶⁶ extrusion coating,²²⁶⁷ adhesive lamination,²²⁶⁸ adhesive tie layers,²²⁶⁹ impact modification/compounding,²²⁷⁰ and surfactants.²²⁷¹
- (3460) Dow is active in the production and sale of acid co-polymers, in particular an EAA product sold under the brand Primacor with acid contents between 3% and 20.5%. [Details on Dow’s sales strategy]. Dow produces acid co-polymers at its manufacturing facilities located in Tarragona (Spain) and Freeport (Texas, US). [Details on Dow’s production process].
- (3461) DuPont produces and sells acid co-polymers, in particular EMAA products and, to a lesser extent, EAA products under the brand Nucrel, with acid content between 9% and 19%. DuPont [details on DuPont’s production location(s)]. It produces its EAA and EMAA products in [details on DuPont’s production location(s)]²²⁷² [details on DuPont’s production location(s)],²²⁷³ [details on DuPont’s production location(s)]. [Details on DuPont’s production process].
- (3462) The sales of the Parties over the last three years [development of Parties’ sales over years] in terms of volume and value (see Table 83).

Table 83 – Acid co-polymers – Sales of the Parties

Supplier	Geography	Value (million EUR)			Volume (kt)		
		2013	2014	2015	2013	2014	2015
Dow	EEA	[...]	[...]	[...]	[...]	[...]	[...]
Dow	Worldwide	[...]	[...]	[...]	[...]	[...]	[...]
DuPont	EEA	[...]	[...]	[...]	[...]	[...]	[...]
DuPont	Worldwide	[...]	[...]	[...]	[...]	[...]	[...]

Source: Form CO, Part E, paragraph 208

²²⁶⁶ High performance sealants: In a multi-layer film, high performance sealants are included as an inner layer to seal against itself when the film is formed into a package.

²²⁶⁷ Extrusion coating is a process in which a thin layer of molten polymer is extruded (fed by gravity) onto the surface of a substrate material and then cooled to make a continuous coating.

²²⁶⁸ Adhesive lamination, in which a pre-made film of polymer is placed next to a substrate, and heat and pressure are then applied to produce adhesion.

²²⁶⁹ Tie layers are materials that bond two otherwise incompatible layers in a co-extrusion. Specifically, tie layers can be placed between two polymers that would not otherwise bind together through an extrusion process in order to create a multi-layered product.

²²⁷⁰ Impact modification is achieved by compounding a small amount of one polymer into the other. The result is a compound that is less rigid/prone to shatter on impact.

²²⁷¹ A surfactant is a substance that reduces the surface tension of a liquid and therefore allows it to foam or penetrate solids.

²²⁷² [Details on usage of DuPont’s production capacity].

²²⁷³ [Details on usage of DuPont’s production capacity].

1.1.2. Relevant market for acid co-polymers

1.1.2.1. Relevant product market

(A) Past product market definitions

(3463) The Transaction concerns notably LDPE products manufactured by high pressure processes. In *Arkema/Bostik*, the notifying party submitted that the market for LDPE products could be further segmented on the basis of the type of co-polymer and the type of reactor used in the manufacturing process, resulting in the following relevant markets: (i) the market for acid co-polymers, including a ter-polymer manufactured by Arkema (Lotader MAH), (ii) the market for epoxide ethylene co-polymers and (iii) the market for ethylene acrylate co-polymers. However, the Commission left open whether a subdivision of the LDPE market is appropriate or whether LDPE forms part of a larger product market.²²⁷⁴

(B) Parties' arguments

(3464) The Parties submit that a market definition containing at least all high pressure ethylene derivatives (the "LDPE family" or "HiPED") would be appropriate. The Parties argue that there is high supply-side substitutability between products in the LDPE family because they involve very similar production methods and some suppliers act as "swing producers"²²⁷⁵ between different products of the LDPE family.

(3465) Further, the Parties argue that there is significant demand-side substitutability between different products of the LDPE family and a high degree of inter-material competition from products from other families.²²⁷⁶ The Parties submit that in all of their applications acid co-polymers face actual or potential competition from other materials. In the case of multi-layer packages for juice, the Parties claim that PET bottles are increasingly popular and provide an additional alternative to using acid co-polymers or packages incorporating acid co-polymers.

(C) The Commission's assessment

(3466) The Commission's investigation analysed whether acid co-polymers constituted a separate market or whether they were part of a broader HiPED market and whether separate markets could be identified by product applications.²²⁷⁷

(3467) Following the market investigation, the Commission's view is that acid co-polymers constitute a separate product market from other LDPE products. While there is a certain degree of supply-side substitutability with some products within the LDPE family,²²⁷⁸ the Commission's investigation did not confirm the existence of substitutability on the demand-side.²²⁷⁹

²²⁷⁴ Commission Decision in Case M.7465 – *Arkema/Bostik* (2015), recital 32.

²²⁷⁵ According to the Parties, a supplier can swing capacity between different products in accordance with its business strategy and/or market conditions, or switch the dedicated use of a plant from one product to another.

²²⁷⁶ For example, LLDPE, metallocene LLDPE (including blends), plastomers, primers, polyurethane, acrylic adhesives, and others.

²²⁷⁷ Questionnaire to Material Science Customers (Q12), questions 14 to 21; Questionnaire to Material Science Competitors (Q17), questions 16 to 24.

²²⁷⁸ Questionnaire to Material Science Competitors (Q17), questions 22 and 22.1.

²²⁷⁹ Questionnaire to Material Science Customers (Q12), questions 17 and 18; Questionnaire to Material Science Competitors (Q17), questions 24 and 24.1.

(C.i) *Demand-side substitutability*

- (3468) Pursuant to the Commission Notice on Market Definition,²²⁸⁰ a relevant product market comprises all those products and services which are regarded as interchangeable or substitutable by the consumer by reason of the products' characteristics, their prices and their intended use.
- (3469) According to the Commission's market investigation, customers do not view other polyolefin products as substitutes of acid co-polymers for their applications.²²⁸¹ Acid co-polymers provide the best balance between performance and price for their intended uses. For example, other polyolefin products cannot achieve the same adhesion as acid co-polymers at the same cost level on polar substrates such as aluminium foil or metallised plastic film.²²⁸² Additionally, the majority of the customers that responded to the market investigation indicate that they would not purchase other polyolefin products if prices of acid co-polymers increased by 5% to 10%.²²⁸³
- (3470) Moreover, the composition and the technology used to produce acid co-polymers provide them with certain properties that are more difficult and more costly to replicate or achieve with other polyolefin products.²²⁸⁴
- (3471) First, the composition of acid co-polymers is relevant for their functionality and intended use, differentiating them from other LDPE products.²²⁸⁵ Acid co-polymers result from the polymerisation of ethylene with GAA or GMAA, resulting in EAA or EMAA co-polymers respectively. Figure 175 illustrates the key raw materials required for the production of acid co-polymers.

²²⁸⁰ Market Definition Notice, OJ C 372, 9.12.1997, page 5-13.

²²⁸¹ Questionnaire to Material Science Customers (Q12), questions 17 and 18. Only one distributor [...] replied affirmatively to the possibility of substituting acid co-polymers by other polyolefin products but did not provide examples of substitutability (see ID9126, questions 17 and 17.1).

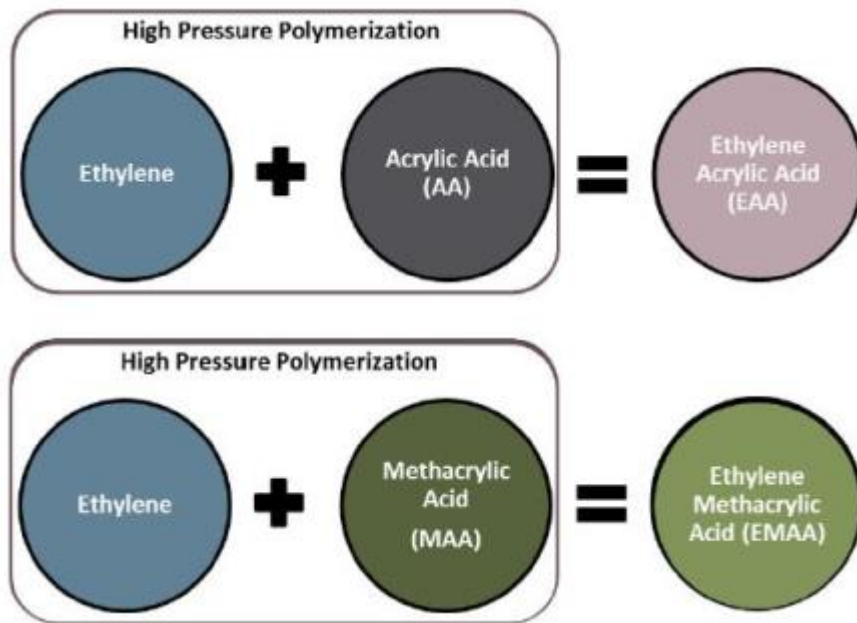
²²⁸² Questionnaire to Material Science Competitors (Q17), questions 24.1 and 24.2; Questionnaire to Material Science Customers (Q12), question 17.

²²⁸³ Questionnaire to Material Science Customers (Q12), question 18.

²²⁸⁴ Questionnaire to Material Science Customers (Q12), question 17.

²²⁸⁵ Questionnaire to Material Science Customers (Q12), question 17.

Figure 175 – Acid co-polymers – Composition



Source: Form CO, Part E, paragraph 192

- (3472) The composition of acid co-polymers determines their polarity. Polarity is an important feature since it drives adhesion to polar substrates (such as metal or cellulose). The higher the level of acid in the acid co-polymer, the higher the level of adhesion between the acid co-polymer and the polar substrate,²²⁸⁶ which influences their functionality and intended use.
- (3473) The Commission also investigated whether further subdivision of the market would be appropriate based on the applications for which acid co-polymers can be used, the monomer on which the acid co-polymer is based or the level of acid content of the acid co-polymer.²²⁸⁷ There are some differences between EAA and EMMAA co-polymers in terms of acid content and functionality. For example, a higher EMMAA acid content percentage is required to achieve properties that can be achieved with a lower EAA acid content percentage.²²⁸⁸ However, for the purpose of this Decision, whether the acid co-polymer market should be further segmented or not does not change the overall analysis of the effects of the Transaction.
- (3474) Second, the technology used to produce acid co-polymers also contributes to provide them with some of the properties that differentiate acid co-polymers from other LDPE products.

²²⁸⁶ Parties' response to the Commission's request for information RFI 3, question 28 (ID823).

²²⁸⁷ Questionnaire to Material Science Customers (Q12), questions 14, 14.1, 15 and 19; Questionnaire to Material Science Competitors (Q17), questions 16, 17 and 18; Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 6 (ID8251); Parties' response to the Commission's request for information RFI 3, question 28 (ID823).

²²⁸⁸ Parties' response to the Commission's request for information RFI 3, question 28 (ID823).

- (3475) Acid co-polymers are produced [information extracted from confidential external market report].²²⁸⁹ [...] the acid co-polymer suppliers uses tubular reactors to manufacture acid co-polymers.²²⁹⁰ This is mainly due to the sticky nature of acid co-polymers and the high pressure requirements. The Parties also indicated that autoclave reactors [Parties' production know-how].²²⁹¹
- (3476) Finally, the Parties claimed that packaging suppliers are increasingly turning to PET bottles, glass bottles, aluminium cans and other alternatives to acid co-polymers, in part due to their cost. However, the market investigation does not support this claim.²²⁹²
- (C.ii) Supply-side substitutability*
- (3477) From a supply-side perspective, acid co-polymers are produced using autoclave technology instead of tubular technology due to its size (namely production capacity) and because the production process is easier to control.
- (3478) The market investigation indicates that producers of acid co-polymers are able to switch between the manufacture of acid co-polymers and the manufacture of certain LDPE products, in particular high EVA and homo-polymer LDPE.²²⁹³
- (3479) However, the Parties recognise and the market investigation confirms that switching production comes at a significant cost, takes time and may not be an interesting business opportunity for the production of acid co-polymers with acid content of 10% or more.²²⁹⁴
- (3480) The Parties estimated that a plant already producing EVA (especially with high VA content) or homo-polymer LDPE could run acid co-polymer campaigns or be fulltime dedicated to produce acid co-polymers, with (i) additional investments in equipment (approximately EUR [...]), (ii) significant on-going maintenance costs (approximately USD [...] per year) and (iii) additional engineering and construction costs.²²⁹⁵ A customer's estimations point at [...] costs: around USD 40 to 60 million to make a current LDPE production asset capable of handling acid.²²⁹⁶
- (3481) Moreover, the production of polymers involving acidic or otherwise corrosive comonomers require corrosion resistance or corrosion management in the reactors and related equipment depending on the acid content of the materials being produced and also the amount of time which the reactor is running production involving acid.

²²⁸⁹ Parties' response to the Commission's request for information RFI 13, Annex Q.19.1 (ID3952-3) pages 2-16 ("CMR industry report (Global Acid Co-Polymers)": [quote from confidential external market report].

²²⁹⁰ Form CO, part E, paragraph 291; Agreed non-confidential minutes of a call with a competitor, 14 September 2016, paragraph 3, ID8622; Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 11, ID8251.

²²⁹¹ Form CO, part E, Annex E.6.8.

²²⁹² Questionnaire to Material Science Customers (Q12), question 46.

²²⁹³ Questionnaire to Material Science Competitors (Q17), questions 33.1 and 33.2.

²²⁹⁴ Parties' response to the Commission's request for information RFI 3 (ID823), question 35; Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 16 (ID8251).

²²⁹⁵ The costs could be significantly higher for acid co-polymers with an acid content of 10% or more. Parties' response to the Commission's request for information RFI 3 (ID823), question 35.

²²⁹⁶ Agreed non-confidential minutes of a call with a customer, 13 April 2016, paragraph 13 (ID4149).

(3482) Furthermore, while there is a theoretical (and limited) degree of supply-side substitutability with some products within the LDPE family,²²⁹⁷ the market investigation shows that there have been no entries in the market in the last three years and none is expected in the next two.²²⁹⁸

(D) Conclusion on the relevant product market for acid co-polymers

(3483) In light of the market investigation and the information available to it, for the purpose of assessing the Transaction, the Commission considers that the relevant product market is the overall acid co-polymer market. However, the Commission will leave open whether such a market could be further sub-divided based on different product applications, the monomer on which the acid co-polymer is based or the level of acid content of the acid co-polymer.

1.1.2.2. Relevant geographic market

(A) Past decisional practice

(3484) As regards the geographic market, in its previous decisions the Commission has considered the relevant geographic market for LDPE to be at least EEA-wide in scope.²²⁹⁹ However, the Commission has not specifically analysed the geographic market for acid co-polymers.

(B) Parties' arguments

(3485) The Parties submit that the geographic market for acid co-polymers could be global and is at least EEA-wide in scope.²³⁰⁰

(C) The Commission's assessment

(3486) The acid co-polymer market is a geographically differentiated market, influenced by the proximity of suppliers to the geographic areas where customers are located.

(3487) Customers favour suppliers with plants or sales offices located in the proximity of their own plants. The market investigation indicated that the majority of customers purchase acid co-polymers at European level from Dow, Ineos or ExxonMobil²³⁰¹ and [details on DuPont's production location(s)], DuPont, [details on DuPont's production location(s)].

(3488) The market investigation indicates that importing and exporting acid co-polymers is possible and economically viable. However, there are challenges.²³⁰² Transport costs within the EEA can represent for some customers up to 6%-7% of total costs,²³⁰³

²²⁹⁷ Questionnaire to Material Science Competitors (Q17), questions 22 and 22.1.

²²⁹⁸ Questionnaire to Material Science Customers (Q12), questions 35 and 36; Questionnaire to Material Science Competitors (Q17), questions 36 and 37.

²²⁹⁹ Commission Decision in Cases M.7465 – Arkema/Bostik (2015), recital 34; M.1671 – Dow Chemical/Union Carbide (2000), recitals 46-48; IV/M.550 – Union Carbide/Enichem (1995), recitals 48 and 49; IV/M.1041 – BASF/Shell (1997), recital 37; and IV/M.1163 – Borealis/IPIC/OMV/PCD (1998), recital 16.

²³⁰⁰ Form CO, part E, paragraph 221.

²³⁰¹ Questionnaire to Material Science Customers (Q12), questions 22 and 22.1; Agreed non-confidential minutes of a call with Anonymous, 18 July 2016, paragraph 3 (ID8244).

²³⁰² Questionnaire to Material Science Customers (Q12), questions 24 and 25; Questionnaire to Material Science Competitors (Q17), questions 27 and 28.

²³⁰³ Questionnaire to Material Science Customers (Q12), question 23.

while transport costs from outside the EEA are higher, representing up to [...] % of total acid co-polymers costs.²³⁰⁴

(D) Conclusion on the relevant geographic market for acid co-polymers

(3489) In light of the market investigation and the information available to it, for the purpose of assessing the Transaction, the Commission considers that the relevant geographic market is at least EEA-wide.

1.1.3. *Competitive assessment on acid co-polymers: non-coordinated effects*

1.1.3.1. Overview of the acid co-polymer market

(3490) According to the market investigation, acid co-polymers are a concentrated market with four main players: Dow, DuPont, ExxonMobil, and Ineos. In 2015, the volume of the acid co-polymers sold in the EEA amounted to approximately [40-50] kt and, at a worldwide level, amounted to [150-200] kt.²³⁰⁵

(3491) Dow and DuPont are the main acid co-polymer players at a worldwide level, followed by ExxonMobil and Ineos.²³⁰⁶

(3492) ExxonMobil is a large petrochemical company incorporated in the US and present worldwide. It produces acid co-polymers, in particular an EAA product called Escor available with acid content up to 15%. The uses of this product include liquid aseptic and dry food packaging, lamitubes and cable shielding. ExxonMobil has one plant in the EEA (Antwerp, Belgium) with two autoclave reactors, one of which is dedicated to acid co-polymers, and two autoclave reactors in Baton Rouge (Louisiana, US) that used to be dedicated to acid co-polymers and are currently dedicated to acrylate co-polymers and EVA.

(3493) Ineos is a global manufacturer of petrochemicals, speciality chemicals and oil products. It produces acid co-polymers, in particular an EMAA product called Novex with acid content up to 8%. The uses of this product include extrusion coating. Ineos has one plant in Cologne (Germany) with an autoclave reactor dedicated to acid co-polymers.

(3494) The Parties submit that Arkema and LyondellBasell are present in the acid co-polymer market. However, the market investigation confirms that neither Arkema nor LyondellBasell sold EAA or EMAA co-polymers in 2015 in the EEA or worldwide.

(3495) Arkema manufactures and sells Lotader and Norsocryl. These products are not acid co-polymers as defined in Section VIII.1.1.2.1. Arkema's Lotader brand includes a product range of reactive ter-polymers composed of ethylene, maleic anhydride and either methyl acrylate, butyl acrylate or ethyl acrylate.²³⁰⁷ According to Arkema, "*Lotader is sold in niche applications where its performance cannot be matched by*

²³⁰⁴ Form CO, part E, paragraph 86.

²³⁰⁵ A figure between brackets and marked with an asterisk indicates that it has been redacted due to confidentiality reasons.

²³⁰⁶ Agreed non-confidential minutes of a call with a customer, 13 April 2016, paragraph 14 (ID4149); Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 10 (ID8251). The market investigation indicates that some customers purchase acid co-polymers from "Other" companies. Respondents indicated that by "Others", they referred to distributors and not to additional acid co-polymer producers. See, for example, Questionnaire to Material Science Customers (Q12), questions 11.1 and 13.

²³⁰⁷ Arkema's website: <http://www.lotader.com/en/lotadersup-sup/> (ID9637).

*acid copolymers. [...] Lotader have [sic] the additional advantage of not being corrosive while acid copolymers are corrosive in some conditions.*²³⁰⁸ Arkema's Norsocryl brand includes a product range of homo-polymers composed of either 2-ethylhexylacrylate, acrylic acid, butyl acrylate, ethyl acrylate or methyl acrylate.²³⁰⁹

- (3496) In turn, LyondellBasell manufactures and sells Lucalen. Lucalen is not an acid copolymer as defined in Section VIII.1.1.2.1. Lucalen is a trade name for low/medium/high density product composed of ethylene, acrylate copolymers and either butyl acrylate or acrylic acid.²³¹⁰

1.1.3.2. Market shares

- (3497) According to the Parties' estimates, post-Transaction, Dow and DuPont would be the largest supplier of acid co-polymers in the EEA with a combined market share of [20-30]% by volume (Dow [10-20]%, DuPont [10-20]%) and worldwide with a combined market share of [40-50]% by volume (DuPont [30-40]%, Dow [10-20]%). The market investigation indicates that the market shares of the Parties in the EEA and worldwide are higher than indicated in the Form CO; and the market share increments that the Transaction would bring about are significant.
- (3498) According to the Commission's market investigation, there are four acid co-polymer manufacturers in the EEA: Dow, DuPont, ExxonMobil and Ineos. At a worldwide level, the CMR industry report (Global Acid Co-Polymers) indicates that [information extracted from confidential external market report].²³¹¹
- (3499) In Table 84 and Table 85, the Commission re-constructed the market shares of the Parties in the EEA and worldwide based on the information collected during the market investigation. The volume of sales of the four acid co-polymer suppliers in 2015 in the EEA [development of Parties' sales over years]. At a worldwide level, DuPont's and Ineos' sales [development of DuPont's sales over years]. In the last three years, [development of DuPont's sales over years]; Ineos' sales increased in volume by [30-40]% and in value by [25-35]%.

²³⁰⁸ Agreed non-confidential minutes of a call with a competitor, 18 April 2016, paragraph 10 (ID884).

²³⁰⁹ Arkema's website: <http://www.arkema.com/en/products/product-finder/range-viewer/Norsocryl-acrylic-monomers/2/> (ID9634).

²³¹⁰ LyondellBasell's website: <https://www.lyondellbasell.com/en/products-technology/polymers/trade-name/lucalen/> (ID9635).

²³¹¹ [Information extracted from confidential external market report]. Source: CMR industry report (Global Acid Co-Polymers), pages 2-16 and 3-5 (ID3952-3).

Table 84 – Acid co-polymers – EEA estimated shares of sales (2015)

Suppliers	2015			
	Volume (kt)	%	Value (million EUR)	%
Dow	[...]	[20-30]%	[...]	[20-30]%
DuPont	[...]	[10-20]%	[...]	[20-30]%
Combined	[...]	[30-40]%	[...]	[40-50]%
ExxonMobil	[...]	[20-30]%	[...]	[20-30]%
Ineos	[...]	[35-45]%	[...]	[20-30]%
Total	[...]	100%	[...]	100%

Source: Form CO, Part E and Commission's market investigation

Table 85 – Acid co-polymers – Worldwide estimated shares of sales (2015)

Supplier	2015			
	Volume (kt)	%	Value (million EUR)	%
Dow	[...]	[10-20]%	[...]	[20-30]%
DuPont	[...]	[40-50]%	[...]	[40-50]%
Combined	[...]	[50-60]%	[...]	[60-70]%
ExxonMobil	[...]	[10-20]%	[...]	[10-20]%
Ineos	[...]	[10-20]%	[...]	[10-20]%
Others ²³¹²	[...]	[5-10]%	[...]	[5-10]%
Total	[...]	100%	[...]	100

Source: Form CO, Part E and Commission's market investigation

(3500) In terms of capacity, the Parties control [50-60]% (~[...]) of the worldwide production capacity of acid co-polymers, that is almost [...] the capacity of Ineos and more than [...] ExxonMobil's capacity.²³¹³

²³¹² The CMR industry report (Global Acid Co-Polymers) (ID3952-3) mentions [information extracted from confidential external market report]. However, the market investigation has not confirmed the existence of these "Other" suppliers of acid co-polymers.

²³¹³ [Details on one of the Parties' production location(s) and EEA market share]. Therefore, the Commission will analyse production capacity at a worldwide level to have a more accurate picture of the position of the Parties.

Table 86 – Acid co-polymers – Worldwide capacity (2015)

Worldwide	2015	
	Volume (kt)	Market Share (%)
Dow	[...]	[20-30]%
DuPont	[...]	[30-40]%
<i>Combined</i>	<i>[...]</i>	<i>[50-60]%</i>
ExxonMobil	[...]	[10-20]
Ineos	[...]	[20-30]
Others	[...] ²³¹⁴	[10-20]%
Total	[...]	100%

Source: Form CO, Part E and Commission's market investigation

(3501) When taking into account the swing capacity as estimated by the Parties namely capacity currently allocated to other products that could be swung to produce acid co-polymers, Dow and DuPont still control more than [50-60]% of the worldwide production capacity, which is more than [...] the capacity of their competitors.

Table 87 – Acid co-polymers – Worldwide actual and potential swing capacity (2015)

Worldwide	2015	
	Volume (kt)	Market Share (%)
Dow	[...]	[5-10]%
DuPont	[...]	[40-50]%
<i>Combined</i>	<i>[...]</i>	<i>[50-60]%</i>
ExxonMobil	[...]	[20-30]%
Ineos	[...]	[20-30]%
Others	[...] ²³¹⁵	[0-5]%
Total	[...]	100%

Source: Form CO, Part E and Commission's market investigation

1.1.3.3. Parties' arguments

(3502) The Parties argue that the Transaction would not give rise to a significant impediment of effective competition in relation to acid co-polymers, either at the EEA-level or at a worldwide level. The Parties' views can be summarised as set out below.

²³¹⁴ Parties' response to the Commission's request for information RFI 29, Annex RFI29 Q.1.A [internal document] (ID5744).

²³¹⁵ Parties' response to the Commission's request for information RFI 29, Annex RFI29 Q.1.A [internal document] (ID5744).

- (3503) First, according to the Parties, there is effective in-kind competition from well-resourced competitors that have sufficient unused capacity to expand production and would do so if acid co-polymer prices/profitability increased or prices/profitability of certain other products decreased. The combined market shares of the Parties in the EEA reflect [details on DuPont’s market position in the EEA].
- (3504) Second, the Parties claim that there is effective competition from materials other than acid co-polymers. This is referred to as “not-in-kind” or “inter-material” competition. Acid co-polymers are used across a variety of applications. In all of their applications, acid co-polymers face actual or potential competition from rival materials, such as those produced by Arkema and LyondellBasell.
- (3505) Third, the Parties are not close competitors. There are a number of differences between the Parties’ products and the focus of the Parties’ businesses.
- (3506) Fourth, the Parties claim that they face close competition from other suppliers. The Parties submit that customers could switch to those other suppliers since they have sufficient spare or swing capacity.
- (3507) Fifth, there is a threat of expansions and entry. The Parties point at Repsol and Westlake as examples of companies likely to expand acid co-polymer capabilities. There is also a threat of entry as high vinyl acetate ethylene (“high-VA EVA”) or acrylate co-polymer suppliers with an autoclave reactor could use capacity to run acid co-polymer campaigns.
- (3508) Sixth, customers have buyer power. According to the Parties, [details on Parties’ customers and their purchasing pattern].
- (3509) In terms of sponsoring entry or expansion, the Parties [details on Parties’ customers and their purchasing pattern].²³¹⁶ As regards leveraging purchasing power, the Parties [details on Parties’ customers and their purchasing pattern].

1.1.3.4. The Commission’s assessment

- (3510) For the reasons set out in this section, the Commission considers that the Transaction would be likely to lead to a significant impediment to effective competition in the acid co-polymer market due to non-coordinated effects, in particular by removing an important competitive constraint.
- (A) Competition between the Parties would be lost
- (3511) The Transaction would lead to a reduction of the number of suppliers of acid co-polymers in the EEA from four to three. The loss of competition between the Parties would lead to an increase of market power of the merged entity due to the closeness of the Parties, and the inability of the two remaining competitors to influence the incentives of the Parties to raise prices.
- (A.i) *The Parties are close competitors*
- (3512) The market investigation confirms that the Parties are close competitors. The majority of customers that responded to the Commission’s market investigation consider the Parties as the closest competitors with regard to EEA.²³¹⁷

²³¹⁶ According to the Parties, possible sponsors of market entry could include [...] and [...], in addition to [...] (Form CO, part E, footnote 167).

²³¹⁷ Questionnaire to Material Science Customers (Q12), question 27.

- (3513) Therefore, the Transaction would eliminate an important competitive constraint from the market. Dow and DuPont have wider portfolios than their two remaining competitors. DuPont is able to supply customers a wide variety of acid co-polymer grades (from acid co-polymers with low to high acid content to proprietary grades). DuPont sells EMAA co-polymers with an acid content up to 19%²³¹⁸ and EAA co-polymers with an acid content up to 9.5%.²³¹⁹ Dow also sells a broad variety of EAA co-polymers with acid content up to 20.5%.²³²⁰ However, ExxonMobil and Ineos have a more limited variety of acid co-polymers than the Parties.
- (3514) For example, with regard to high acid content acid co-polymers, the Parties acknowledge that the Transaction would reduce from three to two the number of competitors able to produce and supply acid co-polymers with high acid content, the merged entity (Dow and DuPont) and ExxonMobil.²³²¹ However, ExxonMobil has a more limited portfolio than the merged entity, composed of only two different high acid content EAA co-polymers (Escor 11% and 15%).²³²² Moreover, the Parties²³²³ and Ineos²³²⁴ confirm that producing acid co-polymers with high acid content is a more costly and complex endeavour than producing acid co-polymers up to 10% acid content. In fact, Ineos does not currently have the ability to produce high acid content acid co-polymers (its highest acid grade is 8%).
- (3515) The Parties submit that their high acid content acid co-polymers do not compete given that Dow's products are used for surfactant applications (acid content >19.5%) and are not suitable for compounding/impact modifications, the main application for which DuPont's high acid content products are used.²³²⁵ However, the applications for which Dow's high acid content acid co-polymers are marketed, for instance Primacor 5980I (20.5%), Primacor 5990I (20%) or Primacor 5986 (20.5%), are broader than surfactant applications and are applications for which DuPont's acid co-polymers could be used or are used, such as heat sealing.²³²⁶ Moreover, Dow has sold

²³¹⁸ Acid co-polymers with acid content above 10% are considered to have high acid content.

²³¹⁹ Form CO, part E, paragraph 217; see also DuPont's website: http://www.dupont.com/content/dam/dupont/products-and-services/packaging-materials-and-solutions/packaging-materials-and-solutions-landing/documents/nucrel_overview.pdf.

²³²⁰ Form CO, part E, paragraph 217; see Dow's website: <http://www.dow.com/en-us/packaging/products/primacor>.

²³²¹ Parties' response to the first Letter of Facts, paragraph 232 (ID10770).

²³²² See ExxonMobil's website: <http://www.exxonmobilchemical.com/Chem-English/brands/escor-eaa-grades-and-datasheets.aspx?QM=40:1078~60:358&RBFLT=86044:5&PG=1&PGSIZE=20&CULTURE=en-US&S=&USERID=1422176&I=58933&UNIT=0&C=Default&SORT=&ln=productsservicesb> (ID9645).

²³²³ Parties' response to the Commission's request for information RFI 3 (ID823), question 35.

²³²⁴ Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 16 (ID8251).

²³²⁵ Response to the Statement of Objections, paragraph 232 (ID10020).

²³²⁶ Form CO, Part E, paragraphs 46-76, 102-131; First Letter of Facts, paragraphs 179-184 (ID10566); Dow's website, Primacor 5980I Technical information at <http://www.dow.com/enus/packaging/products/primacor> (ID10514); Dow's website, Primacor 5990I Technical information at <http://www.dow.com/enus/packaging/products/primacor> (ID10515); Dow's website, Product Selection Guide – Technical information: <http://msdssearch.dow.com/PublishedLiteratureDOWCOM/dh0284/0901b80380284d1c.pdf?filepath=elastomers/pdfs/noreg/072-13201.pdf&fromPage=GetDoc> (ID10516); DuPont's website, Nucrel – Grade Selection Guide at http://www.dupont.com/content/dam/dupont/products-and-services/packaging-materials-and-solutions/packaging-materials-and-solutions-landing/documents/nucrel_overview.pdf (ID10513).

in the past, as well as in 2016, high acid content acid co-polymers with acid content higher than 9.7% and higher than 20%.²³²⁷

(3516) Furthermore, after the Transaction, the merged entity would combine the number one producer of EMAA co-polymers (DuPont) with the number one supplier of EAA co-polymers (Dow). The two remaining players only produce one of them: ExxonMobil sells EAA co-polymers and Ineos sells EMAA co-polymers. According to the market investigation, from the supply side, switching production from EAA to EMAA requires a significant investment. Different equipment is required to handle GAA or GMAA (for example new tanks, storage capacity, handling facility, equipment for the polymerisation of the monomer, etc.), and different reactor settings are also required. This was confirmed by ExxonMobil²³²⁸ and Ineos.²³²⁹ Additionally, none of the suppliers that currently produce one type of acid co-polymers report switching between EAA and EMAA production.²³³⁰

(3517) Additionally, some customers of the Parties indicate that the Transaction would be likely to result in a reduction of the available acid co-polymer products due to the overlaps between the portfolios of the Parties.²³³¹

(A.ii) Increase of market power of the merged entity

(3518) The Transaction would result in the combination of DuPont, which is the supplier with the highest level of sales and the highest production capacity worldwide (see Table 86 and Table 87) and Dow, which is the number one supplier of EAA co-polymers and [...] with manufacturing plants [...] acid co-polymers located in the EEA and in the US. As a result of this combination, the merged entity would significantly increase its market power and the Transaction would eliminate an important competitive constraint.

(3519) DuPont's total sales of acid co-polymers [details on DuPont's sales and production level]. After the Transaction, Dow's production would be added to DuPont's. As a result, the level of the production of the Parties would be [...] their competitors'. Moreover, production in different plants and different regions across the globe would increase the supply reliability and flexibility that the merged entity would be able to offer its customers, which its competitors are not currently able to match.

(3520) The merged entity would have the largest production capacity. After the Transaction, Dow's capacity would be added to DuPont's. The market investigation points to the existence of balance between capacity and demand in the acid co-polymer

²³²⁷ First Letter of Facts, paragraph 183 (ID10566); Parties' response to the First Letter of Facts, paragraph 232 (ID10770).

²³²⁸ ExxonMobil initially stated in a call that that switching to EMAA from EAA is possible with minimal investment and that it would require building a new tank (Agreed non-confidential minutes of a call with a competitor, 15 April 2016, paragraph 16 (ID8250)); however, this statement was later corrected in its response to the eQuestionnaire (see ExxonMobil's response to Questionnaire to Material Science Competitors (Q17) dated 6 July 2016, question 21 (ID6897)).

²³²⁹ Questionnaire to Material Science Competitors (Q17), question 21.2 (ID5012).

²³³⁰ Questionnaire to Material Science Competitors (Q17), question 21.2 (ID5012).

²³³¹ Questionnaire to Material Science Customers (Q12), question 82.1.1: "[w]e do expect that [...] the product portfolio of the combined company would be consolidated [...]"(ID9120); "[t]here exists high risk of reduction of product [p]ortfolio causing the cancellation of current resin (sic) grades" (ID9167); "[t]here is a certain risk of product consilidation [sic] of the combined product portfolio" (ID9389).

market;²³³² however, it also indicates that in the next two years some customers expect capacity restrictions²³³³ and one of the key acid co-polymer customers described the market as capacity constrained.²³³⁴

(3521) Moreover, the remaining competitors in the post-Transaction market would not have capacity comparable to that of the merged entity and would not be able to accommodate all or part of their customers in case of price increases²³³⁵ without incurring significant costs derived from using potential swing capacity (see recitals (3480) and (3501) and Table 87).

(3522) Post-Transaction, Dow's plants in the EEA and the US would be added to DuPont's plants in [details on DuPont's production location(s); information extracted from confidential external market report].²³³⁶ The merged entity would be able to supply customers from their own regions. This is of particular relevance since the market investigation indicated that customers prefer procuring acid co-polymers from plants within their proximity.²³³⁷ After the Transaction, the merged entity would be the number one supplier of acid co-polymers with [details on the Parties' production location(s)].

(B) Customers have limited possibilities of switching suppliers

(3523) The Transaction would result in the reduction of customers' choice of supplier from four to three and even further. The acid co-polymer market is highly concentrated.²³³⁸ Customers perceive the market as monopolistic²³³⁹ and prone to dominant behaviours.²³⁴⁰ There are only four relevant sources of acid co-polymers.

(3524) The method of procurement used in the acid co-polymer market reduces supply alternatives and imposes time delays to switch suppliers. The majority of customers require suppliers to go through a qualification process before they buy from them.²³⁴¹ Customers qualify products with a set of specifications, such as the base monomers used to produce the acid co-polymer (GAA, GMAA). Customers tend to qualify two to three suppliers per product, if they exist but not all suppliers present in the market

²³³² Questionnaire to Material Science Customers (Q12), question 38; Questionnaire to Material Science Competitors (Q17), question 40.

²³³³ Questionnaire to Material Science Customers (Q12), question 39.

²³³⁴ Agreed non-confidential minutes of a call with a customer, 13 April 2016, paragraph 15 (ID4149).

²³³⁵ In 2015, Dow and DuPont sold [...] worldwide out of a combined production capacity of [...], while Ineos and ExxonMobil sold [60-70] kt out of a combined production capacity of [75-85] kt. The competitors of the Parties would only be able to accommodate [10-20] kt of the demand of the Parties' customers after supplying their own customers.

²³³⁶ CMR industry report (Global Acid Co-Polymers), pages 5-9 (ID3952-3).

²³³⁷ Questionnaire to Material Science Customers (Q12), question 22.

²³³⁸ Questionnaire to Material Science Competitors (Q17), question 114.2.1: "*The production and sales of these acid copolymer products will be in the hands of one actor with very high market share and hence will heavily influence the market conditions*" (ID5012); Questionnaire to Material Science Customers (Q13), question 67.1.1: "*DuPont has a USP at tie layer with Nucrel and with Surlyn at high seal applications. Alternativ [sic] products which DOW has started to launch, will disappear. The monopolistic structure will be fixed for long, as new suppliers are not visible*" (ID9342).

²³³⁹ Questionnaire to Material Science Customers (Q12), question 82.1.1: "*With this merger tho (sic) monopol (sic) situation will be fixed for a long time, as we see no other competitor*" (ID9343).

²³⁴⁰ Questionnaire to Material Science Customers (Q12), question 87: "*In the past we have experienced already a monopolistic behaviour of the respective suppliers, DOW and DuPont and therefore we expect the situation getting worse*" (ID9343).

²³⁴¹ Questionnaire to Material Science Customers (Q12), question 41.

because the qualification process takes time and economic resources.²³⁴² The qualification process may take between six months to up to 2-3 years, depending on the customer's own preferences and the specific application for which the products will be used, such as food and pharmaceutical products.

- (3525) Post-Transaction, customers that have only qualified Dow, DuPont or both products would have limited alternative suppliers (Ineos or ExxonMobil) and the qualification process would prevent an immediate replacement of the customer's supplier.
- (3526) The Parties submit that [details on Dow's customers and sales] (see Table 83). The market investigation confirms that the majority of customers have not switched suppliers in the last five years.²³⁴³
- (3527) In conclusion, as a result of the Transaction, customers would have limited possibilities of switching suppliers.
- (C) Acid co-polymer competitors would be unlikely to sufficiently increase output to discourage price increases
- (3528) The Transaction would eliminate an important competitive constraint, combining two key suppliers of acid co-polymers. Post-Transaction, the merged entity would only compete with Ineos and ExxonMobil. Based on the market investigation and the information submitted by the Parties, the Commission concludes that there would be a lack of competitive pressure from other acid co-polymer suppliers and they would be unlikely to increase supply in case of price increases. In the past, Ineos and ExxonMobil have not been able to use their production capacity to increase their sales and supply customers of the Parties [details on Parties' sales strategy].
- (3529) The Parties have [...] the capacity of their competitors in terms of actual or swing capacity. The Parties control [50-60]% (~[...]) of the worldwide production capacity of acid co-polymers. Even when considering swing capacity, the Parties have more than [50-60]% of worldwide production capacity.
- (3530) [Internal assessment].²³⁴⁴
- (3531) According to the market investigation, the average worldwide prices of Dow's and DuPont's acid co-polymers were [...] than the prices of their competitors'. Based on the type of acid co-polymer: (i) the average worldwide price of Dow's EAA co-polymers was [...] than the price of [product of competitor] and (ii) the average worldwide price of DuPont's EMAA co-polymers was [...] than the price of [product of competitor].
- (3532) [Details on Parties' pricing of acid co-polymers].²³⁴⁵ [...], the sales of Ineos and ExxonMobil have not significantly increased ([<5] kt in the EEA and [5-10] kt worldwide),²³⁴⁶ namely customers have not switched their source of supply [details on Parties' sales strategy].

²³⁴² Questionnaire to Material Science Customers (Q12), question 32.

²³⁴³ Questionnaire to Material Science Customers (Q12), question 30.

²³⁴⁴ Parties' response to the Commission's request for information RFI 1, question 18, Annex 18.5, [internal document] (ID340), slide 28.

²³⁴⁵ Form CO, part E, Annex E.6.4; Agreed non-confidential minutes of a call with a customer, 31 May 2016, paragraph 10 (ID381).

²³⁴⁶ Questionnaire to Material Science Competitors (Q17), question 9; Response to request for information to competitors, question 1 (ID8946).

- (3533) Furthermore, customers expect the Transaction to affect prices of polyolefin products negatively (that is price increases are expected) due to the decrease of competition and the increase of power of the Parties.²³⁴⁷ Additionally, Dow’s pricing policy is considered aggressive.²³⁴⁸ Some customers manifested that prices in the acid co-polymer market are driven by suppliers (namely when a supplier increase prices, the others tend to follow).²³⁴⁹
- (3534) In conclusion, post-Transaction, the current inability of Ineos and ExxonMobil to sufficiently increase output to discourage price increases would be unlikely to change. Post-Transaction, the merged entity would have more power to determine prices of acid co-polymers and modify them unilaterally.
- (D) The Parties face limited competitive pressure from not in-kind competition
- (3535) According to the market investigation, not-in-kind competition exercises very limited competitive pressure in the market for acid co-polymers and would not be able to replace the competitive constraint that would disappear from the market as a result of the Transaction.
- (3536) The majority of customers do not consider it possible to substitute acid co-polymers with other polyolefin products for their applications. From all respondents, only one distributor [...] considered such substitution possible.²³⁵⁰
- (3537) Customers and competitors indicate that product properties cannot be replicated by other polyolefin products (“*the required product properties cannot be achieved with other substitute materials*”)²³⁵¹. Other polyolefin products cannot achieve the same adhesion as acid co-polymers at the same cost (for example “[a]cid content is needed to achieve [sic] adhesion to aluminum”²³⁵²; “*Not good enough [sic] adhesion*”²³⁵³). Moreover, competitors stated that acid co-polymers are the best option considering price and performance (“[t]he level of adhesion obtained with acid copolymers on polar substrates (aluminium [sic] foil or metallised plastic film) cannot be obtained

²³⁴⁷ Agreed non-confidential minutes of a call with a customer, 13 April 2016, paragraph 16 (ID4149); Questionnaire to Material Science Customers (Q12): “*We expect a negative impact on prices over time; We expect lower competition and higher prices over time*” (ID9440, question 82.2.1), “[H]igher prices, less supplier, less competitors” (ID9167, question 82.2.1); “[T]his kind of concentration has always a negative impact on price” (ID9464, question 82.2.1); “*Less competition, less options available could drive prices up*” (ID9124, question 82.3.1). Questionnaire to Material Science Competitors (Q17), questions 114.1.1 and 114.3.1 (ID5012): “[...] [W]e will see higher prices. Customers and final users will have less room for price negotiation as the number of producers will decrease. [...] [I]t is likely this merger will reduce growth in these products as convertors will be forced to consider alternative film or their finished product structures and recipes in an attempt to mitigate the likely higher prices.”

²³⁴⁸ Agreed non-confidential minutes of a call with a customer, 15 April 2016, paragraphs 6-7 (ID692); Agreed non-confidential minutes of a call with a customer, 8 July 2016, paragraphs 7 and 12 (ID6352).

²³⁴⁹ Questionnaire to Material Science Customers (Q12), questions 34 and 82.3.1: “*There was a continuous [p]rice increase of EAA although LDPE [p]rices were decreasing*” (ID9167, question 34); “*We feel at least at oligopoly situation as respective rawmaterial (sic) do not fluctuate with all other polymers*” (ID9343, question 34).

²³⁵⁰ Questionnaire to Material Science Customers (Q12), questions 17 and 17.1 (ID9126).

²³⁵¹ Questionnaire to Material Science Customers (Q12), question 17.2 (ID9167).

²³⁵² Questionnaire to Material Science Customers (Q12), questions 17.2 (ID9343).

²³⁵³ Questionnaire to Material Science Customers (Q12), questions 17.2 (ID9206).

*with other products at same cost level*²³⁵⁴; “[a]cid copolymer products have demonstrated the best performance-price balance for applications [...]”²³⁵⁵).

(3538) Moreover, the majority of respondents to the market investigation stated that they would not start purchasing other polyolefin products if prices of acid co-polymers permanently increased by 5% to 10%.²³⁵⁶

(3539) In a previous decision, the notifying parties submitted that Arkema’s Lotader MAH was part of the acid co-polymer market. However, customers during the market investigation indicated that there is only a limited level of substitutability between acid co-polymers and one Arkema product, Lotader 3410. Substitutability is limited to special applications and only for certain customers that after testing and qualifying the product have obtained from their end-users approval to substitute.²³⁵⁷ With regard to LyondellBasell’s Lucalen, the market investigation did not provide evidence of significant substitutability.²³⁵⁸ In any event, in order to switch to any of these products, customers would have to invest resources and up to 2-3 years in the qualification process in order to assess whether these products are adequate for their end-use.

(3540) In conclusion, not-in-kind polyolefin products do not exercise significant competitive pressure on the acid co-polymer products sold by the Parties.

(E) Barriers to entry and expansion are high

(3541) Based on the market investigation and the case file, the Commission concludes that the acid co-polymer market is characterised by high barriers to entry and expansion. Therefore, neither entry nor expansion of production would be able to reduce the impact derived from the elimination of a competitive constraint resulting from the Transaction.

(3542) With regard to barriers to entry, the CMR industry report (Global Acid Co-Polymers)²³⁵⁹ indicates that [information extracted from confidential external market report].²³⁶⁰

(3543) In terms of technology, the Parties claim that the technology is “*well-known and technical information is even available from industry reports.*”²³⁶¹ [Internal assessment].²³⁶² The CMR industry report (Global Acid Co-Polymers)²³⁶³ refers to [information extracted from confidential external market report].

²³⁵⁴ Questionnaire to Material Science Competitors (Q17), questions 24.2 (ID5012).

²³⁵⁵ Questionnaire to Material Science Competitors (Q17), questions 24.1 (ID6897).

²³⁵⁶ Questionnaire to Material Science Customers (Q12), question 18.

²³⁵⁷ Request for information to material science, other customers 1, page 1 (ID9602). Request for information to material science, other customers 2, page 1 (ID9669, ID9324).

²³⁵⁸ Request for information to material science customers (ID9018, ID8874, ID8885, ID9669, ID9324, ID8965, ID8964, ID9602).

²³⁵⁹ CMR industry report (Global Acid Co-Polymers) (ID3952-3).

²³⁶⁰ In the response to the Article 6(1)(c) Decision, the Parties put into question [information extracted from confidential external market report] mentioned in CMR industry report. [Parties’ assessment of information extracted from confidential external market report]. Parties’ response to the Commission's request for information RFI 48 (ID7412), question VII.1 and 2.

²³⁶¹ Parties’ response to the Article 6(1)(c) Decision, footnote 242.

²³⁶² [Internal document] (ID436), slide 5.

²³⁶³ CMR industry report (Global Acid Co-Polymers), pages 3-19 (ID3952-3).

- (3544) In fact, a new entrant interested in the acid co-polymer market could obtain a licence. [Details on technology licensing for HiPED]. [...] ExxonMobil licences autoclave technology.²³⁶⁴ In their response to the Article 6(1)(c) Decision (paragraph 489), the Parties claim that LyondellBasell licences high pressure autoclave technology for the production of LDPE and EVA. However, this technology does not have all the equipment required to produce acid co-polymers. Paying for a licence that does not provide all the necessary technology to enter into the acid co-polymer market does not make economic sense. Hence, the availability of the essential technology to manufacture acid co-polymers is limited.
- (3545) With regard to potential entrants active in the LDPE market, in their response to the Article 6(1)(c) Decision, the Parties claim that “*companies active in, e.g. EVA [quote from confidential external market report] listed by CMR [...] and can thus easily enter the acid co-polymer space*” (paragraph 365 of the response to the Article 6(1)(c) Decision).
- (3546) However, even if several companies have autoclave reactors, none of them have entered the acid co-polymer market in the last five years [details on acid co-polymers prices].²³⁶⁵ Industry reports provide an explanation for this: [information extracted from confidential external market report].²³⁶⁶ The absence of know-how and experience in the production of acid co-polymers contribute to the high barriers to entry, explaining the lack of past entry and the unlikelihood of future entry from those alleged potential entrants.
- (3547) Compounders are also excluded as potential entrants. The market investigation indicates that “*[t]he production of acid copolymers requires autoclaves, polymerization know how and raw material integration (ethylene from a cracker). This is a totally different business model compared to compounding.*”²³⁶⁷
- (3548) With regard to barriers to expansion, current competitors in the acid co-polymer market have not expanded their capacity in the last three years [details on acid co-polymers prices]. The market investigation indicates that it can take around two years or longer to increase production for a polyolefin product.²³⁶⁸
- (3549) Moreover, temporary campaigns to produce acid co-polymers in existing LDPE assets also require time, since the switch from one product to another is not immediate and, more importantly, requires an investment of more than EUR [...] (see recital (3480)).
- (3550) Post-Transaction, the supplier that would be in the best position to expand its production would be the merged entity. The Parties would have the largest production capacity worldwide and they would be vertically integrated with regard to the key input materials necessary for the production of acid co-polymers, namely ethylene, GAA and GMAA. This is a significant deterrent that would be likely to hinder any attempts to expand production or capacity expansions.

²³⁶⁴ Form CO, part E, Annex E.6.8.

²³⁶⁵ Questionnaire to Material Science Customers (Q12), questions 35 and 36; Questionnaire to Material Science Competitors (Q17), questions 36 and 37: One competitor stated that Ineos introduced a new grade of acid co-polymer; however, Ineos was already present in the market.

²³⁶⁶ CMR industry report (Global Acid Co-Polymers), pages 2-16, 3-18 (ID3952-3).

²³⁶⁷ Questionnaire to Material Science Competitors (Q17), question 38.1 (ID5012).

²³⁶⁸ Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 5 (ID8251).

(3551) In conclusion, post-Transaction, current competitors would be unlikely to expand their production or capacity in the short term and new entrants or companies present in the LDPE market would be unlikely to enter the acid co-polymer market since they would have to overcome high barriers to entry and expansion, a potentially long qualification process and the significant spare production capacity of the Parties.

(F) Buyer power

(3552) The Commission concludes that, based on the case file, buyer power would not be sufficient to counterbalance the significant non-coordinated effects derived from the Transaction.

(F.i) *Buyer power is limited to a particular segment of customers*

(3553) The Horizontal Merger Guidelines make clear that countervailing buyer power cannot be found to sufficiently off-set potential adverse effects of a merger if it only ensures that a particular segment of customers with particular bargaining strength is shielded from significantly higher prices or deteriorated conditions after the merger.²³⁶⁹

(3554) The Parties claim they would continue to face strong buyers. According to the Parties, [details on Parties' customers].²³⁷⁰

(3555) [Details on Parties' customers].^{2371,2372} Therefore, the majority of the customers of the Parties would be unlikely to have enough buyer power to countervail the increase of power of the merged entity.

(F.ii) *Buyer power may not exist or may decrease after the Transaction*

(3556) The merged entity would increase its power while the bargaining power of [details on Parties' customers] customers of the Parties would be likely to decrease. Post-Transaction, the Parties would be likely to become an unavoidable trading partner. According to the market investigation, Ineos and ExxonMobil do not have enough spare capacity to supply large customers in full if they were to move all their demand from the merged entity to the remaining competitors in the market without incurring significant costs (see recital (3521)), despite one statement to the contrary from ExxonMobil.²³⁷³

(3557) With regard to multi-sourcing, it is important to ensure security of supply and protect against any supply disruptions or price increases. However, actual multi-sourcing in the acid co-polymer market is limited. The market investigation indicated that the majority of respondents multi-sourced. However, the actual purchases of those respondents confirmed that only a limited number of them effectively bought acid co-polymers from different suppliers. Moreover, the majority of those respondents have not switched suppliers in the last five years.²³⁷⁴

(3558) Furthermore, the ability to multi-source seems to be linked to the volume of the customer's purchases. While a sizable customer states that it "[...] sources acid co-polymers from several suppliers to ensure security of supply (as force majeure

²³⁶⁹ Horizontal Merger Guidelines, paragraph 67.

²³⁷⁰ Parties' response to the Article 6(1)(c) Decision, paragraph 369.

²³⁷¹ [Details on Parties' customers and sales data]. [Parties' submission] (ID5684 and ID5142-4), [...].

²³⁷² [Details on Dow's sales and customers].

²³⁷³ Questionnaire to Material Science Competitors (Q17), question 40 (ID6897).

²³⁷⁴ Questionnaire to Material Science Customers (Q12), question 30.

declarations by suppliers are not uncommon in this industry) and competitiveness of purchase prices”,²³⁷⁵ smaller customers might not be able to find more than one supplier (“*Dow and Exxon are not interested in relationship with customers with small demands*”²³⁷⁶). Therefore, multi-sourcing may not be possible for all customers and would be likely to protect only a limited number of them.

(3559) The Parties claim that small customers could purchase acid co-polymers from distributors. [Details on Parties’ sales strategy]^{2377,2378} [details on Parties’ sales strategy and customers].

(3560) Additionally, customers that have only qualified Dow’s or DuPont’s products (or both) would post-Transaction have limited options if they decide to continue purchasing the same type of acid co-polymers that they are currently using given that Ineos and ExxonMobil only produce one type of acid co-polymer each. In order to purchase from this alternative supplier, customers would still need to go through a qualification process that requires them to invest time (up to 2-3 years for certain applications) and money (more than EUR 10 000 per product).

(F.iii) [Details on Parties’ reaction to customers’ purchasing pattern]

(3561) The Parties claim that [details on customers’ purchasing pattern] (see recital (3509)).²³⁷⁹ [Details on Parties’ reaction to customers’ purchasing pattern].²³⁸⁰ Post-Transaction, this situation would be likely to worsen since alternative suppliers would be effectively limited (see recital (3560)) and the merged entity would be likely to become an unavoidable trading partner for acid co-polymers. Therefore, the ability of the [details on Parties’ customers] customers to [details on customers’ purchasing pattern].

(F.iv) No ability to sponsor entry or expansion

(3562) The Parties’ claim that buyer power manifests itself in customers’ ability to sponsor entry and expansion. However, according to the market investigation, all respondents, including [...], reported that they had not sponsored the entry of a supplier in the acid co-polymer market.²³⁸¹ Ineos stated that customers “[...] *will certainly have a huge incentive in doing it [that is to say sponsoring entry] but very likely not the ability to do it as it requires major changes and investments at an existing commodity product producer.*”²³⁸² This was confirmed by a key acid co-polymer customer.²³⁸³

(3563) Moreover, it should be recalled that buyer power exists where customers could credibly threaten to resort to alternative sources of supply within a reasonable timeframe. Given the time and investments required to swing production and the time and cost required to qualify new products and suppliers (up to 2-3 years

²³⁷⁵ Questionnaire to Material Science Customers (Q12), question 29.1 (ID9379).

²³⁷⁶ Questionnaire to Material Science Customers (Q12), question 29.1 (ID9167); Parties’ response to the Article 6(1)(c) Decision.

²³⁷⁷ [Details on Parties’ sales strategy and customers].

²³⁷⁸ [Details on Parties’ sales strategy and customers].

²³⁷⁹ Parties’ response to the Article 6(1)(c) Decision, paragraph 367.

²³⁸⁰ Parties’ response to the Commission’s requests for information RFIs 9 and 10 (consolidated response) 7 (ID1215), question 22.d, paragraph 22.

²³⁸¹ Questionnaire to Material Science Customers (Q12), question 37.

²³⁸² Questionnaire to Material Science Competitors (Q17), question 39.2 (ID5012).

²³⁸³ Agreed non-confidential minutes of a call with a customer, 13 April 2016, paragraph 15 (ID4149).

depending on the application), even if sponsored entry were to take place, it would not be immediate.

(F.v) Market transparency and capacity constraints

- (3564) The documents submitted by the Parties (for example ICIS newsletter) are newsletters and reports that include a large amount of competitors' data, for example their capacity or their scheduled plant renovations. This suggests that the acid co-polymer market is very transparent in relation to available capacity and potential reductions of supply. Such transparency is also liable to limit buyer power.

(F.vi) Conclusion

- (3565) In conclusion, the Commission considers that the limited countervailing buyer power would be insufficient to off-set the anticompetitive concerns raised by the Transaction given that non-large customers do not have buyer power, only large customers may have certain buyer power, such power would be likely to be reduced post-Transaction and [details on Parties' reaction to customers' purchasing pattern]. Additionally, customers do not have the ability to sponsor entry or expansion and market transparency would be likely to limit buyer power.

1.1.3.5. Conclusion on acid co-polymers

- (3566) The Commission concludes that the loss of competition between the Parties would lead to an increase of market power of the merged entity due to the closeness of the Parties and the inability of the remaining competitors to influence the incentives of the Parties to raise prices. These elements together with (i) the limited possibilities of switching suppliers, (ii) the limited competitive pressure from not-in-kind competition, (iii) the inability of the remaining two competitors to sufficiently increase output to discourage price increases, (iv) the high barriers to entry and expansion in the acid co-polymer market and (v) the limited countervailing buyer power, indicate that the Transaction would lead to significant impediment to effective competition.²³⁸⁴

- (3567) In conclusion, in the light of the market investigation and the information available to it, the Commission considers that the Transaction would significantly impede effective competition in the market for acid co-polymers due to non-coordinated effects, in particular, by eliminating an important competitive constraint.

1.2. Ionomers

1.2.1. Overview of the ionomer market

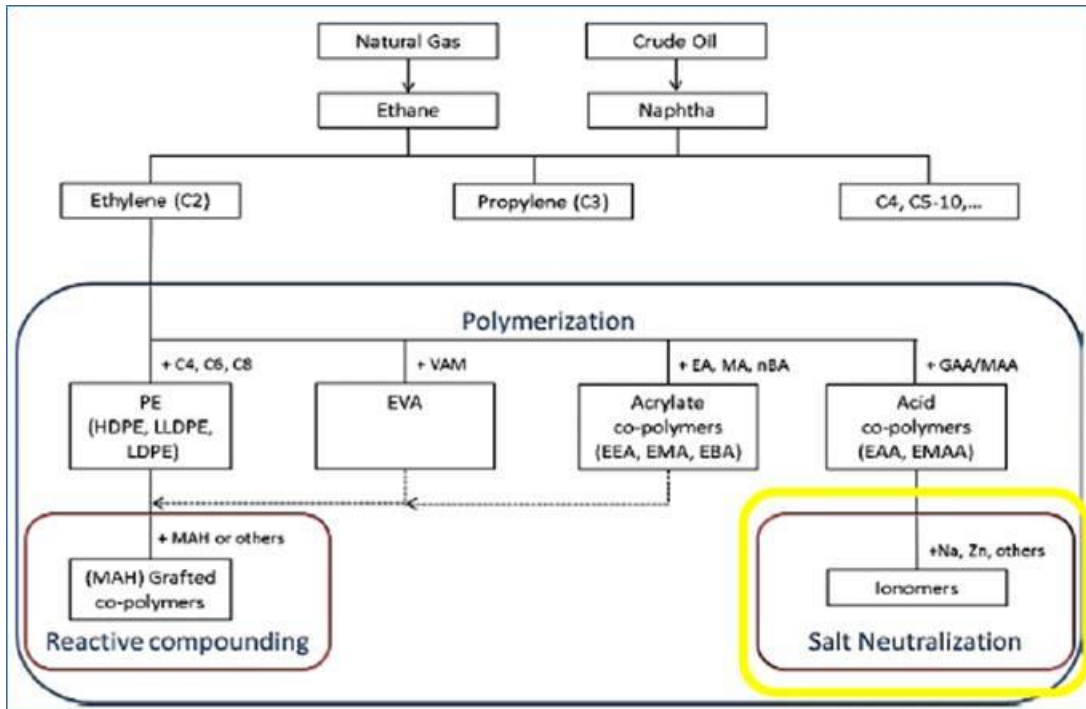
- (3568) Ionomers are polymers containing inter chain ionic bonding. Ionomers are based on acid co-polymers. In the case of ionomers, secondary extrusion is commonly used after base polymers are made via high pressure polymerisation. To produce ionomers, acid co-polymers are neutralised with compounds of sodium, zinc or other salts, which results in the formation of a polymeric salt or ionomer. This is generally done through reactive compounding in a second step (although in some cases it is possible to produce ionomers "in-line" in the high pressure polymer reactor).

²³⁸⁴

The majority of customers that responded to the market investigation indicated that the Transaction would have a negative impact for material science products in the EEA. Questionnaire to Material Science Customers (Q12), question 82.2.

- (3569) Ionomers are mainly based on EMAA and EAA. Existing technology does not allow ionomers to be made out of neutralising other co-polymers such as acrylate co-polymers (Ethylene EA, Ethylene BA or Ethylene MA).²³⁸⁵
- (3570) The overview of ethylene and its derivatives, including ionomers, is presented in Figure 176.

Figure 176 – Ethylene and Ethylene Derivatives Overview



Source: Form CO, part E, paragraph 228

- (3571) Typical applications of ionomers include high performance sealants, adhesive lamination, adhesive tie layers, impact modification, and surfactants. Other more niche applications of ionomers are golf balls, cosmetic packaging, sports and leisure equipment (including bowling pin covers and athletic shoes), automotive exterior trim panels, glass lamination, wire and cable, building panels, photovoltaics, plastic wood replacements, and mining shock tubes.

1.2.2. Relevant market definition for ionomers

1.2.2.1. Relevant product market

(A) Past decisional practice

- (3572) In its past merger decisions, the Commission has not yet assessed the market definition in relation to ionomers.

(B) Parties' arguments

- (3573) The Parties submit that ionomers are part of the overall market for HiPED. According to the Parties, this is due to the significant competition between ionomers and other HiPED in almost all of the principal and more niche applications of

²³⁸⁵ Ethylene ethyl acrylate ("Ethylene EA"), ethylene methyl acrylate ("Ethylene MA"), and ethylene ethylene (n)-butyl acrylate ("Ethylene BA").

ionomers (such as high performance sealants, adhesive lamination, adhesive tie layers, impact modification, surfactants, golf balls, etc.), as indicated by the declining demand for ionomers in the flexible packaging market. It is also due to the high degree of supply side substitutability between ionomers and other HiPED.

(C) The Commission's assessment

- (3574) Based on the results of the market investigation, the Commission concludes that ionomers constitute a separate product market for the reasons explained below.
- (3575) With regard to demand-side substitutability, ionomers are characterised by a number of specific qualities, such as high toughness and puncture resistance, medium tear resistance, excellent clarity, high hot tack and sealing and medium ease of processing. These qualities make ionomers more suitable for a number of applications and valued in the eyes of customers.
- (3576) The results of the market investigation have not confirmed the Parties' suggestion that ionomers form part of a wider market for HiPED. Namely, the majority of responding customers did not consider it possible to substitute ionomers in their applications with other polyolefin products, in particular due to the uniqueness and specificity of ionomers' characteristics.²³⁸⁶ The majority of responding customers did not generally consider that a 5-10% price increase for ionomers would make them purchase other polyolefin products as substitutes to ionomers.²³⁸⁷
- (3577) With respect to the potential distinction of ionomers based on the input material (EMAA or EAA), the majority of respondents did not know whether a distinction between EMAA-based ionomers and EAA-based ionomers was necessary.²³⁸⁸ Only two customers considered it possible to substitute EEA-based ionomers with EMAA-based ionomers or vice-versa in their applications,²³⁸⁹ while three customers indicated that it was not possible.²³⁹⁰ The market investigation points to other potential segmentation of the ionomer market based on the neutralisation salt and the acid content.²³⁹¹
- (3578) As concerns supply side substitutability, the Commission notes that the production of ionomers is quite specific as it requires the neutralisation of acid co-polymers with compounds of sodium, zinc or other salts. As pointed out by other producers of polyolefin products, this requires specific knowledge and technical expertise and involves technical risks.²³⁹²

²³⁸⁶ Questionnaire to Material Science Customers (Q12), question 54.

²³⁸⁷ Questionnaire to Material Science Customers (Q12), question 55.

²³⁸⁸ Questionnaire to Material Science Customers (Q12), questions 51 and 52; Questionnaire to Material Science Competitors (Q17), questions 70 and 71.

²³⁸⁹ Questionnaire to Material Science Customers (Q12), question 53 (ID9124, ID9475).

²³⁹⁰ Questionnaire to Material Science Customers (Q12), question 53 (ID9167, ID9334, ID9343).

²³⁹¹ Questionnaire to Material Science Competitors (Q17), question 70.2 (ID5012).

²³⁹² Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 19 (ID8251); Agreed non-confidential minutes of a call with a competitor, 15 April 2016, paragraph 17 (ID8250).

- (3579) The Parties claim that the required knowledge and expertise is widely available, which would be evidenced by the presence of several compounders.²³⁹³ Despite this claim, according to the market investigation, the only compounder present in the ionomer market is [...].²³⁹⁴ [Details on external manufacturing agreement for Dow's ionomers].
- (3580) Additionally, the only confirmed competitor in the ionomer market indicated that switching production from ionomers to other polyolefin products or vice-versa is not possible without incurring significant costs and delays.²³⁹⁵
- (D) Conclusion on the relevant product market for ionomers
- (3581) In light of the market investigation and the information available to it, for the purpose of assessing the Transaction, the Commission considers that the relevant product market is the overall ionomer market.
- 1.2.2.2. Relevant geographic market
- (A) Past decisional practice
- (3582) In its past merger decisions, the Commission has not yet assessed the scope of the geographic market for ionomers.
- (B) Parties' arguments
- (3583) The Parties submit that the relevant geographic market for ionomers is at least EEA-wide and could well be global. This is in particular due to the ease and relatively low cost of transportation, absence of tariffs or other trade barriers, significant trade flows between the EEA and world regions and absence of significant price differences between regions, especially within the EEA.
- (C) The Commission's assessment
- (3584) From the demand side, customers that responded to the market investigation indicate that they purchase ionomers at regional level (that is Western Europe) (44%), followed by customers which purchase ionomers at EEA level (22%) and then at worldwide level (22%).²³⁹⁶ Nonetheless, the majority of customers negotiate prices with suppliers centrally for the whole EEA.²³⁹⁷
- (3585) Half of the responding customers who expressed an opinion considers it difficult to buy ionomers outside the EEA.²³⁹⁸ However, these same customers (except one) report that they only purchase ionomers from Dow or DuPont, [details on Parties' sales strategy].
- (3586) [Information on Parties' production locations].²³⁹⁹ [Details on Parties' ionomers sources for customers in the EEA].

²³⁹³ Parties' response to the Article 6(1)(c) Decision, paragraph 383.

²³⁹⁴ Questionnaire to Material Science Compounders (Q11), question 2.

²³⁹⁵ Questionnaire to Material Science Competitors (Q17), question 73 (ID5012).

²³⁹⁶ Questionnaire to Material Science Customers (Q12), question 57.

²³⁹⁷ Questionnaire to Material Science Customers (Q12), question 61; Questionnaire to Material Science Competitors (Q17), question 80.

²³⁹⁸ Questionnaire to Material Science Customers (Q12), questions 59 and 60.

²³⁹⁹ Parties' response to the Commission's request for information RFI 18 ([Parties' submission]) (ID5684 and ID5142-4), question 7.

(3587) As regards transport costs for ionomers, according to the Parties, [details on Parties' transport costs].²⁴⁰⁰ A competitor in the ionomer market considers that ionomers can be profitably imported from non-EEA countries.²⁴⁰¹

(D) Conclusion on the relevant geographic market for ionomers

(3588) In light of the market investigation and the information available to it, for the purpose of assessing the Transaction, the Commission considers that the relevant geographic market is the EEA, considering, in particular, the trade flows and origin of the products purchased in the ionomer market.

1.2.3. *Competitive assessment on ionomers*

1.2.3.1. Overview of the ionomer market

(3589) According to the market investigation, the annual volume of the ionomer market amounted to [30–40] kt in the EEA and [80–90] kt worldwide in 2015. By value, the size of the ionomer market in 2015 was EUR [110-120] million in the EEA and EUR [335-345] million worldwide.

(3590) As explained in recital (3569), ionomers can be produced based on EMAA and EAA, but not by neutralising other co-polymers. The Parties estimate [Parties' internal estimate on type of acid co-polymer used for the production of ionomers].

(3591) Ionomers were discovered by DuPont in the 1960s. Since then many relevant patents have expired. Nevertheless, DuPont remains by far the largest supplier of ionomers in the EEA and globally, with all other suppliers combined having only a small share of the market (for market shares, see Section VIII.1.2.3.2).

(3592) DuPont markets its ionomer products under the Surlyn brand. DuPont conducts the neutralisation necessary to produce ionomers itself in [DuPont's production location(s)]. DuPont's ionomers are produced based on [...] acid co-polymers.²⁴⁰² DuPont's global ionomer sales in 2015 were [...] / EUR [...] and its EEA sales were [...] / EUR [...].

(3593) Dow has ionomer products which it markets under the Amplify IO brand. Dow uses a contract manufacturer (compounder), [...], to conduct the neutralisation step. Dow's arrangement with [details on external manufacturing agreement for Dow's ionomers]. Dow's ionomer products are based on EAA co-polymers. Dow's sales of ionomers in 2015 were [...] / EUR [...] in the EEA and [...] / EUR [...] globally.

(3594) Ineos has ionomer products, but they are not sold under a specific brand. Ineos manufactures its ionomers using EMAA acid co-polymers as input material. It has a limited number of customers.

(3595) ExxonMobil produced ionomers in Antwerp, Belgium in the past but has exited the market. ExxonMobil's ionomer products were marketed under the Iotek brand and were based on EAA co-polymers.

(3596) The Parties also identified one additional company, which has developed or may develop ionomer products, namely A. Schulman. However, according to the market investigation, A. Schulman does not sell ionomers.²⁴⁰³ With regard to Honeywell, it

²⁴⁰⁰ Form CO, part E, paragraph 86.

²⁴⁰¹ Questionnaire to Material Science Competitors (Q17), question 78 (ID5012).

²⁴⁰² Response to the Statement of Objections, footnote 1223 (ID10020).

²⁴⁰³ Questionnaire to Material Science Compounders (Q11), questions 2 and 9 (ID1933).

seems to have a very limited (even negligible) presence in the market with Aclyn285, a low molecular weight ionomer with limited uses.²⁴⁰⁴

1.2.3.2. Market shares

(3597) DuPont is the largest supplier of ionomers both in the EEA and worldwide with an estimated market share of more than [90-100]% both by volume and by value in 2015. Dow's market share in 2015 was approximately [0-5]%. The other suppliers of ionomers had a combined market share (in volume) of [5-10]% in the EEA and [0-5]% worldwide. According to the market investigation, Ineos would be likely to be the only competitor that remains in the ionomer market EEA and worldwide after the Transaction. The market shares are set out in Table 88 and Table 89.

Table 88 – Ionomers – EEA estimated shares of sales (2015)

Supplier	2015			
	Volume (kt)	%	Value (million EUR)	%
Dow	[...]	[0-5]%	[...]	[0-5]%
DuPont	[...]	[90-100]%	[...]	[90-100]%
Parties Combined	[...]	[90-100]%	[...]	[90-100]%
Others	[...]	[5-10]%	[...]	[0-5]%
Total	[...]	100%	[...]	100%

Source: Data from the Commission's market investigation

Table 89 – Ionomers – Worldwide estimated shares of sales (2015)

Supplier	2015			
	Volume (kt)	%	Value (million EUR)	%
Dow	[...]	[0-5]%	[...]	[0-5]%
DuPont	[...]	[90-100]%	[...]	[90-100]%
Parties Combined	[...]	[90-100]%	[...]	[90-100]%
Others	[...]	[0-5]%	[...]	[0-5]%
Total	[...]	100%	[...]	100%

Source: Data from the Commission's market investigation

²⁴⁰⁴ Request for information to material science customers, question 7(c) (ID9018); Request for information to material science competitors, question 4(d) (ID8878).

(3598) The sales of ionomers (by volume and by value) of the Parties in the EEA and worldwide [development of Parties' sales over years], with [development of DuPont's sales over years] as shown in Table 90.

Table 90 – Sales of ionomers of the Parties in volume and value (2013-2015) in the EEA and worldwide

Supplier	Geography	Value (million EUR)			Volume (kt)		
		2013	2014	2015	2013	2014	2015
Dow	EEA	[...]	[...]	[...]	[...]	[...]	[...]
Dow	Worldwide	[...]	[...]	[...]	[...]	[...]	[...]
DuPont	EEA	[...]	[...]	[...]	[...]	[...]	[...]
DuPont	Worldwide	[...]	[...]	[...]	[...]	[...]	[...]

Source: Form CO, Part E, paragraph 234

(3599) According to the market investigation, the global production capacity for ionomers amounts to [120-130], of which [80-90]% is controlled by the Parties. DuPont itself controls ~[70-80]% of the ionomer production capacity worldwide.

Table 91 – Ionomers – Worldwide estimated capacity (2015)

Supplier	2015	
	Volume (kt)	%
Dow	[...] ²⁴⁰⁵	[0-5]%
DuPont	[...]	[70-80]%
Parties Combined	[...]	[80-90]%
Others	[...]	[10-20]
Total	[...]	100

Source: Data from the Commission's market investigation

1.2.3.3. Parties' arguments

(3600) The Parties submit that the Transaction would not result in a significant impediment of effective competition in relation to ionomers, either at EEA-level or at worldwide level, for the following reasons.

²⁴⁰⁵ [Name of Dow's external manufacturer of ionomers] production capacity for ionomers. Parties' response to the Commission's request for information RFI 60 (ID8890), question II.4.

- (3601) First, according to the Parties, Dow [Parties' internal assessment and pricing strategy]. The Parties claim that the effects of the Transaction would be *de minimis*. This is due to (i) Dow's marginal presence in ionomers, (ii) the fact that Dow does not produce ionomers itself ("in-line") but rather conducts neutralisation externally by a compounding step carried out by [...], (iii) [details on Parties' ionomers pricing strategy and suitability of Parties' ionomers products], (iv) [details on customers' purchasing pattern], and (v) [details on Parties' business plans].
- (3602) Second, DuPont faces other competitors. The Parties consider that other companies, such as ExxonMobil, Ineos and A. Schulman, are active in or at least have the capacity and ability to produce ionomers. Moreover, the Parties submit that ionomers compete in almost all of their principal applications with other materials (in particular HiPED). If this inter-material competition is taken into account, DuPont's ionomer sales would not represent a share of more than [5-10]% in any application except [details on an application for ionomers]. Not-in-kind products that compete with ionomers are offered by many competitors, including ExxonMobil, Arkema, Ineos, Versalis, LyondellBasell, and Saint Gobain.

1.2.3.4. The Commission's assessment

(3603) For the reasons set out in this section, the Commission considers that the Transaction leads to a significant impediment to effective competition with respect to ionomers, in particular by strengthening DuPont's dominant position.

(A) DuPont has a dominant position in ionomers

(3604) Having been the first to develop ionomers, DuPont today remains by far the largest producer of ionomers, despite the expiration of patents in the 1980s.²⁴⁰⁶ DuPont holds more than a [90-100]% market share by revenue and volume both in the EEA and worldwide. The Horizontal Merger Guidelines state that according to well established case law, very large market shares - 50% or more - may in themselves be evidence of the existence of a dominant market position.²⁴⁰⁷ The case law has confirmed that although the importance of market shares may vary from one market to another, very large shares are in themselves, and save in exceptional circumstances, evidence of the existence of a dominant position.²⁴⁰⁸

(3605) During the market investigation, several ionomer customers identified DuPont as a dominant player with the ability to control the market²⁴⁰⁹ and its ionomers as "must have" products.²⁴¹⁰ [Parties' internal assessment].²⁴¹¹

(3606) Therefore, the Commission considers that DuPont holds a dominant position in the market for ionomers. Any combination with a supplier of competing products would by definition only strengthen this position.

²⁴⁰⁶ Parties' response to the Commission's request for information RFI 60 (ID8890), question I.2.d.

²⁴⁰⁷ Horizontal Merger Guidelines, paragraph 17.

²⁴⁰⁸ Judgment of 14 December 2005, *General Electric v Commission*, T-210/01, EU:T:2005:456, paragraph 115.

²⁴⁰⁹ Questionnaire to Material Science Customers (Q12), question 71.

²⁴¹⁰ Questionnaire to Material Science Customers (Q12), question 85.

²⁴¹¹ [Internal document], slide 12 (ID1329-92).

(B) Dow is an important alternative to DuPont

(3607) The Commission considers that, contrary to the Parties' claim, Dow does constitute an appreciable competitive constraint on DuPont with respect to ionomers despite its market share ([0-5]%). Indeed, Dow's ionomers appear to be an important and close alternative to those of DuPont, with a potential to grow in their competitive influence absent the Transaction.

(B.i) *Dow is the main alternative to DuPont*

(3608) The Parties contest the findings of the market investigation regarding closeness of competition.²⁴¹² The Parties claim that the comparison between Dow and DuPont is "natural" but does not mean that Dow exerts competitive pressure on DuPont. [Parties' internal assessment of competitive landscape in ionomers].²⁴¹³

(3609) Moreover, according to the results of the market investigation, Dow is viewed as the main or even the only alternative to DuPont in the supply of ionomers.²⁴¹⁴ Since ExxonMobil exited the market [>3] years ago, the only non-negligible producers of ionomers are Dow and DuPont. Customers have gone through the process of qualifying Dow as a supplier of ionomers to avoid exclusive dependency on DuPont. Moreover, responding customers and competitors have generally identified Dow as the closest competitor to DuPont in ionomers.²⁴¹⁵ [Parties' internal assessment of competitive landscape in ionomers].²⁴¹⁶

(B.ii) *Dow can expand its current presence in ionomers and become a stronger competitor*

(3610) While currently Dow has a market share of [0-5]% in ionomers, there are indications that Dow has the potential to become a stronger competitor in the future. [Details on

²⁴¹² Parties' response to the Article 6(1)(c) Decision, paragraph 386.

²⁴¹³ Parties' response to the Commission's request for information RFI 10, [Parties' submission] (ID1165-127), slide 2.

²⁴¹⁴ "Currently only Dow and DuPont are very active in ionomers", agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 17 (ID8251); "DuPont has a strong position in EAA based acid co polymers (sic) and in EAA based ionomers (sic). Only DOW has started to launch some products in this application area"; "As Dupont is single source we are looking for a second supplier for EAA based ionomers. One Option was DOW, but with the merge is this alterantive (sic) gone. No other supplier yet", Questionnaire to Material Science Customers response (Q12), questions 65.1 and 82.1.1 (ID9343); "[...] for Ionomers, Dow and Dupont are going to hold the majority of the market. Our sources of supplies are going to be clearly restricted", Questionnaire to Material Science Customers response (Q12), question 82.1.1 (ID9124); "Everybody knows DOW and DuPont are the big players in ionomers", Questionnaire to Material Science Compounders response (Q11), question 12.1 (ID2779); "[Ionomers] DuPont and Dow are the only producers", Questionnaire to Material Science Customers response (Q13), question 70.1 (ID9474).

²⁴¹⁵ During the market investigation, only one customer out of 23 respondents identified Ineos as a close competitor of DuPont in the ionomer market ([...] ionomers) (see Questionnaire to Material Science Customers response (Q12), question 62 (ID9694)); while eight customers and Ineos identified Dow as DuPont's closest competitor (see Questionnaire to Material Science Customers response (Q12), question 62; Questionnaire to Material Science Competitors response (Q17), question 81). "In Ionomers [...] the commercial offer from DuPont combined with the ionomer offer from Dow will create a leveraging position difficult to compete with", Questionnaire to Material Science Competitors response (Q17), question 114.1.1 (ID5012).

²⁴¹⁶ See for example Parties' response to the Commission's request for information RFI 1, question 18, Annex 18.4, [internal document] (ID339), slide 13.

Parties' business strategy].²⁴¹⁷ [Parties' internal assessment and business strategy].²⁴¹⁸ [Parties' internal assessment].²⁴¹⁹ [Commission's assessment of Parties' internal business strategy].

(3611) [Development of Dow' sales over years] (see Table 90).

(B.iii) Dow is a competitive supplier

(3612) The Parties claim²⁴²⁰ that Dow does not constitute an appreciable competitive constraint on DuPont due [details on Parties' ionomers pricing and the suitability of ionomers for different applications]. However, according to the data submitted by the Parties, [details on Parties' ionomers pricing].²⁴²¹ [Suitability of Parties' ionomers for a specific application].²⁴²² [Details on suitability of different types of ionomers for different applications], the Transaction would eliminate the only non-negligible alternative to DuPont, hence strengthening DuPont's dominant position.

(C) Limited competitive constraints from other ionomer suppliers

(3613) Contrary to the submissions of the Parties, the market investigation does not indicate significant competitive constraints exerted by suppliers of ionomers other than Dow.

(3614) ExxonMobil used to produce EAA-based ionomers in the past but has since exited this market. [Parties' internal assessment of competitive landscape in ionomers].²⁴²³ During the market investigation, ExxonMobil stated that the ionomer market is very small and production is very technical, requiring heavy customer support.²⁴²⁴ Also, according to ExxonMobil, substantial investment would be needed to re-start producing ionomers. The available evidence does not allow the Commission to consider ExxonMobil as an interested and credible entrant into the ionomer market, in which, in addition, ExxonMobil had only a very limited presence in the past.

(3615) Ineos [internal assessment]. [...], Ineos confirmed that it has certain sales of ionomers but they are limited. The market investigation confirms Ineos' limited competitive relevance: (i) only one customer identified Ineos as a close competitor of DuPont, while eight customers identified Dow (see footnote 2414); and (ii) [internal assessment].²⁴²⁵ Moreover, Ineos indicated that it does not offer a range of products wide enough to grow significantly and expand geographically,²⁴²⁶ [details on Parties' business plans] (see recital (3610)).

²⁴¹⁷ Parties' response to the Commission's request for information RFI 1, question 18, Annex 18.5, [internal document] (ID340), slide 42.

²⁴¹⁸ Parties' response to the Commission's request for information RFI 1, question 18, Annex 18.5, [internal document] (ID340), slide 42.

²⁴¹⁹ Parties' response to the Commission's request for information RFI 1, question 18, Annex 18.5, [internal document] (ID340), slide 41.

²⁴²⁰ Parties' response to the Article 6(1)(c) Decision, paragraph 385, point 3.

²⁴²¹ Parties' response to the Commission's request for information RFI 17, Annex 1 (ID5240), question 1.

²⁴²² Parties' response to the Commission's request for information RFI 33 ([Parties' submission]) (ID9606-93 and ID9606-142), question 6.

²⁴²³ Parties' response to the Commission's request for information RFI 1, question 18, Annex 18.5, [internal document] (ID340), slide 28.

²⁴²⁴ Agreed non-confidential minutes of a call with a competitor, 15 April 2016, paragraph 17 (ID8250).

²⁴²⁵ See, for example, Parties' response to the Commission's request for information RFI 1, question 18, Annex 18.4, [internal document] (ID339), slide 13.

²⁴²⁶ Questionnaire to Material Science Competitors (Q17), question 76.1 (ID5012); Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 17 (ID8251).

- (3616) The market investigation has not confirmed that A. Schulman, which according to the Parties advertises ionomers under the Clarix brand, is a competitor in ionomers.²⁴²⁷ [Internal assessment of competitive landscape in ionomers].²⁴²⁸
- (3617) With regard to compounders, according to the market investigation, the only compounder present in the ionomer market is [...] ²⁴²⁹ and none of the customers that responded to the market investigation reported compounders supplying ionomers.²⁴³⁰
- (3618) Similarly, the market investigation has not identified any other non-negligible actual or potential producers of ionomers other than the Parties. As stated by one market participant, “*only Dow and DuPont are very active in ionomers*”.²⁴³¹ Customers also generally do not see credible alternative suppliers of ionomers in the market.²⁴³²
- (D) Limited competitive constraints from not-in-kind products
- (3619) The Commission considers that ionomers are not subject to sufficient competitive constraints from other polyolefin products in the relevant applications. The majority of responding customers stated that they cannot substitute ionomers with other polyolefin products due to ionomers being “*unique and specific*”, “*very specially designed*”, “*difficult to change*” and impossible to “*be matched by other commercially available materials*”.²⁴³³
- (3620) The Parties support their claim of inter-material competition [details on Parties’ product availability and customers’ sourcing pattern].²⁴³⁴
- (3621) [Details on Parties’ product availability and customers’ sourcing pattern].²⁴³⁵
- (E) High barriers to entry and expansion
- (3622) The Commission considers that the market for ionomers is characterised by high barriers to entry and expansion.
- (3623) The Parties stated that [internal assessment].²⁴³⁶
- (3624) The vast majority of respondents to the market investigation either have not observed or were not aware of any new entry of ionomer suppliers in the EEA in the last five

²⁴²⁷ Parties’ response to the Commission’s request for information RFI 1, question 18, Annex 18.5, [internal document], slide 42.

²⁴²⁸ Parties’ response to the Commission’s request for information RFI 18 7 ([Parties’ submission]) (ID5142-4), question.

²⁴²⁹ Questionnaire to Material Science Compounders (Q11), question 2.

²⁴³⁰ Questionnaire to Material Science Compounders (Q11), questions 14, 15 and 16; Questionnaire to Material Science Customers (Q12), question 48.2.

²⁴³¹ Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 17 (ID8251). Similar statements have been made by other respondents to the market investigation, see Questionnaire to Material Science Customers (Q12), question 82.1; and see also footnote 2414 above.

²⁴³² Questionnaire to Material Science Customers (Q12), questions 64 and 65.

²⁴³³ Questionnaire to Material Science Customers (Q12), question 54.2 (ID9124); Questionnaire to Material Science Customers (Q12), question 54.2 (ID9167); Questionnaire to Material Science Customers (Q12), question 54.2 (ID9334).

²⁴³⁴ Parties’ response to the Commission’s request for information RFI 60 (ID8890), question 2.b.

²⁴³⁵ Parties’ response to the Commission’s request for information RFI 60 (ID8890), question 2.b.

²⁴³⁶ Parties’ response to the Commission’s request for information RFI 3 (ID823), question 32.

years.²⁴³⁷ Respondents also do not expect entry of new suppliers, in particular in light of the Transaction.²⁴³⁸

- (3625) Entering and expanding in the ionomer market appears to be difficult even for established players possessing production capabilities and which are vertically integrated (that is producing acid co-polymers). Moreover, Ineos explained that entry requires a significant learning process and involves technical risks.²⁴³⁹ It would take approximately 2-3 years or more to obtain approval by customers of the samples, and an additional waiting period to start selling the product.²⁴⁴⁰
- (3626) In addition, customers for ionomers are viewed by producers as very conservative and reluctant to switch between suppliers.²⁴⁴¹ Customers themselves have confirmed this by indicating that they have generally not switched to a different supplier of ionomers in the last five years.²⁴⁴² Switching to a new supplier requires its qualification,²⁴⁴³ which is a lengthy and cumbersome process.
- (3627) Also, no likelihood of entry was identified by the compounders responding to the market investigation and none of the customers that responded to the market investigation reported compounders supplying ionomers.²⁴⁴⁴
- (3628) The entry and expansion of non-integrated competitors (that is to say which do not produce acid co-polymers themselves, such as compounders) would be likely to be further impeded by the Parties' strong position in EMAA and EAA co-polymers (see Section VIII.1.1) which are the main input for ionomers.
- (F) No countervailing buyer power
- (3629) With respect to buyer power, it suffices to note that the buyer power of customers may compensate for the market power of the supplier "*if those customers have the ability to resort to credible alternative sources of supply within reasonable time.*"²⁴⁴⁵ In this Decision, given the dominant position of the merged entity in the ionomer market with a more than [90-100]% market share and a broad and consolidated product portfolio, the Commission concludes that there would be no sufficient buyer power that would offset the negative effects resulting from the Transaction with respect to ionomers.
- (3630) With respect to the potential sponsoring of entry/expansion by customers, the results of the market investigation have been negative. In particular, the responding customers and competitors were generally not aware of instances where a customer

²⁴³⁷ Questionnaire to Material Science Customers (Q12), question 70; Questionnaire to Material Science Competitors (Q17), question 86.

²⁴³⁸ Questionnaire to Material Science Customers (Q12), question 70; Questionnaire to Material Science Competitors (Q17), question 87.

²⁴³⁹ Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 19 (ID8251).

²⁴⁴⁰ Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 21 (ID8251).

²⁴⁴¹ Agreed non-confidential minutes of a call with a competitor, 31 May 2016, paragraph 20 (ID8251).

²⁴⁴² Questionnaire to Material Science Customers (Q12), question 64.

²⁴⁴³ Questionnaire to Material Science Customers (Q12), question 76.

²⁴⁴⁴ Questionnaire to Material Science Compounders (Q11), questions 14, 15 and 16; Questionnaire to Material Science Customers (Q12), question 48.2.

²⁴⁴⁵ Judgment of 23 February 2006, *Cementbouw Handel & Industrie BV v Commission*, T-282/02, EU:T:2006:64, paragraph 230.

tried to sponsor entry of an ionomer supplier. The respondents also questioned the ability of customers to sponsor such entry post-Transaction.²⁴⁴⁶

1.2.3.5. Conclusion on ionomers

- (3631) The Commission concludes that the loss of competition between the Parties would be likely to lead to the strengthening of DuPont's dominance due to the importance of Dow as a competitor despite its [0-5]% market share because: (i) Dow is the main alternative to DuPont; (ii) Dow can credibly expand its current presence in ionomers and become a stronger competitor; (iii) Dow is a competitive supplier; (iv) there are limited competitive constraints from the remaining supplier, Ineos, and even more limited from inter-material products; (v) there are high barriers to entry an expansion, and (vi) there is no countervailing buyer power.
- (3632) In conclusion, in light of the market investigation and the information available to it, the Commission considers that the Transaction would significantly impede effective competition in the market for ionomers due to non-coordinated effects, in particular by strengthening DuPont's dominance in the ionomer market.

1.3. MAH grafted polymers

1.3.1. Parties' activities

- (3633) Dow and DuPont are active in grafted polymers, in particular MAH grafted polymers.²⁴⁴⁷ Grafted polymers are produced by grafting the maleic anhydride molecule to a base polymer referred to as the "backbone." The backbone of a MAH grafted polymer is frequently low pressure-produced PEs (for example, ethylene-based elastomers such as POE). Grafting is usually undertaken via reactive compounding/extrusion although it is also possible to add MAH during the polymerisation process within the reactor itself so that MAH grafted co-polymers can be produced in-line directly through high pressure polymerisation.
- (3634) Dow is active in MAH grafted polymers with Amplify GR (MAH grafted PE), Amplify TY (MAH grafted PE including some blends) and Retain (MAH grafted POE). Dow's sales of MAH grafted polymers in 2015 were EUR [...] in the EEA and EUR [...] worldwide. [Details on Dow's production of MAH grafted polymers, including production location(s)].
- (3635) DuPont is also active in MAH grafted polymers with Fusabond and Bynel (which are available in different forms, in particular MAH grafted PE, MAH grafted PE with blends, MAH grafted polypropylene and MAH grafted EVA). DuPont's sales of MAH grafted polymers in 2015 were EUR [...] in the EEA and EUR [...] worldwide. [Details on DuPont's production location(s)].

²⁴⁴⁶ Questionnaire to Material Science Customers (Q12), question 72; Questionnaire to Material Science Competitors (Q17), question 90.

²⁴⁴⁷ MAH grafted polymers can also be referred to as MAH grafted polyolefins to reflect the fact that they are produced with a backbone derived in some way from ethylene or propylene.

1.3.2. *Relevant market*

1.3.2.1. Relevant product market

(3636) The Commission has previously considered that co-polymers of MAH and another monomer could constitute a relevant product market.²⁴⁴⁸ The Parties submit that the most appropriate market definition is one for all HiPED. For the purpose of this Decision, the Commission considers that the exact product market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

1.3.2.2. Relevant geographic market

(3637) In Ashland/ISP, the Commission defined the relevant geographic market for co-polymers composed of MAH and another monomer as worldwide.²⁴⁴⁹ The Parties submit that the relevant geographic market is at least EEA-wide or worldwide in scope. For the purpose of this Decision, the Commission considers that the exact geographic market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

1.3.3. *Market shares*

(3638) The Parties submit that in 2015 (i) Dow had a market share of [0-5]% and [5-10]% (in volume and value) in the EEA and worldwide, respectively; and (ii) DuPont had a market share in the EEA of [20-30]% (in volume) and [30-40]% (in value), and worldwide of [20-30]% (in volume) and [20-30]% (in value).

(3639) The Parties face competition from at least five competitors in the EEA and three competitors worldwide, such as Arkema with market shares in the EEA of [20-30]% (in volume) and [20-30]% (in value) and worldwide of [5-10]% (volume) and [5-10]% (value); Mitsui (EEA: [10-20]% in volume and [10-20]% in value; and worldwide: [20-30]% in volume and value), LyondellBasell (EEA: [10-20]% in volume and [10-20]% in value; worldwide: [10-20]% in volume and [10-20]% in value), or ExxonMobil (EEA: [5-10]% in volume and value).

1.3.4. *Competitive assessment*

(3640) The Commission notes that the Parties' combined market share amounts to [30-40]% in volume and [30-40]% in value in the EEA and worldwide; and the market share increments brought by the Transaction amount to [...]%-points in the EEA and [...]%-points worldwide.

(3641) The merged entity would continue to be challenged by a number of large and well-established competitors, including Arkema, Mitsui and LyondellBasell, as well as other smaller players such as ExxonMobil or Polyram. The merged entity would also continue to face competition from all or part of these competitors within each of the relevant sub-segments of the market based on the combination of MAH and another monomer (see Table 92).

²⁴⁴⁸ Commission Decision in Case M.6313 – Ashland/International Specialty Products (ISP) (2011), recitals 48 to 57.

²⁴⁴⁹ Commission Decision in Case M.6313 – Ashland/International Specialty Products (ISP) (2011), recital 56.

Table 92 – Parties’ competitors by MAH grafted polymer sub-segments

[Internal assessment of competitors’ production]²⁴⁵⁰

Source: Form CO, Part E

(3642) Moreover, the Parties submit that MAH is widely available and that there are no supply constraints. Likewise, polymers to which MAH is grafted are, according to the Parties, not subject to significant supply constraints and can be obtained from a wide range of suppliers.

1.3.5. Conclusion

(3643) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not significantly impede effective competition with respect to MAH grafted polymers in the EEA.

2. VERTICAL LINKS

(3644) Dow and DuPont are active in markets that are vertically related or otherwise connected. The Transaction would give rise to several vertically affected markets. However, according to the market data provided by the Parties, there are no competition concerns, and the market investigation did not indicate that competition would be significantly impeded with regard to (any of) these products. These vertical links concern:

- (a) Glacial methacrylic acid – Acid co-polymers;
- (b) Polyolefin elastomers – MAH grafted polymers / Polyamide nylon resins / Polyoxymethylene;
- (c) Methyl acrylate – Ethylene acrylic elastomer;
- (d) Glycidyl methacrylate / butyl acrylate – Ethylene ter-polymers: E/nBA/GMA.

2.1. Vertical relationship between glacial methacrylic acid (upstream) – acid co-polymers (downstream)

2.1.1. Parties’ activities

(3645) Dow is active in the production and sale of GMAA. As explained in Section VIII.1.1, GMAA is produced by purifying crude methacrylic acid (“MAA”). GMAA is used as an input for the production of acid co-polymers, as well as for the production of other products. Dow’s sales of GMAA in 2015 were EUR [...] in the EEA and EUR [...] worldwide. Dow produces GMAA at its manufacturing facilities located [location of Dow’s manufacturing facilities] and sells GMAA under no specific brand name.

(3646) The Transaction would give rise to a vertically affected market. DuPont is not active in the production of GMAA, but it produces and sells EMAA acid co-polymers using GMAA as an input. As indicated in Section VIII.1.1, DuPont manufactures acid co-polymers in the [location of DuPont’s manufacturing facilities], and sells them under the Nucrel brand.

²⁴⁵⁰ The Parties submit that additional compounders may also be active in these spaces, for example: Polyram, Silon, Addivant, addComp Holland.

2.1.2. *Market definition*

2.1.2.1. Upstream market: Glacial methacrylic acid

(A) Relevant product market

(3647) The Commission has previously considered that MAA constitutes a distinct product market.²⁴⁵¹ However, the Commission has not yet investigated the scope of the relevant product market for GMAA in past decisions. The Parties submit that the relevant product market is the market for GMAA.

(3648) For the purpose of this Decision, the Commission considers that the exact product market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

(3649) In previous decisions,²⁴⁵² the Commission considered the relevant geographic market for MAA to be at least EEA-wide. However, the Commission has not yet investigated the scope of the relevant geographic market for GMAA. The Parties submit that the market for GMAA is global in scope or at least EEA-wide.

(3650) For the purpose of this Decision, the Commission considers that the exact geographic market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.1.2.2. Downstream market: Acid co-polymers

(A) Relevant product market

(3651) The relevant product market for acid co-polymers is addressed in Section VIII.1.1.2.1.

(B) Relevant geographic market

(3652) The relevant geographic market for acid co-polymers is addressed in Section VIII.1.1.2.2.

2.1.3. *Market shares*

2.1.3.1. Upstream market: Glacial methacrylic acid

(3653) The Parties submit that in 2015 Dow had a market share of [10-20]% (in volume and value) in the EEA, and [10-20]% (in volume and value) worldwide.

(3654) Dow competes: (i) with six undertakings in the EEA, including Evonik ([30-40]% in volume and value), Lucite ([20-30]% in volume and value), BASF ([10-20]% in volume and value) and Suzhou Anli ([5-10]% in volume and value); and (ii) with at least six undertakings worldwide, including LG Chem ([20-30]% in volume and value), Evonik ([10-20]% in volume and value), Lucite ([10-20]% in volume and value), Mitsubishi Rayon ([5-10]% in volume and value) and BASF ([5-10]% in volume and value).

²⁴⁵¹ Commission Decision in Case M.942 – Veba/Degussa (1997), recital 15.

²⁴⁵² Commission Decision in Case M.942 – Veba/Degussa (1997), recital 36.

2.1.3.2. Downstream market: Acid co-polymers

(3655) DuPont's market shares in the acid co-polymer market are discussed in Section VIII.1.1.3.2.

2.1.4. *Competitive Assessment: Glacial methacrylic acid (upstream) – Acid co-polymers (downstream)*

(3656) With regard to input foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in input foreclosure because it would have a market share of [10-20]% in the upstream market in the EEA and [10-20]% worldwide and it would continue to be challenged by competitors in the EEA (including Evonik, Lucite and BASF, which represent ~[70-80]% of the total GMAA market) and worldwide (including LG Chem and Evonik, which account together for [50-60]% of the total GMAA market). Moreover, GMAA is a homogeneous product so competitors of the merged entity in the downstream market could switch their supplies to the remaining upstream competitors.

(3657) In terms of customer foreclosure, the Parties would not have the ability or incentive to engage in customer foreclosure because the production of acid co-polymers represents a small portion of the total demand of GMAA (<15%). Moreover, DuPont is not an important customer of the upstream GMAA market. DuPont [details on DuPont's supply sources] worldwide GMAA purchases amounted to [...] in 2015 (that is less than [details on DuPont's purchases]% of worldwide GMAA sales).

2.1.5. *Conclusion*

(3658) On balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical relationship between the Parties' activities in the markets for GMAA and acid co-polymers.

2.2. Vertical relationship between polyolefin elastomers (upstream) – MAH grafted polymers / polyamide nylon 66 resins / polyoxymethylene (downstream)

2.2.1. *Parties' activities*

(3659) The term "elastomer" refers to a broad range of natural or synthetic polymers with elastic properties (colloquially known as "rubber"). Polyolefin elastomers ("POE"s) are a relatively new class of polymers that emerged in the early 1990s with recent advances in metallocene polymerisation catalysts. It represents one of the fastest growing synthetic polymers. In the past, the Commission found that synthetic elastomers are rarely if ever used without being mixed.²⁴⁵³

(3660) Dow is active in the production and sale of POE. Dow's sales of POE in 2015 were EUR [...] in the EEA and EUR [...] worldwide. Dow produces POE at its manufacturing facilities located in [location of Dow's manufacturing facilities]²⁴⁵⁴ and sells it under the brands Engage, Versify, Affinity GA, Infuse and Intune.

²⁴⁵³ Commission Decision in Case M.663 – Dow/DuPont (1996), recital 23.

²⁴⁵⁴ [Details on Dow's production facilities].

- (3661) MAH grafted polymers. The Transaction would give rise to a vertically affected market. DuPont and, to a lesser extent, Dow are active downstream as manufacturers and suppliers of MAH grafted polymers, namely POE-based MAH grafted polymers under the brands: Fusabond (DuPont) and RETAIN (Dow). [Details on DuPont’s production secrets]²⁴⁵⁵ DuPont produces MAH grafted polymers itself in its facilities [location of DuPont’s manufacturing facilities].
- (3662) Polyamide nylon resins are nylon resins produced by reacting adipic acid (a 6-carbon dibasic acid) and hexamethylene diamine (a 6-carbon aliphatic diamine). The majority of resins have molecular weights suited for injection moulding and some are used for filaments, wire jacketing, film and extruded shapes including rod, slab and sheet stock. The Transaction would give rise to a vertically affected market. DuPont produces polyamide nylon resins using POE as an input. DuPont’s sales of polyamide nylon resins in 2015 were EUR [...] in the EEA and EUR [...] worldwide. DuPont sells polyamide nylon 66 resins under the brands Minlon, Selar, Elvamide, Nyлинд and Zytel.²⁴⁵⁶
- (3663) DuPont’s acetal resins are semi-crystalline, thermoplastic polymers produced by the polymerisation of formaldehyde. They are also commonly referred to as polyoxymethylenes (“POM”s). POMs are produced either as homo-polymers or co-polymers and are used in automotive, appliances, construction, hardware, electronics and consumer goods industries, among others. The Transaction would give rise to a vertically affected market. DuPont produces POMs using POE as an input. DuPont’s sales of POMs in 2015 were EUR [...] in the EEA and EUR [...] worldwide. DuPont sells POMs under the brand Delrin (a homo-polymer).

2.2.2. Market definition

2.2.2.1. Upstream market: POEs

(A) Relevant product market

- (3664) In previous cases, the Commission has defined POE as a relevant product market.²⁴⁵⁷ The Commission left open whether the market could be further segmented into various separate relevant markets, namely ethylene octene dipolymer rubber (“EOM”), ethylene butene dipolymer rubber (“EBM”) and ethylene-hexene dipolymer rubber (“EHM”).²⁴⁵⁸
- (3665) The Parties submit that the relevant market encompasses at least two elastomers, ethylene propylene diene ter-polymer (“EPDM”) and POE (if not also other polymers), particularly due to the following considerations: (i) EPDM is suitable for POE applications, (ii) EPDM-based downstream products can be formulated to be substantially equivalent to POE, and (iii) EPDM and POE are priced similarly.
- (3666) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

²⁴⁵⁵ DuPont’s Fusabond is a family of functional polymers that have been modified (typically by MAH grafting) to help bond together dissimilar polymers used in toughened, filled and blended compounds.

²⁴⁵⁶ DuPont provided its data for all polyamide nylon compounds; however, Elvamide and Selar do not contain POEs or EPDM.

²⁴⁵⁷ Commission Decision in Case M.3733 – Dow/DDE (2005), recitals 11-13.

²⁴⁵⁸ Commission Decision in Case M.3733 – Dow/DDE (2005), recitals 11-13.

(B) Relevant geographic market

- (3667) In previous cases, the Commission has defined the relevant geographic market for POE as at least Union-wide.²⁴⁵⁹
- (3668) The Parties submit that the relevant geographic market for POE is at least EEA-wide or worldwide in scope due to the following considerations: (i) low transport costs, (ii) Dow supplies EPDM and POE on a worldwide basis, (iii) other suppliers supply EPDM and POE on a worldwide basis, and (iv) uniform pricing.
- (3669) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.2.2.2. Downstream market: MAH grafted polymers

(A) Relevant product market

- (3670) The relevant product market for MAH grafted polymers is addressed in Section VIII.1.3.2.1.

(B) Relevant geographic market

- (3671) The relevant geographic market for MAH grafted polymers is addressed in Section VIII.1.3.2.2.

2.2.2.3. Downstream market: Polyamide nylon resins

(A) Relevant product market

- (3672) The Commission has not yet investigated the scope of the relevant product market for polyamide nylon resins in past decisions. The Parties submit that a narrow putative market would include only nylon resins.
- (3673) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

- (3674) The Commission has not yet investigated the scope of the relevant geographic market for polyamide nylon resins in past decisions. The Parties submit that the relevant geographic market can be left open and provide share estimates at the EEA and worldwide levels.
- (3675) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

²⁴⁵⁹ Commission Decision in Case M.663 – Dow/DuPont (1996), recital 31; see also Commission Decision in Case M.3733 – Dow/DDE (2005), recital 14.

2.2.2.4. Downstream market: POMs

(A) Relevant product market

- (3676) The Commission has not yet investigated the scope of the relevant product market for POMs in past decisions. The Parties submit that the appropriate product market definition is a single market for POMs (including both co-polymer and homo-polymer resins) because: (i) they are used in similar applications, and (ii) the molecular structure and properties of these products are very similar.
- (3677) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

- (3678) The Commission has not yet investigated the scope of the relevant geographic market for POMs in past decisions. The Parties submit that the relevant geographic market can be left open and provide share estimates at the EEA and worldwide levels.
- (3679) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.2.3. Market shares

2.2.3.1. Upstream market: POEs

- (3680) The Parties submit that in 2015 Dow had a market share of [50-60]% (in volume) and [30-40]-[40-50]% (in value) in the EEA and [40-50]% (in volume) and [40-50]% (in value) worldwide.
- (3681) Dow competes: (i) with at least five undertakings in the EEA, including Borealis ([10-20]% in volume), LG ([10-20]% in volume), Mitsui ([10-20]% in volume) and ExxonMobil ([5-10]% in volume);²⁴⁶⁰ and (ii) with five undertakings worldwide, including ExxonMobil ([10-20]% in volume and value), Mitsui ([10-20]% in volume and value), SK/SABIC ([5-10]% in volume and value) and LG Chem ([5-10]% in volume and value).

2.2.3.2. Downstream markets: MAH grafted polymers

- (3682) DuPont's market shares of MAH grafted polymers are discussed in Section VIII.1.3.3.

2.2.3.3. Downstream markets: Polyamide nylon resins

- (3683) The Parties submit that in 2015 DuPont had a market share of [20-30]% (in volume and value) in the EEA and worldwide. DuPont competes with at least five undertakings in the EEA, including BASF ([20-30]% in volume and value) and Solvay ([10-20]% in volume and value), and with at least five undertakings

²⁴⁶⁰ The Parties submit that market shares by value were in 2015: (i) Borealis: [10-20]%, (ii) LG: [10-20]%, (iii) Mitsui: [10-20]%, and (iv) ExxonMobil: [5-10]%.

worldwide, including Solvay ([10-20]% in volume and value), BASF ([10-20]% in volume and value) and Ascend ([10-20]% in volume and value).

2.2.3.4. Downstream markets: POMs

- (3684) The Parties submit that in 2015 DuPont had a market share of [10-20]% (in volume) and [20-30]% (in value) in the EEA and [10-20]% (in volume) and [10-20]% (in value) worldwide.
- (3685) DuPont competes: (i) with at least five undertakings in the EEA, including Celanese ([40-50]% in volume and value) and BASF ([10-20]% in volume and value); and (ii) with at least eight undertakings worldwide, including Celanese ([20-30]% in volume and value), Polyplastics ([10-20]% and [10-20]% in volume and value, respectively), Korea Engineering Plastics ([10-20]% in volume and value), Mitsubishi Engineering Plastics ([5-10]% in volume and value), BASF ([5-10]% in volume and value) and YuTianHua Group ([5-10]% in volume and value).

2.2.4. *Competitive Assessment*

- (3686) With regard to input foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in input foreclosure because it would continue to be challenged by a number of competitors in the upstream market in the EEA (including Borealis, LG, Mitsui and ExxonMobil) and worldwide (including ExxonMobil, Mitsui, SK/SABIC and LG Chem). The Parties submit that POE is a relatively homogeneous product and downstream competitors would be able to switch to Dow's upstream competitors. [Details of Parties' production capacity]²⁴⁶¹ [details on Parties competitors' production capacities]²⁴⁶² and at least two suppliers have recently entered the POE market, namely SK/Sabic (2014)²⁴⁶³ and Borealis (2016).²⁴⁶⁴
- (3687) For MAH grafted polymers, in terms of customer foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in customer foreclosure because DuPont's shares in the downstream market are of [20-30]%-[30-40]% in the EEA and [20-30]% worldwide and it would continue to face competition from at least six undertakings in the EEA (including Arkema, Mitsui and LyondellBasell, which represent ~[50-60]% (in volume) of the EEA MAH grafted polymer market) and from at least four undertakings worldwide (including Mitsui, LyondellBasell and Arkema, which represent ~[40-50]% (in volume) of the global MAH grafted polymer market).
- (3688) Moreover, the Parties submit that DuPont is not an important customer for Dow's competitors in the upstream market. DuPont's worldwide POE purchases for use in MAH-grafted polymers amounted to [...] in 2015 (that is ~[...]% of total POE sales in the EEA, and [...] % of total POE sales worldwide).

²⁴⁶¹ Form CO, part G, paragraph 42.

²⁴⁶² See press release at: <http://www.businesskorea.co.kr/english/news/industry/15349-elastomer-production-lg-chem-build-korea%E2%80%99s-biggest-elastomer-plant> (ID12579); see also <http://www.ogedata.com/news/show-56111.html> (ID12580).

²⁴⁶³ See press release at: <http://www.plasticstoday.com/sabic-inks-metallocene-pe-jv-koreas-sk-global/206652118520633> (ID12582).

²⁴⁶⁴ See Borealis Group's website at: <http://www.borealisgroup.com/en/company/news-events/news/2016/6/Borealis-extends-Queo-plastomers-portfolio-with-polyolefin-elastomers-rebrands-Compact-technology-to-Borceed/> (ID12581).

- (3689) Furthermore, the Parties claim that the Transaction would have no effect in these markets since [details on DuPont's supply sources].
- (3690) For polyamide nylon resins, in terms of customer foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in customer foreclosure because DuPont's shares in the downstream market are [20-30]% in the EEA and worldwide and it would continue to face competition in the downstream market from at least five undertakings in the EEA (including BASF and Solvay), and from at least five undertakings worldwide (including Solvay, BASF and Ascend).
- (3691) Moreover, the Parties submit that DuPont is not an important customer for Dow's competitors in the upstream market. DuPont's worldwide POE purchases for use in polyamide nylon resins amounted to [...] in 2015 (that is ~[...]% of total POE sales in the EEA, and [...]% of total POE sales worldwide).
- (3692) Furthermore, the Parties claim that the Transaction would have no effect in these markets since [details on DuPont's supply sources].
- (3693) For POMs, in terms of customer foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in customer foreclosure because DuPont's shares in the downstream market are [10-20]%-[20-30]% in the EEA and [10-20]% worldwide and it would continue to face competition in the downstream market from at least five undertakings in the EEA (including Celanese and BASF, which represent ~[50-60]% (in volume) of the total POM market) and from at least eight undertakings worldwide (including Celanese, Polyplastics and Korea Engineering Plastics, which represent ~[40-50]% (in volume) of the total POM market).
- (3694) Moreover, the Parties submit that DuPont is not an important customer for Dow's competitors in the upstream market. DuPont's worldwide POE purchases for use in POM amounted to [...] in 2015 (that is <[...]% of total POE sales in the EEA and <[...]% of total POE sales worldwide).
- (3695) Furthermore, the Parties claim that the Transaction would have no effect in these markets since [details on DuPont's supply sources].

2.2.5. *Conclusion*

- (3696) On balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical relationship between the Parties' activities in the upstream market for POE and the downstream markets for MAH grafted polymers, polyamide nylon resins and POM.

2.3. Vertical relationship between methyl acrylate (upstream) – (ii) ethylene acrylate elastomers (downstream)

2.3.1. *Parties' activities*

- (3697) Dow is active in the production and sale of methyl acrylate ("MA"). MA ($\text{CH}_2\text{CHCO}_2\text{CH}_3$) is the methyl ester of acrylic acid. It is made by the esterification of methanol and crude acrylic acid. It is used as an additive in copolymer-based adhesives, fibers, non-acrylic polymers (food packaging) and plastics. It is also used as the starting block for anti-oxidants and amino esters. Dow's sales of MA in 2015 were EUR [...] in the EEA and EUR [...] worldwide. Dow produces MA at its

manufacturing facilities located in [location of Dow's manufacturing facilities], and sells it under no specific brand name.

- (3698) The Transaction would give rise to vertically affected markets. DuPont is not active in the production and sale of MA but it produces ethylene acrylic elastomers using MA as an input.
- (3699) Ethylene acrylic elastomers are synthetic elastomers produced through the addition of various co-polymers to ethylene and propylene in low or high polymerisation processes, depending on the end-product. DuPont's ethylene acrylic elastomers are used in oil-resistant applications such as turbo charger hoses and oil resistant cables. DuPont's sales of ethylene acrylic elastomers in 2015 were EUR [...] in the EEA and EUR [...] worldwide. DuPont produces ethylene acrylic elastomer at its manufacturing facilities located in [location of DuPont's production facilities] and sells it under the brand Vamac.

2.3.2. *Market definition*

2.3.2.1. Upstream market: Methyl acrylate

(A) Relevant product market

- (3700) MA is an acrylate ester. The Commission has previously considered that each acrylate ester constitutes a distinct product market.²⁴⁶⁵ The Parties agree with that product market definition and submit that the relevant product market is the market for MA.
- (3701) For the purpose of this Decision, the Commission considers that the exact product market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

- (3702) The Commission considered in previous decisions the relevant market to be not broader than EEA-wide.²⁴⁶⁶ The Parties submit that the relevant geographic market can be left open and provide share estimates at the EEA and worldwide levels.
- (3703) For the purpose of this Decision, the Commission considers that the exact geographic market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.3.2.2. Downstream market: Ethylene acrylic elastomer

(A) Relevant product market

- (3704) The Commission has previously considered that specific synthetic elastomers fall within distinct relevant product markets on the basis that each has specific characteristics (for example, heat and oil resistance) and costs that define the applications for which they may be used.²⁴⁶⁷

²⁴⁶⁵ Commission Decision in Cases M.5424 – Dow/Rohm & Haas (2009), recitals 30-73; M.6178 – Arkema/Total's Resin Division (2011), recitals 39-41; and M.7465 – Arkema/Bostik (2015), recitals 16-19.

²⁴⁶⁶ Commission Decision in Case M.5424 – Dow/Rohm & Haas (2009), recital 59.

²⁴⁶⁷ Commission Decision in Case M.663 – Dow/DuPont (1996), recital 21.

(3705) The Parties submit that ethylene acrylic elastomers compete with other ethylene acrylic elastomers and also with polyacrylic rubbers (also known as ACM), which can be substitutable from a demand side perspective following testing and qualification by customers.

(3706) For the purpose of this Decision, the Commission considers that the exact product market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

(3707) The Commission considered in previous decisions the relevant market to be at least Union-wide, “and probably larger.”²⁴⁶⁸ The Parties submit that the relevant geographic market can be left open and provide share estimates at the EEA and worldwide levels.

(3708) For the purpose of this Decision, the Commission considers that the exact geographic market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.3.3. *Market shares*

2.3.3.1. Upstream market: Methyl acrylate

(3709) The Parties submit that in 2015 Dow had a market share of [30-40]% (in volume and value) in the EEA and [10-20]% (in volume and value) worldwide.

(3710) In the EEA, Dow competes with at least six undertakings, including Arkema ([20-30]% in volume and value), Hexion ([20-30]% in volume and value) and BASF ([10-20]% in volume and value). At a worldwide level, Dow competes with at least five undertakings, including Formosa ([10-20]% in volume and value), LG Chemicals ([10-20]% in volume and value), Jurong Chemicals ([10-20]% in volume and value), Arkema ([5-10]% in volume and value) and Wanhua Chemicals ([5-10]% in volume and value).

2.3.3.2. Downstream market: Ethylene acrylic elastomers

(3711) The Parties submit that in 2015 DuPont’s market shares for ethylene acrylic elastomers and ACM were [60-70]% (in volume) in the EEA and [50-60]% (in volume) worldwide.²⁴⁶⁹

(3712) DuPont competes with at least two undertakings in the EEA, namely Zeon ([10-20]% in volume) and Unimatec ([10-20]% in volume), and with at least four undertakings worldwide, namely Zeon ([20-30]% in volume), Unimatec ([10-20]% in volume), Tophe ([5-10]% in volume) and Denka ([5-10]% in volume).

²⁴⁶⁸ Commission Decision in Case M.663 – Dow/DuPont (1996), recital 31; see also Commission Decision in Case M.3733 – Dow/DDE (2005), recital 14.

²⁴⁶⁹ The Parties submit that DuPont’s market share by value were in 2015: [60-70]% in the EEA and [50-60]% worldwide.

2.3.4. *Competitive Assessment*

- (3713) With regard to input foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in input foreclosure because the merged entity would continue to be challenged by a number of competitors in the upstream market, including Arkema, Hexion and BASF. Moreover, MA is a homogeneous product so competitors of the merged entity in the downstream market could switch their supplies to the remaining upstream competitors. Additionally, the Parties submit that [details on DuPont's manufacturing costs], such as DuPont's Vamac.
- (3714) In terms of customer foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in customer foreclosure because it would continue to face competition from at least two undertakings in the EEA, Zeon and Unimatec, and at least four undertakings worldwide (Zeon, Unimatec, Tophe and Denka). Moreover, DuPont is not an important customer in the downstream market. DuPont [details on DuPont's purchases] and its worldwide MA purchases amounted to ~[...] (that is less than [...] % of MA worldwide market). Furthermore, ethylene acrylic elastomers represent a small portion of the total demand of MA (<[the percentage of the total demand of MA that is purchased in order to be used in the production of ethylene acrylic elastomers] %).

2.3.5. *Conclusion*

- (3715) On balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical relationship between the Parties' activities in the markets for MA and ethylene acrylic elastomers.

2.4. Vertical relationship between glycidyl methacrylate / butyl acrylate (upstream) – ethylene ter-polymer: E/nBA/GMA (downstream)

2.4.1. *Parties' activities*

- (3716) Dow is active in the production and sale of glycidyl methacrylate ("GMA") and butyl acrylate ("BA").
- (3717) GMA is produced from GMAA and epichlorohydrin. It is used mainly as a crosslinker in the production of polymers for automotive clear-coat applications (that is the top finish on automobiles). GMA is also used in the production of downstream products, including synthetic latex polymers, asphalt modifiers, thermoplastic modification, latex modification and non-automotive coatings (such as construction (for example flooring) and furniture). Dow's sales of GMA in 2015 were EUR [...] in the EEA and EUR [...] worldwide. Dow produces GMA at its manufacturing facilities located in [location of Dow's production facilities], and sells it under no specific brand name.
- (3718) BA ($\text{CH}_2=\text{CHCOOC}_4\text{H}_9$) is normally produced by a simple reaction between acrylic acid and n-butanol, with water as a by-product. It is a colourless liquid with a sharp odour. BA offers significant advantages as an additive in a wide range of co-polymer-based finishes, coatings, sealants, adhesives, inks, lubricants, saturants, textiles, elastomers and plastics. Dow's sales of BA in 2015 were EUR [...] in the EEA and EUR [...] worldwide. Dow produces BA at its manufacturing facilities

located in [location of Dow's production facilities] and sells it under no specific brand name.²⁴⁷⁰

- (3719) The Transaction would give rise to vertically affected markets. DuPont is not active in the production and sale of GMA or BA but it produces ethylene ter-polymers ethylene/n-butyl acrylate/glycidyl methacrylate ("E/nBA/GMA") using GMA and BA as inputs.
- (3720) E/nBA/GMA ter-polymers are a family of ethylene copolymer resins produced in autoclave reactors with high pressure processes that include different chemistries and that can be compounded with other resins to increase flexibility, toughness, long-term outdoor exposure and soft touch. E/nBA/GMA ter-polymers are predominantly used for asphalt paving. [Details on DuPont's use of ter-polymers]. DuPont's sales of E/nBA/GMA ter-polymers in 2015 were EUR [...] in the EEA and EUR [...] worldwide. DuPont sells E/nBA/GMA ter-polymers under the Elvaloy PTW brand.

2.4.2. *Market definition*

2.4.2.1. Upstream markets: Glycidyl methacrylate

(A) Relevant product market

- (3721) The Commission has not yet investigated the scope of the relevant product market for GMA in past decisions. The Parties submit that GMA constitutes a distinct product market. The Parties argue that there is no demand-side substitutability for GMA.
- (3722) For the purpose of this Decision, the Commission considers that the exact product market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

- (3723) The Commission has not yet investigated the scope of the relevant geographic market for GMA in past decisions.
- (3724) The Parties submit that the relevant market is worldwide for the following reasons:
- (a) GMA is a commodity product traded globally. GMA is almost always readily available and generally has the same characteristics regardless of which supplier produces it.
 - (b) There is virtually no production of GMA in the EEA. The main manufacturers are located in North America and Japan (for example, Mitsubishi Gas Chemical and NOF Corporation), as well as China. GMA is exported from these countries to customers located worldwide.
 - (c) Transportation costs do not play a significant role in this market. The average transportation cost as a proportion of the final sale for GMA shipped from the US into the EEA is around [...] %.

²⁴⁷⁰

[Information on Dow's production facilities, including its location].

(3725) For the purpose of this Decision, the Commission considers that the exact geographic market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.4.2.2. Upstream market: Butyl acrylate

(A) Relevant product market

(3726) BA is an acrylate ester. The Commission has previously considered that each acrylate ester constitutes a distinct product market.²⁴⁷¹ The Parties agree with that market definition.

(3727) For the purpose of this Decision, the Commission considers that the exact product market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

(3728) The Commission considered in previous decisions the relevant market to be at least EEA-wide.²⁴⁷² The Parties submit that acrylate esters are commodity products that are traded on a global basis and do not vary between suppliers in terms of chemical properties.

(3729) For the purpose of this Decision, the Commission considers that the exact geographic market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.4.2.3. Downstream market: E/nBA/GMA ter-polymers

(A) Relevant product market

(3730) The Commission has not yet investigated the scope of the relevant product market for ethylene ter-polymers.

(3731) The Parties submit that E/nBA/GMA ter-polymers are predominantly used for asphalt paving, in which they face not only in-kind competition from a demand side perspective, but also significant not-in-kind competition from styrene-butadiene-styrene (“SBS”) polymers, which are used to modify bitumen for paving applications. According to the Parties, these products, GMA and SBS generally are not interchangeable or substitutable from a demand-side perspective.²⁴⁷³ However, there is significant supply-side substitutability among ethylene ter-polymers.

(3732) For the purpose of this Decision, the Commission considers that the exact product market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

²⁴⁷¹ Commission Decision in Cases M.5424 – Dow/Rohm & Haas (2009), recitals 30-73; M.6178 – Arkema/Total’s Resin Division (2011), recitals 39-41; and M.7465 – Arkema/Bostik (2015), recitals 16-19.

²⁴⁷² Commission Decision in Case M.5424 – Dow/Rohm & Haas (2009), recital 34.

²⁴⁷³ Form CO, part I, paragraph 393.

(B) Relevant geographic market

- (3733) The Commission has not yet investigated the scope of the relevant product market for ethylene ter-polymers.
- (3734) The Parties submit that the relevant geographic market is worldwide. DuPont supplies these products globally from a few manufacturing facilities. Transport costs (at approximately USD [...] per kg) and tariffs (at about the same rate) are generally low.
- (3735) For the purpose of this Decision, the Commission considers that the exact geographic market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.4.3. *Market shares*

2.4.3.1. Upstream market: Glycidyl methacrylate

- (3736) The Parties submit that in 2015 Dow had a market share of [50-60]% (in volume and value) in the EEA, and [40-50]% (in volume and value) worldwide.
- (3737) The Parties claim that in the EEA, Dow competes mainly with Chinese-established companies, which have a collective market share of ~[20-30]%. Dow competes worldwide with at least two undertakings, Mitsubishi Gas Chemical ([20-30]% in volume and value) and NOF Corporation ([10-20]% in volume and value), as well as other competitors such as Chinese-established companies.

2.4.3.2. Upstream market: Butyl acrylate

- (3738) The Parties submit that in 2015 Dow had a market share of [30-40]% (in volume and value) in the EEA and [10-20]% (in volume and value) worldwide.
- (3739) Dow competes: (i) with at least five undertakings in the EEA, including Arkema ([20-30]% in volume and value), BASF ([10-20]% in volume and value) and Hexion ([5-10]% in volume and value); and (ii) with at least six undertakings worldwide, including BASF (market leader with a share of [10-20]% in volume and value), Formosa ([10-20]% in volume and value), Zhejiang ([10-20]% in volume and value), Arkema ([5-10]% in volume and value) and Jurong Chemical ([5-10]% in volume and value).

2.4.3.3. Downstream market: E/nBA/GMA ter-polymers

- (3740) The Parties submit that in 2015 DuPont had a market share of [10-20]% (in volume) and [10-20]% (in value) in the EEA and [60-70]% (in volume) and [70-80]% (in value) worldwide.
- (3741) DuPont competes with Arkema in the EEA ([80-90]% in volume and [80-90]% in value) and worldwide ([30-40]% in volume and [20-30] in value).

2.4.4. *Competitive Assessment*

2.4.4.1. Glycidyl methacrylate (upstream) –E/nBA/GMA ter-polymers (downstream)

- (3742) With regard to input foreclosure, the Commission notes that, after the Transaction, the merged would not have the ability or incentive to engage in input foreclosure because it would continue to be challenged by some competitors in the upstream market in the EEA and worldwide (namely Mitsubishi Gas Chemical NOF Corporation and Chinese-established companies). Moreover, GMA is a

homogeneous product so competitors of the merged entity in the downstream market could switch their supplies to the remaining upstream competitors. Furthermore, [details on Dow's future plans, sales and agreements].^{2474,2475}

(3743) In terms of customer foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in customer foreclosure because E/nBA/GMA ter-polymers represent a small portion of the global GMA demand (<[the percentage of the total demand of GMA that is purchased in order to be used in the production of the E/nBa/GMA ter-polymers]). Moreover, DuPont is not an important customer in the downstream market in the EEA or worldwide. DuPont [details on DuPont's supply sources] worldwide GMA purchases amounted to [...] in 2015 (that is <[...]% of global GMA sales).

2.4.4.2. Butyl acrylate (upstream) –E/nBA/GMA ter-polymers (downstream)

(3744) With regard to input foreclosure, the Commission notes that after the Transaction the merged entity would not have the ability or incentive to engage in input foreclosure because it would continue to be challenged by a number of competitors in the upstream market in the EEA (including Arkema, BASF and Hexion, which represent ~[40-50]% of the total BA market) and worldwide (including BASF - the market leader, Arkema, Formosa, Zhejiang and Jurong Chemicals). Moreover, BA is a homogeneous product so competitors of the merged entity in the downstream market could switch their supplies to the remaining upstream competitors.

(3745) In terms of customer foreclosure, the Commission notes that, after the Transaction, the merged entity would not have the ability or incentive to engage in customer foreclosure because E/nBA/GMA ter-polymers represent a small portion of the global BA demand (<[percentage of global BA demand that is bought to be used in E/nBA/GMA ter-polymers]). Moreover, DuPont is not an important customer in the downstream market for E/nBA/GMA ter-polymers. DuPont [details on DuPont's supply sources] worldwide BA purchases amounted to [...] in 2015 (that is to say less than [...]% of the global BA sales).

2.4.5. *Conclusion*

(3746) On balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical relationship between the Parties' activities in the markets for GMA, BA and E/nBA/GMA ter-polymers.

SECTION IX: SPECIALTY PRODUCTS

(3747) The Specialty Products division of the merged entity is planned to combine DuPont's activities in Electronics & Communications, Safety & Protection, Nutrition & Health and Industrial Biosciences (EUR [...] total revenue in 2014) with Dow's Electronic Materials business (EUR [...] total revenue in 2014). There are a number of horizontal overlaps and vertical relationships between the Parties' activities in this area, of which those relevant are further described in this section.

²⁴⁷⁴ Parties' response to the Commission's request for information RFI 14, Annex 2.9.

²⁴⁷⁵ Parties' response to the Commission's request for information RFI 14, Annex 2.10.

1. HORIZONTAL OVERLAPS

1.1. Post-etch residue removal products

1.1.1. Overview of the products

- (3748) Post-etch residue removal ("PERR") products are mixtures formulated to remove any residue from the substrate after the etching process.
- (3749) Etching is a process used in the fabrication of semiconductors. It is used to chemically remove layers from the surface of a wafer, in order to define the necessary circuits of a semiconductor. Before etching begins, a wafer is coated with a photoresist or a hard mask and is exposed to a pattern during photolithography. Etching removes material only from the pattern traces, forming the circuit.

1.1.2. The Parties' activities

- (3750) Both Parties produce PERR products.
- (3751) Dow manufactures PERR products [details on the location of Dow's production facilities] at its manufacturing facilities in [details on the location of Dow's production facilities]. Dow produces PERR products for single wafer cleaning tools, as well as for batch spray cleaning tools. According to the Parties, Dow's PERR products are designed for older etching technology. In particular, they are not suited for advanced designs or copper applications.
- (3752) DuPont manufactures approximately [details on DuPont's quantities produced and location of production facilities]% of its PERR products [location of DuPont's production facilities] at its manufacturing facilities [location of DuPont's production facilities], with the remaining production being [details on DuPont's supply sources]. DuPont offers both aqueous and semi-aqueous organic mixture formulates to remove residues from substrate surfaces after via, poly, and metal etch processes. Some of DuPont's PERR products are suited for advanced designs and copper applications.

1.1.3. Market definition

1.1.3.1. Relevant product market

- (3753) The Commission has not examined the definition of the relevant market in relation to PERR products in past decisions.
- (3754) The Parties submit that from a demand-side perspective, a distinction could be drawn between traditional PERR products, which are not suited for copper applications, and PERR products designed for copper applications. In particular, traditional PERR products cannot be used on copper-based chips, while PERR products designed for copper applications cannot be used on aluminum-based chips.
- (3755) However, the Parties also note that, from a supply-side perspective, there is a degree of supply-side substitution for a number of reasons. First, the assets and production process for producing both categories of PERR products are the same and, in practice, the same production line could be used to manufacture both categories. Second, once an appropriate blend has been formulated, there is no unique know-how or technology needed to create either category of a PERR product. Third, many companies ([details on the Parties' activities and supply sources]) active in this sphere make extensive use of contract manufacturing, thereby lowering any potential barriers to entry for other suppliers of PERR products.

- (3756) The vast majority of respondents to the Commission's market investigation agreed with the distinction between traditional PERR products and PERR products for copper applications. According to their replies, these two categories are designed for application on different metals (aluminium vs copper) and customers do not use them interchangeably. The replies were however mixed regarding supply-side substitutability.
- (3757) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition. Since there is no overlap in the Parties' activities with respect to PERR products for copper applications (which are not produced by Dow), the Commission assesses in this Decision the following plausible relevant markets: (i) a market for all PERR products; and (ii) a market for traditional PERR products.

1.1.3.2. Relevant geographic market

- (3758) The Parties submit that the market for PERR products is worldwide in scope based on the following considerations: (i) transportation costs for PERR products are low, amounting to [details on transport costs]% of the overall cost of the product; (ii) there are no non-tariff barriers to trade; (iii) prices globally are homogeneous and primarily determined based on the volume purchased by the customer; similar volumes in the EEA have similar prices in North America or in Asia-Pacific regions; and (iv) many EEA customers have semiconductor manufacturing footprints both in the EEA and in North America and Asia-Pacific regions.
- (3759) The respondents to the Commission's market investigation indicated that the suppliers typically supply and customers typically purchase PERR products on a global scale.
- (3760) For the purpose of this Decision, the Commission considers that the exact market definition (for example whether EEA-wide or worldwide) can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

1.1.4. Market shares

- (3761) In the EEA market for all PERR products, in 2015 Dow had a market share of [0-5]% (by volume) and [0-5]% (by value) and DuPont had a market share of [50-60]% (by volume) and [60-70]% (by value), with a combined market share of [60-70]% (by volume) and [60-70]% (by value). Other significant competitors include Avantor ([10-20]% by volume; [10-20]% by value), MGC ([10-20]% by volume; [10-20]% by value) and TOK ([5-10]% by volume; [5-10]% by value). In the worldwide market for all PERR products, in 2015 Dow had a market share of [0-5]% (by volume) and [0-5]% (by value) and DuPont had a market share of [20-30]% (by volume) and [30-40]% (by value), with a combined market share of [20-30]% (by volume) and [30-40]% (by value). Dow and DuPont compete with at least five other significant players, such as ATMI ([20-30]% by volume and value), APC ([10-20]% by volume; [10-20]% by value), MGC ([10-20]% by volume and value), Avantor ([5-10]% by volume and value) and Nagase ([5-10]% by volume and value).
- (3762) In the EEA market for traditional PERR products only, in 2015 Dow had a market share of [0-5]% (by volume and value) and DuPont had a market share of [90-100]% (by volume and value), with a combined market share of [90-100]%. Other

competitors in the EEA include APC ([0-5]%), ATMI ([0-5]%) and Avantor ([0-5]%). In the worldwide market for traditional PERR products only, in 2015 Dow had a market share of [0-5]% (by volume and value) and DuPont had a market share of [20-30]% (by volume) and [40-50]% (by value), with a combined market share of [20-30]% (by volume) and [40-50]% (by value). Dow and DuPont compete with at least five other significant players, in particular Nippon Zeon ([30-40]% by volume; [5-10]% by value), APC ([10-20]% by volume; [20-30]% by value), Nagase ([5-10]% by volume; [5-10]% by value), MGC ([5-10]% by volume; [5-10]% by value) and Avantor ([0-5]% by volume; [5-10]% by value).

1.1.5. *Competitive assessment*

- (3763) The Commission notes that DuPont has a strong presence in PERR products if the geographic market is defined as limited to the EEA. In particular, DuPont's market share reaches approximately [60-70]% for all PERR products and [90-100]% for traditional PERR products in the EEA. DuPont explains its stronger position in the EEA compared to the rest of the world due to its first mover advantage in the 1990s. However, DuPont's existing patents have been expiring in 2010-2016 which is likely to increase competitive pressure on DuPont in the future.
- (3764) Dow, on the other hand, is a very small player in PERR products. Its shares in the EEA range between [0-5]% and [0-5]%. In fact, it has only [details on Dow's customer list] in the EEA. According to the Parties, [details on Dow's sales and research and development activities]. The Commission considers that these elements indicate that Dow is an insignificant player in PERR products and the Transaction would thus bring only a limited increment to DuPont's existing position.
- (3765) Moreover, based on the results of the market investigation, the Commission finds that the Parties are unlikely to be close competitors on the possible markets for PERR products. DuPont's and Dow's traditional PERR products are not based on the same technology: Dow's PERR products are fluoride-based, while DuPont's traditional PERR products are mainly hydroxylaminebased. These two technologies have different characteristics with different removal processes. Hydroxylamine-based PERRs are highly selective cleaners. The chemistry is effective at completely removing unwanted process residues over a wide range of concentrations, temperatures, and other process conditions without damaging the device being cleaned. Hydroxylamine-based PERR products have a broader range of applications. By contrast, non-hydroxylamine, fluoride-based PERR products (such as Dow's) can provide adequate cleaning but are not as chemically selective and require precise control of process parameters to avoid damaging the device, which have a very high value compared to the cost of the PERR product. Customers who have established operations based on hydroxylamine PERR products may be not inclined to consider alternatives such as fluoride-based cleaners due to the operational impact and risk with regard to process control.
- (3766) The market investigation confirmed the lack of closeness between the Parties' PERR products with no respondent considering them to be close alternatives. Also, based on the Commission's review, [details on the content of the Parties' internal documents].
- (3767) The majority of respondents to the market investigation, including the only EEA customer of Dow, opined that following the Transaction there would remain credible alternatives to Dow/DuPont for purchasing PERR products.

1.1.6. *Conclusion*

(3768) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition, in particular through strengthening of DuPont's dominant position, due to the limited horizontal overlap between the Parties' activities in the markets for PERR products.

1.2. **Breathable membranes for building applications**

1.2.1. *Overview of the products*

(3769) Breathable membranes are used in construction to separate the interior and exterior of a building and serve three main purposes: (i) they provide a vapor-permeable membrane that allows moisture in framing lumber or insulation to escape; (ii) they create a secondary weather barrier behind the building's siding, preventing wind-driven rain and other water from reaching the sheathing; and (iii) they serve as an air barrier to prevent air infiltration, helping to reduce heating and cooling costs.

1.2.2. *The Parties' activities*

(3770) In the EEA, Dow supplies breathable membranes for residential building applications, and in particular for thermally insulated wooden constructions, under its *Vempro* brand. The *Vempro* brand includes two products: (i) *Vempro*, for wall applications; and (ii) *VemproR+* for roof applications. Dow does not produce *Vempro* or *VemproR+* itself but outsources manufacturing to a third party, which produces these membranes [details on Dow's supply sources] using a common 3-layer polypropylene technology.

(3771) In 2015, Dow's total *Vempro* and *Vempro R+* sales in the EEA were approximately EUR [...].

(3772) DuPont supplies breathable membranes for residential building applications under the *Tyvek* brand name. *Tyvek* is a synthetic material consisting of flash-spun high density polyethylene ("HDPE") fibers and is wind-tight and water resistant. It is primarily designed for use in roof and wall applications in new construction, refurbishment or extension projects for residential buildings. *Tyvek* used for roof applications undergoes an additional lamination process so as to provide further reinforcement, which, together with printing and slitting the "mother-rolls", is done by third-party "converters".

(3773) In 2015, DuPont's total sales of *Tyvek* breathable membranes amounted to approximately EUR [...] in the EEA.

1.2.3. *Market definition*

1.2.3.1. Relevant product market

(3774) The Commission has not examined the definition of the relevant market specifically in relation to breathable membranes in the past.

(3775) The Parties submit that the relevant product market is no narrower than breathable membranes for building applications (including both wall and roof applications), if not broader in scope. According to the Parties, there is a significant degree of supply-side substitution between these two product types because there are very limited differences in their respective manufacturing processes. Also, it is claimed that there is a degree of demand-side substitutability between breathable membranes for roof and for wall applications. Both membranes have similar water retention and vapor

permeability. Notwithstanding that roof membranes are generally subject to more stringent certifications than wall membranes, these certifications are not a legal requirement but rather a testament to quality.

- (3776) The results of the market investigation were not conclusive as to whether breathable membranes should be distinguished between wall and roof applications. The respondents to the Commission's questionnaire were almost equally split when replying whether these two types of breathable membranes differ in their characteristics. The majority of respondents, however, noted that there are substantial price differences, with breathable membranes for roof applications being more expensive. From a supply-side perspective, only one respondent considered that it would be easy and profitable for a producer of breathable membranes for one application to switch to another, in response to a small but significant, non-transitory price increase.
- (3777) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

1.2.3.2. Relevant geographic market

- (3778) The Parties submit that the market for breathable membranes for building applications is EEA-wide in geographic scope due to low transportation costs (amounting to approximately [...] % of the overall cost of the product), general similarity of prices across the EEA, and the use of the same brands by producers.
- (3779) While breathable membranes for roof applications are used across the EEA, membranes for wall applications are used primarily in the Nordic region (namely Denmark, Finland, Sweden, and Norway) because these products are particularly suited for timber-wood housing, which is especially popular in this region.
- (3780) The majority of the respondents to the market investigation indicated that the geographic scope of the relevant market is regional, while around a third of respondents considered it to be EEA-wide. Only one respondent believed that the market was national.
- (3781) For the purpose of this Decision, the Commission considers that the scope of the geographic market for breathable membranes for building applications is at least regional.

1.2.4. Market shares

- (3782) In the Nordic region,²⁴⁷⁶ the market shares of the relevant suppliers of breathable membranes for building applications were the following.

²⁴⁷⁶ In the EEA, the Parties' combined market share for breathable membranes for building applications is around [10-20] % (also separately for roof and wall applications). The possible EEA market is therefore not discussed further in this Decision.

Table 93 – Market shares for breathable membranes for building applications in the Nordic region (2015)

	Overall Building Applications		Roof Only		Wall Only	
	Sale (EUR M)	%	Sale (EUR M)	%	Sale (EUR M)	%
DuPont	[...]	[20-30]%	[...]	[20-30]%	[...]	[20-30]%
Dow	[...]	[0-5]%	[...]	[0-5]%	[...]	[0-5]%
<i>Combined</i>	[...]	[20-30]%	[...]	[20-30]%	[...]	[20-30]%
T-Emballage	[...]	[10-20]- [20-30]%	[...]	[0-5]- [5-10]%	[...]	[20-30]%
Icopal	[...]	[20-30]- [30-40]%	[...]	[20-30]- [30-40]%	[...]	[20-30]%
Monier & Klöber	[...]	[5-10]- [10-20]%	[...]	[5-10]- [10-20]%	[...]	[0-5]- [5-10]%
Dörken	[...]	[0-5]- [5-10]%	[...]	[0-5]- [5-10]%	[...]	[0-5]- [5-10]%
Würth	[...]	[0-5]- [5-10]%	[...]	[5-10]- [10-20]%	[...]	[0-5]- [5-10]%
Other (sold under private label)	[...]	[5-10]- [10-20]%	[...]	[5-10]- [10-20]%	[...]	[0-5]- [5-10]%
Total	[...]	100%	[...]	100%	[...]	100%

Source: Form CO

(3783) Table 93 shows that post-Transaction the Parties would have a [20-30]% share of the market and would compete with several other significant suppliers including T-Emballage, Icopal and Monier & Klöber.

1.2.5. Competitive assessment

(3784) The Commission notes that the merged entity would have a relatively moderate position in the market, with its market share not exceeding [20-30]%. Post-Transaction, a number of other established suppliers of breathable membranes for roof and wall applications would remain on the market, such as Icopal ([20-30]-[30-40]%), T-Embalage ([20-30]% for wall applications), Monier & Klöber ([5-10]-[10-20]% for roof applications), and Würth ([5-10]-[10-20]% for roof applications).

(3785) Moreover, the Commission observes that Dow has a relatively limited market position with [0-5]% market share and sales of less than EUR [...]. According to the Parties, [details on the Parties' distributors and customers]. The Commission considers that, in light of Dow's limited market presence, the Transaction would be unlikely to bring a substantial change in the market by way of strengthening the DuPont's position, which is also moderate.

(3786) Furthermore, there are indications that the Parties' products are not close competitors. The characteristics and properties of DuPont's and Dow's products are different. DuPont's *Tyvek* is a unique, single-layer product. By contrast, Dow's *Vempro* uses a more commoditised 3-layer technology which is common to most other suppliers. According to the information provided by the Parties, DuPont's single-layer *Tyvek* is priced [...] when compared to Dow's *Vempro* and other 3-layer products from other suppliers. In the Commission's view, these differences in the characteristics and

pricing of the Parties' products further limit the likelihood of any negative impact of the Transaction on competition in this market.

1.2.6. *Conclusion*

(3787) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the horizontal overlap between the Parties' activities in the markets for breathable membranes for building applications.

2. VERTICAL LINKS

2.1. Vertical relationship: 248 photoresist polymers (upstream) and 248nm photoresists (downstream)

2.1.1. *Overview of the products*

(3788) Photoresists are used in photolithography in which electromagnetic radiation is applied to burn a desired pattern onto a flat surface. This process is used in semiconductor manufacturing. Photoresists are essentially chemicals that, when exposed to specific wavelengths of radiation, become soluble or insoluble, depending on design.

(3789) Photolithography uses ultraviolet or deep ultraviolet radiation from lasers designed for use at specific spectral wavelengths (for example, 193nm, 248nm, 365nm), depending on the dimensions of the integrated circuit being produced by the semiconductor manufacturer. The photoresist to be used must be responsive to, and is therefore determined by, the laser to be used. As a result, these products are categorised according to the wavelength of the radiation used in the lithography process.²⁴⁷⁷

(3790) Photoresist polymers are used as an input in the manufacture of photoresists and are custom-designed for the specific photoresist product. Hence, 248 photoresist polymers are designed for use in formulating 248nm photoresists.

2.1.2. *The Parties' activities*

(3791) DuPont produces 248 photoresist polymers at its [location of DuPont's manufacturing facilities; details on DuPont's supply sources and manufacturing]. DuPont's sales in 2015 were EUR [...] globally and EUR [...] in the EEA. DuPont also produces a small amount of 193 photoresist polymers but not of polymers for other photoresist wavelengths. DuPont does not produce or sell any photoresists for semiconductor lithography.

(3792) Dow purchases 248 photoresist polymers, including from DuPont, to produce 248nm photoresists used in semiconductor lithography. From its supply of 248nm photoresists, Dow generated EUR [...] globally and EUR [...] in the EEA in 2015. Dow's purchases of 248 photoresist polymers from DuPont amounted to EUR [...] representing [...]% of Dow's needs (and [...]% of DuPont's total sales).

²⁴⁷⁷ Available photoresist wavelengths include, for example 193nm (Argon Fluoride/ArF) photoresists which use "193i polymers"; 248nm (Krypton Fluoride/KrF / Deep Ultra Violet) photoresists which use "248 polymers"; 365nm (I-line) photoresists which use "365 polymers"; and 436nm (G-Line) photoresists which use "436 polymers".

2.1.3. *Market definition*

2.1.3.1. Upstream market: 248 photoresist polymers

(A) Relevant product market

- (3793) The Commission has not examined in detail the definition of the relevant market in relation to photoresist polymers in the past.
- (3794) 248 photoresist polymers are chemicals designed to have ultraviolet response at wavelengths of 248nm, but also must meet characteristics for high levels of purity, batch consistency and functional reactivity, separating them from a demand- and supply-perspective from conventional polymers due to the steps and processes required to achieve these criteria.
- (3795) Photoresist polymers are custom designed for the specific photoresist product during its development. According to the Parties, 248 photoresist polymers are not interchangeable with polymers designed for any other wavelength of radiation, including 193nm, which is the fastest growing segment. Also the respondents to the market investigation unanimously confirmed that 248 photoresist polymers are not interchangeable with polymers designed for other wavelengths of radiation in their end use.
- (3796) From the supply-side perspective, the respondents to the market investigation generally indicated that a producer of photoresist polymers is unlikely to switch to producing a different type of photoresist polymers in response to a small but significant, non-transitory price increase. The respondents referred to differences in equipment, required know-how and IP rights.
- (3797) Nevertheless, for the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition. In this Decision, the Commission carries out its assessment on the basis of the narrowest plausible market definition for 248 photoresist polymers.

(B) Relevant geographic market

- (3798) The Parties submit that the markets for both 248 photoresist polymers is global, given that: (i) transport prices are negligible in relation to sales prices; (ii) there are no regional market specificities or any other barriers to entry; (iii) suppliers are active globally from a limited number of production facilities, and in particular, [location of DuPont's production facilities]; and (iv) customers in the EEA are supplied from facilities located in other world regions, including in the [location of DuPont's production facilities].
- (3799) This view was generally confirmed by the respondents to the market investigation who stated that 248 photoresist polymers are procured on a worldwide basis and are shipped across global regions. There are several Japanese and South Korean suppliers which appear to sell also into the EEA. The shipping costs of photoresist polymers were referred to as "immaterial" compared to the cost of photoresists.
- (3800) For the purpose of this Decision, the Commission considers that it can be left open whether the relevant geographic market for 248 photoresist polymers is EEA-wide or worldwide in scope since the Transaction would not significantly impede effective competition in the internal market under any market definition.

2.1.3.2. Downstream market: 248nm photoresists

(A) Relevant product market

- (3801) The Commission has not examined in detail the definition of the relevant market in relation to photolithography photoresists in the past.
- (3802) The Parties submit that the relevant market is the market for the supply of 248nm photoresists. In their view, from a demand-side perspective 248nm photoresists are not interchangeable with other chemical products – even with other photolithography photoresists designed for other wavelengths, as the photoresists will only respond to the particular wavelength of the radiation chosen for the application. From a supply-side perspective, 248nm photoresists require different intellectual property, inputs and know-how from other photoresists and so production would not be quickly or cheaply transformed in response to a small but significant, non-transitory price increase.
- (3803) The respondents to the market investigation generally confirmed that 248nm photoresists are not interchangeable with other photolithography photoresists designed for other wavelengths. Also from supply-side perspective, none of the respondents considered that a producer of a different type of photoresists could easily and profitably change to producing 248nm photoresists in response to a small but significant, non-transitory price increase.
- (3804) Nevertheless, for the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition. In this Decision, the Commission carries out its assessment on the basis of the narrowest plausible market definition for 248nm photoresists.

(B) Relevant geographic market

- (3805) The Parties submit that the market for 248nm photoresists is global in scope, for the same reasons as set out in recital (3798).
- (3806) This view was generally confirmed by the respondents to the market investigation who stated that 248nm photoresists are procured on a worldwide basis and are shipped across global regions.
- (3807) For the purpose of this Decision, the Commission considers that it can be left open whether the relevant geographic market for 248nm photoresists is EEA-wide or worldwide in scope since the Transaction would not significantly impede effective competition in the internal market under any market definition.

2.1.4. *Market shares*

2.1.4.1. Upstream market: 248 photoresist polymers

- (3808) In the upstream market for 248 photoresist polymers, DuPont's market share in 2014 by volume²⁴⁷⁸ was [30-40]% (including captive production) on a worldwide basis, as shown in Table 94.

²⁴⁷⁸ While DuPont was not able to provide exact market share estimates based on revenue, it stated that those estimates would not be materially different from the volume shares (Parties' response to the Commission's request for information RFI 41, question 1).

Table 94 – Worldwide 2014 shares in 248 photoresist polymers

Companies	Volume (MT)	Market Share (%)
DuPont	[...]	[30-40]%
Nisso (Nippon Soda)	[...]	[20-30]%
Maruzen	[...]	[10-20]%
Captive Internal (for example Shin-Etsu)	[...]	[20-30]%
Toho	[...]	[5-10]%
Others	[...]	[0-5]%
Total	[...]	100%

Source: Form CO (based on DuPont internal estimates)

(3809) The Parties were not able to provide the corresponding market shares for the EEA. Nevertheless, given that DuPont's sales in the EEA are minimal (EUR [...] representing [...]% of DuPont's total sales), DuPont's market share in the EEA is likely to be insignificant.

2.1.4.2. Downstream market: 248nm photoresists

(3810) Dow's estimated share for the supply of 248nm photoresists is approximately [20-30]% globally, and [30-40]% in the EEA, as set out in Table 95 and Table 96.

Table 95 – Worldwide 2015 Share of Dow and its Main Competitors in 248nm Photoresists

Company	Revenue (EUR million)	Market Share (%)
Dow	[...]	[20-30]
TOK	[...]	[20-30]
Shin-Etsu	[...]	[20-30]
JSR	[...]	[10-20]
Others	[...]	[10-20]
Total	[...]	100

Source: Form CO based on Dow internal estimates

Table 96 – EEA 2015 Share of Dow and its Main Competitors in 248nm Photoresists

Company	Revenue (EUR million)	Market Share (%)
Dow	[...]	[30-40]
TOK	[...]	[20-30]
JSR	[...]	[10-20]
Shin-Etsu	[...]	[0-5]
Others	[...]	[20-30]
Total	[...]	100

Source: Form CO based on Dow internal estimates

2.1.5. Competitive assessment

(3811) With regard to input foreclosure, the Commission investigated the ability and incentive of DuPont to foreclose the downstream players other than Dow from access to its 248 photoresist polymers.

(3812) Regarding the ability, the Commission established that 248 photoresist polymers are likely to represent a relatively important input in the production of 248nm photoresists. Dow estimated that 248 photoresist polymers account for approximately [30-40]% of the average total cost of 248nm photoresists. Another producer of 248nm photoresists estimated that such share in the total cost is as high as 50%.²⁴⁷⁹

(3813) Furthermore, on the basis of the results of the market investigation, the Commission considers that DuPont has a certain degree of market power in relation to its customers of 248 photoresist polymers. First, 248 photoresist polymers are a significantly customised product. They are designed and optimised by a polymer producer for specific applications of a customer.²⁴⁸⁰ This makes it more difficult for customers to switch their existing supplier. Second, the Commission established that [details on DuPont's pricing practices].²⁴⁸¹ [Details on the content of DuPont's internal documents].²⁴⁸²

(3814) Nevertheless, the Commission notes that a number of other elements suggest that any degree of market power enjoyed by DuPont in the upstream market would not be sufficient to enable input foreclosure. In particular, DuPont's worldwide market share on the upstream market is only [30-40]%; post-Transaction there would remain a number of sizeable suppliers of 248 photoresists polymers, such as Nisso, Maruzen and Toho, from which customers could source polymers. Also, there are a number of vertically integrated players such as Shin-Etsu which could not be foreclosed. Moreover, even those customers which during the market investigation pointed to the difficulties of switching to other polymer suppliers in the short term, did not exclude

²⁴⁷⁹ Questionnaire to Customers and Competitors – Photoresists (Q9), question 15; Agreed non-confidential minutes of a call with a customer, 18 July 2016, paragraph 10.

²⁴⁸⁰ Questionnaire to Customers and Competitors – Photoresists (Q9), question 11; Agreed non-confidential minutes of a call with a customer, 18 July 2016.

²⁴⁸¹ [Internal document].

²⁴⁸² [Internal document].

doing so in the event of a lasting price increase post-Transaction. In addition, many customers already procure 248 photoresist polymers from several suppliers (that is to say to multi-source) which mitigates their vulnerability to potential input foreclosure. Finally, [details on DuPont's pricing strategy].

- (3815) Regarding the incentive to engage in input foreclosure, the Commission did not find evidence suggesting that Dow would be likely to capture any significant portion of the downstream demand diverted away from foreclosed producers of 248nm photoresists. Also, the margins of Dow downstream and DuPont upstream do not indicate that the merged entity's likely gain in the upstream market would outweigh its likely losses from limiting sales in the downstream market.
- (3816) In terms of customer foreclosure, the Commission notes that post-Transaction a number of other significant customers for 248 photoresist polymers would remain on the market, including TOK and JSR. According to the Parties, Dow forms a relatively small part (approximately [...]%) of total demand for 248 photoresist polymers. Therefore, the Commission considers that after the Transaction there would continue to be a sufficiently large customer base to which the competing producers of 248 photoresist polymers could sell their output.

2.1.6. *Conclusion*

- (3817) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical link between the Parties' activities in the markets for 248 photoresist polymers and 248nm photoresists.

2.2. **Vertical relationship: Breathable membranes for building applications (upstream) and inverted roof insulation systems (downstream)**

2.2.1. *The Parties' activities*

- (3818) In addition to the applications described in Section IX.1.2.2, DuPont sells limited quantities of its *Tyvek* breathable membranes for use in inverted roof insulation systems to Dow and other inverted roof insulation suppliers. Dow then sells DuPont's breathable membranes combined with its flat roof extruded polystyrene ("XPS") foam insulation products, and markets it as an inverted roof insulation system.
- (3819) DuPont's 2015 EEA sales of *Tyvek* breathable membranes for building applications amounted to approximately EUR [...]. Of this, DuPont's sales of *Tyvek* used for inverted roof applications were approximately EUR [...].
- (3820) Dow produces flat roof XPS foam insulation products, a segment where DuPont is not active. Dow combines DuPont's *Tyvek* with its XPS insulation products, and supplies the package as a diffusion-open rainwater drainage layer for inverted roofs. Dow's package includes DuPont's *Tyvek* breathable membrane and an XPS thermal insulation product. Dow is not active in mineral wool or any other type of inverted roof insulation system in the EEA.
- (3821) Dow's inverted roof insulation systems are sold primarily in [...]. Dow's 2015 EEA sales of inverted roof insulation systems amounted to approximately EUR [...]. [Details on Dow's purchases and supply sources].

2.2.2. Market definition

2.2.2.1. Upstream market: Breathable membranes for building applications

(A) Relevant product market

(3822) As explained in Section IX.1.2.3.1, for the purpose of this Decision, the Commission considers that the exact market definition in relation to breathable membranes for building applications can be left open, in particular as to the need to distinguish between wall and roof applications. Indeed, the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

(3823) As explained in Section IX.1.2.3.2, for the purpose of this Decision, the Commission considers that the scope of the geographic market for breathable membranes for building applications is at least regional.

2.2.2.2. Downstream market: Inverted roof insulation systems

(A) Relevant product market

(3824) Insulation materials are products which reduce the thermal and acoustic exchange between different elements of a construction. Insulation materials for building applications are normally used to insulate walls, floors, roofs, and ducts. They are produced either from foams (expanded polystyrene, extruded polystyrene, and polyurethane) or mineral wools (stone wools or glass wools).

(3825) Inverted insulation systems can be used for all types of flat roofs. Inverted roofs have their waterproofing layer beneath the insulation. The thermal insulation boards placed on top of the roofing membrane provide protection against damaging factors, such as extreme temperatures. Inverted roofs also provide protection against climatic impacts and UV-radiation, mechanical impacts during construction, use and maintenance periods, and protection against blistering of the membrane (the waterproofing membrane on the warm side of the thermal insulation acts as a vapor barrier).

(3826) Inverted roof insulation systems do not all require a membrane (such as *Tyvek*). For instance, Dow offers an inverted roof insulation system for park decks that does not include *Tyvek*. Dow's competitors in this area sell inverted roof insulation systems both with and without a membrane, depending on regional needs.

(3827) The Commission has previously examined the market for insulation materials. In *Saint-Gobain/BPB*, the Commission left open whether a distinction should be drawn between insulation products produced from mineral wools and from foams.²⁴⁸³ Similarly, in *Kingspan/Steel Partners* the Commission found that the market for sandwich panels could be segmented between foam core sandwich panels and those with mineral fiber cores. In particular, the Commission found that (i) foam core and mineral fiber sandwich panels have different characteristics and therefore meet different needs; and (ii) production of sandwich panels cannot be easily switched from foam core to mineral wool core, or vice versa.²⁴⁸⁴ Also, in *Saint-Gobain/BPB*, the Commission concluded that it was not necessary to subdivide the market for insulation materials

²⁴⁸³ Commission Decision in Case M.3943 – *Saint-Gobain/BPB* (2005), recital 28.

²⁴⁸⁴ Commission Decision in Case M.7479 – *Kingspan/Steel Partners* (2015).

for building applications based on the specific application for which these products are used (for example roof, wall, floor, ceiling, etc.).²⁴⁸⁵

- (3828) The Parties submit that there could be grounds to consider a separate market for inverted roof insulation systems. On inverted roofs, the insulation system is placed above the waterproofing layer, which requires a different construction composition and method from conventional roof insulation systems. The Parties also claim that there is limited demand-side and supply-side substitutability between foam insulation products (such as Dow's inverted roof insulation systems which include DuPont's membranes) and mineral fiber/ wool insulation products.
- (3829) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition. The Commission has assessed the Transaction under the narrowest putative market for foam-based inverted roof insulation systems.

(B) Relevant geographic market

- (3830) The Parties submit that the market for inverted roof insulation systems is at least EEA-wide given that (i) trade is not substantially affected by high transportation costs (transportation within the EEA accounts for up to a maximum of [...] % of the total price of the system); (ii) prices are generally uniform across Member States; and (iii) the systems can be adapted to different national specifications at a reasonable cost.
- (3831) In previous decisions, the Commission found indications of both that the market may be regional²⁴⁸⁶ and at least national in scope.²⁴⁸⁷
- (3832) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.2.3. *Market shares*

2.2.3.1. Upstream market: Breathable membranes for building applications

- (3833) DuPont's estimated share of breathable membranes for building applications [details on Dow's sales and DuPont's market shares]. DuPont's share on a regional level is likely to be even smaller.

2.2.3.2. Downstream market: Inverted roof insulation systems

- (3834) In Germany, Dow's share of foam-based inverted roof insulation systems was [30-40] % in 2015. Other significant competitors included BASF ([20-30] %), Jackson ([10-20] %), URSA ([10-20] %) and Austroterm ([5-10] %).
- (3835) In the UK, Dow's share of foam-based inverted roof insulation systems was [40-50] % in 2015. Other significant competitors included Knauf Insulation ([20-30] %) and Kingspan ([20-30] %).

²⁴⁸⁵ Commission Decision in Case M.3943 – Saint-Gobain/BPB (2005), recital 28.

²⁴⁸⁶ Commission Decision in Case M.735 – BPB/Isover (1996), recital 14.

²⁴⁸⁷ Commission Decision in Case M.3943 – Saint-Gobain/BPB (2005), recital 30.

(3836) Dow's market shares would be lower in a putative market for inverted roof insulation systems including both foam and mineral wool solutions.

2.2.4. *Competitive assessment*

(3837) With regard to input foreclosure, the Commission considers that the Transaction would be unlikely to result in the foreclosure of downstream inverted roof insulation producers' access to breathable membranes for building applications. This is because DuPont has a limited position in the upstream market for breathable membranes for building applications [details on the location of the majority of the Parties' sales].²⁴⁸⁸ Post-Transaction, competing producers of inverted roof insulation systems would continue to have alternative sources of supply of breathable membranes.

(3838) Furthermore, already pre-Transaction DuPont sells approximately [details on DuPont's customer list]% of its breathable membranes for inverted roof insulation systems to Dow. The remaining [details on DuPont's customer list]% of its limited sales were made to [details on DuPont's customer list] (approximately EUR [...]) and [details on DuPont's customer list] (approximately EUR [...]). [Details on DuPont's customer list], the Transaction is would be unlikely to have any adverse effect on the dynamics of competition in the downstream market for the supply of inverted roof insulation systems.

(3839) Also as regards customer foreclosure, the Commission considers that the combined entity would not have the ability or incentive to foreclose access to customers for competing breathable membrane suppliers.

(3840) Already before the Transaction, [details on Dow's supply sources]. The Transaction therefore would not affect competing suppliers of breathable membranes regarding their business with inverted roof system customers.

(3841) Moreover, Dow only represents a small portion of the demand for breathable membranes for building applications. In 2015, Dow purchased only approximately EUR [...] of *Tyvek* from DuPont. As such, Dow does not represent a significant source of demand for these products and the Transaction would therefore not affect competing suppliers of breathable membranes.

(3842) Finally, there are significant competitors both in Germany and the UK in the market for inverted roof insulation systems. Key competitors in this area include BASF ([20-30]% in Germany), Jackson ([10-20]% in Germany), URSA ([10-20]% in Germany), Knauf and Kingspan ([20-30]% in the UK each). These companies represent a significant source of demand which would remain available to competing membrane suppliers post-Transaction.

2.2.5. *Conclusion*

(3843) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical link between the Parties' activities in the markets for breathable membranes for building applications and inverted roof insulation systems.

²⁴⁸⁸ According to DuPont, its market share in the putative market of breathable membranes for roof applications would not be materially different.

2.3. Vertical relationship: (Hydroxypropyl)methylcellulose (HPMC/MC) (upstream) and food ingredients (downstream)

2.3.1. The Parties' activities

- (3844) Dow is active in the production and sale of (hydroxypropyl)methylcellulose HPMC/MC. HPMC/MC are cellulose ethers. They can be used by manufacturers of food ingredients as synthetic food texturisers. Dow sells HPMC/MC in the EEA from [location of Dow's production sites].
- (3845) DuPont is not active in the production and sale of HPMC/MC but it produces system products for dairy and bakery food applications²⁴⁸⁹ using HPMC/MC as inputs. DuPont's system products are essentially blends of various ingredients (including HPMC and MC) that are sold as a ready-made blend or mix to customers. DuPont's demand for HPMC/MC is limited: in 2015 it purchased approximately EUR [...] of HPMC (of which approximately EUR [...] were purchased from Dow) and EUR [...] of food grade MC (of which EUR [...] was purchased in the EEA) from a variety of suppliers. [Details on DuPont's supply sources].

2.3.2. Market definition

2.3.2.1. Upstream market: HPMC/MC

(A) Relevant product market

- (3846) HPMC/MC are cellulose ethers. The Commission has previously considered cellulose ethers in *Dow/Wolff Walsrode*.²⁴⁹⁰ In that case the Commission examined the effects of the transaction both under a market for all cellulose ethers as well as for the type of cellulose ether in which the activities of the parties overlapped in that case (methyl cellulose and derivatives, or MC&D).
- (3847) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition. In this Decision, the Commission assesses the Transaction on the basis of the narrowest plausible market for the supply of HPMC/MC for regulated applications (that is to say food and pharmaceutical applications).

(B) Relevant geographic market

- (3848) The Commission has previously considered²⁴⁹¹ that the relevant market for cellulose ethers is more likely to be EEA-wide rather than worldwide. The Parties submit that the relevant market is at least EEA-wide, if not worldwide in scope due to low transportation costs.
- (3849) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

²⁴⁸⁹ DuPont's system products are essentially blends of various ingredients that are sold as a ready-made blend or mix to customers in the food industry to improve the safety, nutritional quality, texture, and shelf-life of food and beverage products.

²⁴⁹⁰ Commission Decision in Case M.4550 – Dow Chemical Company/Wolff Walsrode (2007).

²⁴⁹¹ Commission Decision in Case M.4550 – Dow Chemical Company/Wolff Walsrode (2007), recital 23.

2.3.2.2. Downstream market: System products for dairy and bakery food applications

(A) Relevant product and geographic market

(3850) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.3.3. Market shares

2.3.3.1. Upstream market: HPMC/MC

(3851) The Parties estimate that Dow's share in a market for HPMC for regulated applications only is around [60-70]% at the EEA level and [60-70]% globally. The Parties estimate that Dow's share in a market for MC for regulated applications only is around [50-60]% at the worldwide level and around [50-60]% at the EEA level.

(3852) Dow competes with a number of other sizeable players, such as Shin-Etsu, Samsung, and Ashland. The Parties were unable to provide competitors' shares with a split between HPMC and MC.

2.3.4. Competitive assessment

(3853) With regard to input foreclosure, the Commission notes that DuPont's demand for HPMC/MC is very limited. As mentioned in recital (3845), in 2015 DuPont purchased approximately EUR [...] of HPMC and EUR [...] of food grade MC. By comparison, in 2015, Dow's merchant sales of HPMC/MC for regulated applications in the EEA were around EUR [...] and around EUR [...] worldwide. Therefore, the Commission considers that it would unlikely be economically viable for Dow to supply HPMC/MC only to DuPont and foreclose other customers of HPMC/MC.

(3854) In addition, after the Transaction there would remain a number of alternative suppliers in the upstream markets for HPMC and MC both worldwide and in the EEA, including Shin-Etsu, Samsung, Ashland, Shandong Head, JRS, and regionally-focused suppliers. These competitors have substantial excess capacity²⁴⁹² and represent capable alternatives to Dow in case the merged entity were to engage in input foreclosure.

(3855) In terms of customer foreclosure, the Commission notes that DuPont currently sources only a limited quantity of food grade HPMC/MC from third-party suppliers. There are many food producers that represent alternative sources of demand, including Tate & Lyle, General Mills, Unilever Europe, Kraft Foods Global, Kellogg, or Hain Frozen Foods. Furthermore, food applications represent a limited proportion of the total demand of HPMC/MC. The Parties submit that they represent less than [...]%. Therefore, the Commission considers that purchases of HPMC/MC for food applications have little impact on upstream conditions for the supply of HPMC/MC.

²⁴⁹²

According to the Parties' estimates, Samsung has a capacity utilisation of approximately [capacity utilisation of Parties' competitors – information based on internal estimates of the Parties]%, Shin-Etsu [capacity utilisation of Parties' competitors – information based on internal estimates of the Parties]%, Ashland [capacity utilisation of Parties' competitors – information based on internal estimates of the Parties]%, and others are estimated to have a capacity utilisation of on average [capacity utilisation of Parties' competitors – information based on internal estimates of the Parties]%.

2.3.5. *Conclusion*

(3856) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical relationship between the Parties' activities in the markets for HPMC/MC and system products for dairy and bakery food applications.

2.4. Vertical relationship: Propylene glycol (upstream) used for food, industrial bioscience and agricultural applications (downstream)

2.4.1. *The Parties' activities*

(3857) Dow is active in the production and sale of propylene glycol. Propylene glycol is derived from propylene oxide, a chemical intermediate used to produce commercial and industrial products.

(3858) According to the Parties, propylene glycol is used in several process industries including pharmaceuticals, fragrances, cosmetics, personal care, and food (together accounting for approximately [details on the applications of propylene glycol, including the Parties' applications]% of propylene glycol consumption); unsaturated polyester resins (used, for example, in composites for windmill blades, pipes, tanks; [details on the applications of propylene glycol, including the Parties' applications]%; liquid detergent ([details on the applications of propylene glycol, including the Parties' applications]%; de-icing fluids (aircraft de-icing fluid, heat transfer fluid, thermal fluids; [details on the applications of propylene glycol, including the Parties' applications]%; anti-freeze products ([details on the applications of propylene glycol, including the Parties' applications]%; paints, coatings, inks, cooling fluids, animal feed, tobacco, and (poly)urethanes ([details on the applications of propylene glycol, including the Parties' applications]%). The Parties also state that crop protection products manufacturers represent a very small proportion of total propylene glycol demand.

(3859) The propylene glycol content of these various downstream products varies significantly. A relatively large amount of propylene glycol is required for the production of aircraft de-icing fluids (where propylene glycol accounts for a major portion of the downstream product's total cost), while only limited volumes are used in the production of food and agrochemical products.

(3860) Dow produces propylene glycol at facilities in [location of Dow's production facilities]. Dow uses its propylene glycol captively, and sells it to competitors (including DuPont) for agricultural/agrochemical and food applications.

(3861) DuPont is not active in the production of propylene glycol but purchases it as an input to produce certain products food and formulated crop protection products.

(3862) In total, DuPont purchased approximately EUR [...] of propylene glycol in 2015 on a worldwide basis, and approximately EUR [...] in the EEA. DuPont purchased EUR [...] worth of propylene glycol from Dow, of which only EUR [...] in the EEA. [Details on DuPont's supply sources].

2.4.1.1. Upstream market: Propylene glycol

(A) Relevant product market

- (3863) The Commission has previously considered propylene glycols constitute a distinct product market.²⁴⁹³
- (3864) For the purpose of this Decision, the Commission considers that the exact market definition can be left open (in particular with respect to different applications or grades of propylene glycol) since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market

- (3865) The Commission has previously considered the relevant market for propylene glycols to be EEA-wide.²⁴⁹⁴
- (3866) The Parties submit that the relevant market is at least European/EEA-wide and even worldwide. They consider that propylene glycol is easily and safely transportable and there is considerable trade globally.
- (3867) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.4.1.2. Downstream applications: food, industrial bioscience and crop protection products

- (3868) DuPont uses propylene glycol as a formulation chemical for the manufacture of emulsifiers used in the food industry. In addition, DuPont's industrial bioscience business purchases propylene glycol as a formulation chemical for enzymes sold to the detergent industry. DuPont also uses propylene glycol as a solvent and anti-freeze to manufacture formulated crop protection products.
- (3869) For the purpose of this Decision, the Commission considers that the exact market definition in relation to the downstream applications of propylene glycol can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.4.2. Market shares

- (3870) In the market for propylene glycol, the Parties submit that in 2015 Dow had a market share of [30-40]% in the EEA and [30-40]% worldwide. Both in the EEA and globally, Dow competes with at least three other sizeable competitors, such as LyondellBasell ([20-30]%), Ineos ([20-30]%) and Repsol ([10-20]%). The Parties estimate that Dow's sales share is generally within the [30-40]% range even if one were to consider narrower segments by specific application or grade of propylene glycol.

²⁴⁹³ Commission Decision in Case M.2355 – Dow/Enichem Polyurethane (2001), recital 13.

²⁴⁹⁴ Commission Decision in Case M.2355 – Dow/Enichem Polyurethane (2001), recital 17.

2.4.3. *Competitive assessment*

- (3871) With regard to input foreclosure, the Commission notes that after the Transaction the merged entity would continue to be challenged by a number of competitors in the upstream market both in the EEA and worldwide, including LyondellBasell, Ineos or Repsol, which account together for [50-60]% of the market.
- (3872) Furthermore, as follows from recital (3858), the downstream applications for which DuPont uses propylene glycol as an input (that is to say to produce food, industrial bioscience and crop protection products) constitute a relatively minor use of propylene glycol. Also, the volumes of propylene glycol required for those DuPont's application are modest. Therefore, the Commission considers that DuPont's competitors would likely be able to obtain propylene glycol also from other sources. Moreover, capacity utilisation in propylene glycol production facilities in Western Europe is estimated by the Parties to be only at approximately [details on capacity utilization – information based on the Parties' internal estimates]%.
- (3873) In terms of customer foreclosure, the Commission notes that [details on DuPont's supply sources] the Transaction could have only a very limited impact on DuPont's procurement of propylene glycol from other suppliers.
- (3874) Moreover, as explained in recital (3872), food, industrial bioscience and agricultural applications such as DuPont's account for only a small portion of propylene glycol demand. DuPont's purchases account for a small fraction of total propylene glycol sales both in the EEA and globally. The Transaction would not have any impact on competing propylene glycol suppliers' ability to sell large volumes of propylene glycol into other, major applications in which the merged entity is not present as a propylene glycol customer, such as pharmaceuticals, de-icing fluids, and personal care.

2.4.4. *Conclusion*

- (3875) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical relationship between the Parties' activities with respect to propylene glycol used for food, industrial bioscience and agricultural applications.

2.5. **Vertical relationship: Isopropanolamines (upstream) and post-etch residue removal products (downstream)**

2.5.1. *Overview of the products*

- (3876) Isopropanolamines ("IPAs") are basic chemicals which promote the functionality of other molecules, serving as emulsifiers, antistats, hardeners, stabilizers, chemical intermediates, neutralizers and grinding aids. IPAs are mainly used in cosmetics and personal care products to provide neutralisation of acidic components, the proper pH, and the desired surfactant properties. To a lesser extent, they are also used to manufacture cleaners for aluminium. IPAs can be further divided into (i) MIPA; (ii) DIPA; (iii) TIPA 99.²⁴⁹⁵

²⁴⁹⁵

Monoisopropanolamine ("MIPA") is the common name for 1-amino-2-propanol, a colourless liquid with an ammonia-like odour. MIPA is a highly reactive chemical with a pH of 11.4 as a 1% solution. MIPA has the lowest molecular weight of the three standard isopropanolamines. Use of MIPA is growing for titanium dioxide dispersion in paints, plastics and paper. Diisopropanolamine ("DIPA") is

(3877) As explained in Section IX.1.1, PERR products are mixtures formulated to remove any residue from the substrate after the etching process in the fabrication of semiconductors.

2.5.2. *Parties' activities*

(3878) Dow is active in the production and sale of IPAs. Dow produces IPAs at its manufacturing facility located in [details of Dow's production facilities], Dow uses a significant part (approximately [...]%) of its IPAs production internally to produce, *inter alia*, agricultural, automotive, and paint formulations. It supplies the remainder on the merchant market to companies such as [details on Dow's customer list]. It also supplies IPAs to distributors, including [details on Dow's customer list].

(3879) In 2015, Dow's sales of IPAs amounted to approximately EUR [...] in the EEA and EUR [...] globally.

(3880) DuPont is not active in the manufacturing or sale of IPAs but it uses MIPA as an input in its PERR products. In 2015, DuPont purchased MIPA from a distributor Univar for approximately EUR [...] worldwide. [...] only a small fraction ([...]%) bought from Univar comes from BASF.

(3881) As explained in Section IX.1.1, Dow also produces PERR products but to a much more limited extent compared to DuPont.

2.5.3. *Market definition*

2.5.3.1. IPAs (upstream)

(A) Relevant product market definition

(3882) The Commission has not yet investigated the scope of the relevant product market for IPAs in past decisions.

(3883) The Parties submit that the only conceivable sub-segmentation of the relevant market for IPAs would be by type of IPA (namely MIPA; DIPA; TIPA 99).

(3884) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market definition

(3885) The Parties consider IPAs markets to be at least EEA-wide, and possibly worldwide. Usually producers supply IPAs from a single production site. In order to compete in a particular region of the world, in particular in Europe, it is not necessary to have a production site there.

the common name for 1,1'-iminodi-2-propanol. It is a secondary amine. Major applications include personal care, metalworking and gas treating products. Triisopropanolamine ("TIPA") is the common name for 1,1',1"-nitrilotri-2-propanol. It is a tertiary amine. It is used as a cross-linker in special -based coating applications. The cement and concrete industries use TIPA as a grinding aid, and it is used in concrete admixtures. TIPA is used as a neutralising agent in agricultural products and water borne coatings.

(3886) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.5.3.2. PERR products (downstream)

(A) Relevant product market definition

(3887) As described in Section IX.1.1.3.1, a distinction can be drawn between traditional PERR products, which are not suited for copper cleaning applications (“traditional PERR products”) and PERR products designed for copper cleaning applications.

(3888) For the purpose of this Decision, the Commission considers that the exact market definition can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

(B) Relevant geographic market definition

(3889) As described in Section IX.1.1.3.2, for the purpose of this Decision, the Commission considers that the exact market definition (for example whether EEA-wide or worldwide) can be left open since the Transaction would not significantly impede effective competition in the internal market under any plausible alternative market definition.

2.5.4. Market shares

2.5.4.1. IPAs (upstream)

(3890) In the market for IPAs, in 2015 Dow had a market share of [10-20]% in the EEA and [10-20]% worldwide. Dow competes with four undertakings in the EEA, which are BASF ([40-50]%), Sasol ([10-20]%), Fortischem ([10-20]%) and Nanjing Hongbaoli Alkanolamines ([10-20]%), and with at least four other undertakings worldwide, in particular Nanjing Hongbaoli Alkanolamines ([30-40]%), BASF ([10-20]%), Shanghai Jiafu Fine Chemicals ([10-20]%) and Jiahua Chemicals (Bingzhou) ([5-10]%).

(3891) In the market for MIPAs, in 2015 Dow had a market share of [10-20]% in the EEA and [20-30]% worldwide. Dow competes with four undertakings in the EEA, which are BASF ([30-40]%), Sasol ([10-20]%), Nanjing Hongbaoli Alkanolamines ([10-20]%) and Fortischem ([10-20]%), and with at least four other undertakings worldwide, such as Nanjing Hongbaoli Alkanolamines ([40-50]%), BASF ([10-20]%), Fortischem ([5-10]%) and Sasol ([5-10]%).

2.5.4.2. PERR products (downstream)

(3892) As described in Section IX.1.1.4, in a market comprising all PERR products, DuPont’s estimated 2015 global market share was approximately [30-40]% ([60-70]% in the EEA). Dow had limited sales and its share was well below [0-5]% globally (and below [0-5]% in the EEA).

(3893) In the market for traditional PERR products, DuPont’s estimated market share was approximately [40-50]% globally and [90-100]% in the EEA. Dow’s share was approximately [0-5]% globally and [0-5]% in the EEA.

2.5.5. *Competitive Assessment*

- (3894) With regard to input foreclosure, the Commission notes that Dow has a limited upstream position with its highest market share reaching [20-30]% if the market were defined as comprising the supply of MIPAs worldwide. A number of significant alternative suppliers would remain after the Transaction both in the EEA (including BASF, Sasol, Fortischem and Nanjing Hongbaoli Alkanolamines, which account together for [80-90]% of the total IPA market) and worldwide (including Nanjing Hongbaoli Alkanolamines, BASF, Shanghai Jiafu Fine Chemicals and Jiahua Chemicals (Bingzhou), which account together for [60-70]% of the total IPA market).
- (3895) Moreover, IPAs are homogeneous products and the competing producers of PERR products could switch to purchasing from the remaining upstream competitors.
- (3896) Furthermore, based on the information provided by the Parties, only small quantities of IPAs are incorporated into the downstream PERR products and IPAs represent only approximately [...] % of the total costs of producing DuPont's PERR products.
- (3897) In terms of customer foreclosure, PERRs products represent a small portion of the total demand for IPAs.²⁴⁹⁶ Moreover, DuPont is not an important customer in the downstream market, since it represents approximately [details on DuPont's purchases] % of the total IPA demand and [details on DuPont's purchases] % of the total MIPA demand. In addition, DuPont already sources [details on DuPont's purchases and supply sources] % of its IPA consumption from Dow. Therefore, the Commission considers that DuPont is not an important IPA customer for Dow's competitors and their ability to supply IPAs post-Transaction would not be affected.

2.5.6. *Conclusion*

- (3898) Therefore, on balance and in light of the evidence available to it, the Commission considers that the Transaction would not lead to a significant impediment to effective competition due to the vertical relationship between the Parties' activities in the markets for IPAs and PERR products.

SECTION X: REMEDIES

- (3899) In order to render the Transaction compatible with the internal market in relation to price and product competition in the markets for (i) herbicides for cereals, oilseed rape, sunflower, rice and pasture, (ii) chewing and sucking (including thrips) insecticides, (iii) fungicides for rice blast, (iv) acid co-polymers and (v) ionomers in the EEA as well as in relation to innovation competition in crop protection, including products in the discovery stage for herbicides, insecticides and fungicides, the Parties submitted commitments pursuant to Article 8(2) of the Merger Regulation on 7 February 2017 (the "First Commitments"). The Commission market tested the First Commitments.
- (3900) In order to address the issues raised in the market test, the Parties submitted a final set of commitments on 17 February 2017 (the "Final Commitments").²⁴⁹⁷

²⁴⁹⁶ The Parties estimate that the total PERR demand represented by the downstream market would amount to approximately EUR [...] in a worldwide market for MIPAs of EUR [...] (approximately [...] %).

²⁴⁹⁷ The Parties submitted a Corrigendum to the Crop Protection Final Commitments on [date].

(3901) The commitments submitted by the Parties consist essentially in the divestment to a single buyer of assets on crop protection (the “Crop Protection Divested Business”). In addition the commitments included the divestments to a single buyer of Dow’s acid co-polymer and ionomer businesses (the “Polyolefins Divested Business”).

1. GENERAL PRINCIPLES FOR THE ASSESSMENT OF REMEDIES

(3902) As set out in the Remedies Notice,²⁴⁹⁸ the following principles apply where parties to a merger choose to offer commitments in order to restore effective competition.

(3903) Where a concentration raises competition concerns in that it could significantly impede effective competition, the parties may seek to modify the concentration in order to resolve the competition concerns and thereby gain clearance of their merger.²⁴⁹⁹

(3904) The Commission only has power to accept commitments that are capable of rendering the concentration compatible with the internal market in that they will prevent a significant impediment to effective competition in all relevant markets where competition concerns were identified.²⁵⁰⁰ To that end, the commitments have to eliminate the competition concerns entirely²⁵⁰¹ and have to be comprehensive and effective from all points of view.²⁵⁰²

(3905) In assessing whether proposed commitments are likely to eliminate its competition concerns, the Commission considers all relevant factors including *inter alia* the type, scale and scope of the commitments, judged by reference to the structure and particular characteristics of the market in which those concerns arise, including the position of the parties and other participants on the market.²⁵⁰³ Moreover, commitments must be capable of being implemented effectively within a short period of time.²⁵⁰⁴

(3906) In case of implementation risks and implementation uncertainties for instance related to third party consents, it is incumbent to the parties to remove such uncertainties.²⁵⁰⁵

(3907) Where a proposed concentration threatens to significantly impede effective competition, the most effective way to maintain effective competition, apart from prohibition of the concentration, is to create the conditions for the emergence of a new competitive entity or for the strengthening of existing competitors via divestitures by the merging parties.²⁵⁰⁶

²⁴⁹⁸ Commission's Notice on Remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 ("Remedies Notice"), OJ C 267, 22.10.2008, page 1.

²⁴⁹⁹ Remedies Notice, paragraph 5.

²⁵⁰⁰ Remedies Notice, paragraph 9.

²⁵⁰¹ Judgment of 18 December 2007, *Cementbouw Handel & Industrie v Commission*, C-202/06 P, EU:C:2007:814, paragraph 54: “*it is necessary, when reviewing the proportionality of conditions or obligations which the Commission may, by virtue of Article 8(2) of Regulation No 4064/89, impose on the parties to a concentration, not to determine whether the concentration still has a Community dimension after those conditions or obligations have been complied with, but to be satisfied that those conditions and those obligations are proportionate to and would entirely eliminate the competition problem that has been identified*”.

²⁵⁰² Remedies Notice, paragraphs 9 and 61.

²⁵⁰³ Remedies Notice, paragraph 12.

²⁵⁰⁴ Remedies Notice, paragraph 9.

²⁵⁰⁵ Remedies Notice, paragraph 11.

²⁵⁰⁶ Remedies Notice, paragraph 22.

- (3908) The divested activities must consist of a viable business that, if operated by a suitable purchaser, can compete effectively with the merged entity on a lasting basis and that is divested as a going concern. The business must include all the assets which contribute to its current operation or which are necessary to ensure its viability and competitiveness and all personnel which are currently employed or which are necessary to ensure the business' viability and competitiveness.²⁵⁰⁷
- (3909) Personnel and assets which are currently shared between the business to be divested and other businesses of the parties, but which contribute to the operation of the business or which are necessary to ensure its viability and competitiveness, must also be included. Otherwise, the viability and competitiveness of the business to be divested would be endangered.²⁵⁰⁸
- (3910) Normally, a viable business is a business that can operate on a stand-alone basis, which means independently of the merging parties as regards the supply of input materials or other forms of cooperation other than during a transitory period.²⁵⁰⁹
- (3911) The intended effect of the divestiture will only be achieved if and once the business is transferred to a suitable purchaser in whose hands it will become an active competitive force in the market. The potential of a business to attract a suitable purchaser is an important element of the Commission's assessment of the appropriateness of the proposed commitment.

2. FIRST COMMITMENTS

- (3912) On 7 February 2017, the Parties submitted the First Commitments. These are constituted by three packages: (i) the "Crop Protection First Commitments" (as described in Section X.2.1.1), (ii) the "Acid Co-Polymers First Commitments" (as described in Section X.2.1.2) and (iii) the "Ionomers First Commitments" (as described in Section X.2.1.2). The latter two are hereinafter referred to as the "Polyolefins First Commitments".

2.1. Description of the First Commitments

2.1.1. Crop Protection First Commitments

- (3913) According to the Crop Protection First Commitments, the Parties commit to divest a Crop Protection Divested Business consisting of (i) the "Herbicide Division" and the "Insecticide Division" (as described below) and (ii) the "R&D Division" (as described below), with the sole exception of assets retained by the merged entity.
- (3914) In particular, the **Herbicide Division** consists of the following Herbicide Divested AIs and the Herbicide Divested Formulated Products for their use globally:
- (1) Herbicide Divested AIs: DuPont's AIs in the markets for herbicides where the Commission has identified competition concerns, namely thifensulfuron methyl, tribenuron methyl, metsulfuron methyl, chlorsulfuron methyl, triflurosulfuron methyl, lenacil, flupyrsulfuron methyl, ethametsulfuron methyl and azimsulfuron;

²⁵⁰⁷ Remedies Notice, paragraphs 23-25.

²⁵⁰⁸ Remedies Notice, paragraph 26.

²⁵⁰⁹ Remedies Notice, paragraph 32.

- (2) Herbicide Divested Formulated Products: DuPont's formulated products containing the Herbicide Divested AIs, and all related registrations and pending registrations and except those formulated products included in the retained business.
- (3915) The **Insecticide Division** consists of the following Insecticide Divested AIs and the Insecticide Divested Formulated Products for their use globally:
 - (1) Insecticide Divested AIs: DuPont's AIs in the markets for insecticides where the Commission has identified competition concerns, namely Rynaxypyr, Cyazypyr and indoxacarb.
 - (2) Insecticide Divested Formulated Products: DuPont's formulated products containing the Insecticide Divested AIs, and all related registrations and pending registrations and except those formulated products included in the Retained Business.
- (3916) The **R&D Division** consists of the Divested R&D Organisation and Divested Pipeline.
 - (1) Divested Pipeline: all DuPont crop protection pipeline products, excluding only the retained pipeline. The Divested Pipeline includes DuPont's library of [number of compounds] compounds and the pipeline projects included in Table 97.

Table 97 – Divested pipelines

[...]

- (2) Divested R&D Organisation: DuPont's global R&D Organisation, including DuPont's Global Technology Organisation and DuPont's Regional Development Organisation. The only assets and personnel in the global DuPont R&D Organisation that will not be included in the R&D Division are those expressly listed under the retained business described below.
 - (1) Global Technology Organisation includes DuPont's discovery chemistry, discovery biology, development biology, process development, formulations and analytical sciences, stewardship and regulatory department and crop protection commercialisation, portfolio and resource management groups.
 - (2) Regional Development Organisation includes scientists and personnel worldwide providing regulatory and registration work and field biology testing and analysis.
- (3917) As regards *facilities*, the Crop Protection Divested Business includes the following:
 - (1) For the **Herbicide Division**: (i) [name of facility] Formulation Unit [name of facility] in [localization]; (ii) [name of facility] Formulation Unit in [localization]; (iii) [name of facility] Formulation Unit in [localization]; (iv) [name of facility] Formulation Unit in [localization]; (v) [name of facility] Manufacturing Unit in [localization]; and (vi) [name of facility] Packaging Unit [localization]
 - (2) For the **Insecticide Division**: (i) [name of facility] Formulation Unit in [localization]; (ii) [name of facility] Formulation Unit [name of facility] in [localization]; (iii) [name of facility] Packaging Unit in [localization]; (iv) [name of facility] Packaging Unit in [localization]; (v) [name of facility]

Formulation and Packaging Unit in [localization]; (vi) [name of facility] Insecticide Formulation Unit in [localization]; (vii) [name of facility] Manufacturing Unit in [localization] and (viii) [name of facility] Manufacturing Unit in [localization].

- (3) For the **R&D Division**: (i) the Stine discovery facility in Newark, US; (ii) 14 field biology facilities or development centers and (iii) [name of facility].

(3918) As regards *personnel* to be included in the Herbicide and Insecticide Divisions, the Parties applied the following criteria:

- (1) all employees assigned to the activities covered by the Crop Protection Divested Business except employees assigned exclusively or predominantly ([...]) to other activities;
- (2) the sales employees who had the highest percentage of sales of the products comprised in the Herbicide Division and Insecticide Division;
- (3) the employees needed to fully support the Crop Protection Divested Business consistent with the geographical spread of product sales, as detailed below;
- (4) the employees who had the highest percentages of activity on the Crop Protection Divested Business's products and functional activities to support these products; and
- (5) the manufacturing employees relating to the Herbicide Division and Insecticide Division.

(3919) In the Crop Protection Divested Business are thus included:

- (1) For the **Herbicide Division**: [number of employees] total business employees overall, including (i) [number of employees] manufacturing employees; (ii) [number of employees] employees in sales and marketing; (iii) [number of employees] employees performing technical functions; and (iv) [number of employees] employees performing supply functions.
- (2) For the **Insecticide Division**: [number of employees] total business employees overall, including (i) [number of employees] manufacturing employees - plus up to [number of employees] contractors; (ii) [number of employees] employees in sales and marketing; (iii) [number of employees] employees performing technical functions; (iv) [number of employees] employees from the global organisation performing business functions; and (v) [number of employees] employees performing supply functions.

(3920) Regarding the **R&D Division**, all the personnel in the DuPont R&D Organisation was included except for the retained personnel described below. The R&D Division includes [number of employees] total business employees, overall divided by the following functions:

- (1) [number of employees] necessary critical support staff at the divestment facility.
- (2) [number of employees] full time and [number of employees] part time patent agents.

- (3) [number of employees] personnel related to the Divestment R&D Organisation:
 - (1) the global technology leader;
 - (2) the Discovery chemistry team, composed of [number of employees] employees (includes [number of employees] employees in the DuPont [name of facility] facility);
 - (3) the Discovery biology team, composed of [number of employees] employees;
 - (4) the Development biology team, composed of [number of employees] employees;
 - (5) the Process development, formulations and analytical sciences group, composed of [number of employees] employees;
 - (6) the Stewardship and regulatory department, composed of [number of employees] employees;
 - (7) the Crop Protection commercialisation, portfolio and resource management group, composed of [number of employees] employees;
 - (8) the EMEA R&D Organisation, composed of [number of employees] employees;
 - (9) the North America field development and registration and regulatory affairs group, composed of [number of employees] employees;
 - (10) the Canada R&D Organisation composed of [number of employees] employees;
 - (11) the Asia Pacific R&D Organisation composed of [number of employees] employees; and
 - (12) the Latin America R&D Organisation composed of [number of employees] employees.
- (3921) The Herbicide and Insecticide Divisions also include all DuPont's products, brands, customers, customer lists, registrations, any studies and results of tests that DuPont has undertaken (including physical copies thereof), or has on-going at closing, to support the renewal of divestment registrations and products, labels, regulatory data, trademarks, patents and other intellectual property related to the Herbicide and Insecticide Divisions or necessary to ensure the viability and competitiveness of the Herbicide and Insecticide Divisions.
- (3922) The R&D Division includes all patents as well as know-how and any other IP owned by DuPont related to its global R&D Organisation and crop protection pipeline.

- (3923) The Crop Protection Divested Business includes additionally the following *transition agreements*:²⁵¹⁰
- (1) A Transition Supply Agreement for up to [duration] to supply to the purchaser the Divested Formulated Products [...], that are currently being manufactured by DuPont at the retained facilities; and
 - (2) A Toll Supply Agreement for the supply [...] to the purchaser of the Divested Formulated Products made at the retained facilities. This agreement shall last no longer than [duration] following the completion of the Transition Supply Agreement.
- (3924) The Parties additionally proposed to transfer to the purchaser, with the R&D Division, contracts that DuPont currently has with third party service providers globally as well as interim contract technicians for the European R&D centre and a number of other agreements with third parties.
- (3925) Under the Crop Protection First Commitments, the Parties proposed not to include in the Crop Protection Divested Business, among other, the following elements:
- (1) The retained pipeline consisting in the nematicide and seed treatment AIs in the discovery and development stages and fungicide AIs in the development stage [...].

Table 98 – Retained pipeline

[...]

- (2) The following facilities related to DuPont's R&D Organisation: (i) the Haskell portion of the Stine-Haskell site ([process information]); (ii) [facility]; (iii) [facility]; (iv) [facility] (v) [facility].
- (3) The following personnel relating to the R&D Division: (i) [number of employees] employees related to Development Biology; (ii) [number of employees] employees related to Process development, formulations and analytical sciences; (iii) [number of employees] employees related to Stewardship and regulatory; (iv) [number of employees] employees related to Crop Protection commercialisation, portfolio and resource management group; (v) [number of employees] employees related to the EMEA R&D Organisation; (vi) [number of employees] employees related to the North America field development and registration and regulatory affairs group; (vii) [number of employees] employees related to the Canada R&D Organisation; (viii) [number of employees] employees related to the Asia Pacific R&D Organisation; and (ix) [number of employees] employees related to the Latin America R&D Organisation.
- (4) All herbicide AIs that are not Herbicide Divested AIs, and registrations for mixtures that contain any herbicide retained AI.

²⁵¹⁰ DuPont currently has a toll manufacturing agreement with [name of company] for the manufacture of [name of product] under typical toll terms as DuPont's facility in Cernay is not able to produce Herbicide Divestment Formulated Products [product information]. The agreement term is until [duration]; DuPont will use its reasonable best efforts to transfer the agreement to the Purchaser.

- (5) All insecticide AIs that are not Insecticide Divested AIs and all formulated products and mixtures that solely contain any insecticide AI other than the Insecticide Divested AIs.
- (6) The following facilities related to the Herbicide and Insecticide Divested AIs: (i) [name of facility] Formulation Unit [name of facility]; (ii) [name of facility] Formulation Unit; (iii) [name of facility] Formulation Unit [name of facility] (iv) [name of facility]; (v) [name of facility] Packaging Unit; (vi) [name of facility] Formulation and Packaging Unit; (vii) [name of facility] Site; (viii) [name of facility] Formulation Unit; (ix) [name of facility] Packaging Unit; (x) [name of facility] Packaging Unit; and (xi) [name of facility] Formulation Unit.
- (7) The merged entity would license back, on an exclusive basis from the purchaser, the divested IP and the divested technical AI registration data and formulated product registration data necessary for the sale, manufacture and formulation (i) of the formulated products listed in recitals (3925)(4) and (3925)(5) and (ii) of the retained seed treatment formulated products and seed treatment [...].
- (3926) DuPont currently has [number of agreements] agreements with Syngenta for Rynaxypyr and Cyazypyr, [agreement information]^{2511,2512,2513,2514}.
- (3927) [Agreement information].²⁵¹⁵
- (3928) [Agreement information].²⁵¹⁶
- (3929) [Agreement information].
- (3930) The Parties proposed to transfer to the Crop Protection Divested Business the Rynaxypyr Licence Agreement (and respective amendments) and the Cyazypyr Licence Agreement (and the respective amendments). However, the merged entity would retain the right to manufacture Rynaxypyr and Cyazypyr solely for supply to Syngenta under the existing Supply Agreements with Syngenta, either by manufacturing the products itself or through a supply agreement with the purchaser.
- (3931) Finally, the Crop Protection Divested Business includes the **Picoxystrobin licence**. This consists in the supply to the purchaser, under an exclusive licence for the sale of such product for use solely for rice blast in the EEA, of either a straight picoxystrobin finished product or straight picoxystrobin which the purchaser will be able to use for producing its own straight finished product or mixtures with other AIs solely for use in rice blast. Supply will be [...].
- (1) The Parties shall provide the purchaser with the necessary intellectual property, know-how and related registration data to ensure the continued sale of picoxystrobin for use solely on rice blast in the EEA.
- (2) [...].

2511 [Internal document].
 2512 [Internal document].
 2513 [Internal document].
 2514 [Internal document].
 2515 [Internal document].
 2516 [Agreement information].

(3932) According to the Crop Protection First Commitments, the purchaser of the Crop Protection Divested Business must be independent of the Parties, have the financial resources and proven expertise as well as the incentive to maintain and develop the business. In particular, the purchaser should be a company already active in crop protection [...].

(3933) Moreover, the Crop Protection First Commitments provide that the Transaction cannot be consummated before DuPont or the trustee have entered into a final binding sale and purchase agreement for the sale of the Crop Protection Divested Business and the Commission has approved the purchaser and the terms of sale.

2.1.2. Polyolefins First Commitments

(3934) According to the Polyolefins First Commitments, the Parties commit to divesting Dow's (i) acid co-polymer and (ii) ionomer businesses.

(3935) In particular, **Dow's acid co-polymer business** included:

(1) the following main *tangible assets*:

(a) The Freeport ACP Facility. It is a [...] ACP production facility with a maximum asset capability ("MAC")²⁵¹⁷ of [...] per year.

(b) The Tarragona ACP Facility. It is a [...] ACP production facility with a MAC of [...] per year. The transfer also includes certain [...] equipment required to operate the ACP Facility, [details on Dow's financial strategy].

(c) All marketing material, including but not limited to product information sheets, training materials, price lists, and presentations.

(2) the following main *intangible assets*:

(a) The Primacor trademark, which is currently used by Dow for the marketing of ACPs.

(b) Know-how, including operation manuals, relevant piping and instrumentation diagrams (P&ID), specifications for raw materials and end-product, and know-how relating to the applicable quality control procedures.

(3) the transfer of licences, permits and authorisations related to the Freeport and Tarragona operations; and access for actual or future third-party suppliers and service providers of the Polyolefins Divested Business to the Freeport and Tarragona ACP Facilities.

(4) the transfer of contracts, agreements, leases, commitments and understandings, *inter alia*, Dow committed to use reasonable best efforts to transfer all contracts with third-party suppliers of products and services to the Polyolefins Divested Business, [details on supply arrangement with third party].

(5) the following customer and other records:

(a) All available customer records for ACP customers globally. To the extent customers have contracts in place specifically for ACPs and these can be legally assigned, Dow committed to also assigning those to the

²⁵¹⁷ [Description of Dow's method to measure asset capability].

purchaser. For contracts requiring consent, Dow committed to using reasonable best efforts to obtain such consents.

- (b) In case customer and other records do not exclusively relate to the Polyolefins Divested Business but also to other (retained) businesses, these customer and other records would be redacted, subject to the review of the Monitoring Trustee.
- (6) the following *personnel*:
- (a) In relation to the Tarragona ACP Facility, Dow has identified [...] operational roles for which it committed to taking reasonable steps, including appropriate incentive schemes (based on industry practice), to make available and transfer suitable employees for these roles to the purchaser.
 - (b) In relation to the Freeport and Tarragona ACP Facilities, Dow has identified [...] additional roles for which it committed to taking reasonable steps, including appropriate incentive schemes (based on industry practice), to make available and transfer suitable employees for these roles to the purchaser as from Closing.
- (7) arrangements for the supply of the following products or services by the Parties or Affiliated Undertakings:
- (a) Operating services (“OSA”) for the Freeport ACP facility. For as long as the Parties operate the retained facilities at Freeport, they will operate the Freeport ACP Facility for the purchaser under an OSA, manufacturing products in accordance with the purchaser’s instructions [...]. The purchaser will solely control and make all commercial and other strategic decisions relating to ACP production planning, maintenance strategy, capital investment, supply chain management, quality management, marketing, sales and any potential technology development. The Parties’ involvement will be limited to operating the Freeport ACP Facility, according to the purchaser’s instructions, with firewalls in place to prevent the leakage of any commercially sensitive information concerning the Polyolefins Divested Business. The Parties commit to executing the purchaser’s decisions in a non-discriminatory manner in accordance with standard industry practice under the OSA.
 - (b) Transitional operating services – transitional OSA for the Tarragona ACP Facility. During the Initial Transition Period ([...]) and, if required, the Supplemental Transition Period (up to [...]), the merged entity will continue to operate the Tarragona ACP Facility on behalf and for the benefit of the purchaser [...] under a transitional OSA, with the merged entity employees subject to strict firewalls and confidentiality agreements.
 - (c) Raw material. At the purchaser’s option, the Parties are prepared to enter into an agreement of up to [...] to supply ethylene and GAA, [...] and on fair and reasonable terms to be negotiated with the purchaser, to the Polyolefins Divested Business for the Freeport ([...]) and the Tarragona ([...]) ACP Facilities.

(3936) In particular, **Dow’s ionomer (“IO”) business** included:

- (1) the following main *tangible assets*:
 - (a) Marketing materials. All product information sheets, training materials, price lists and presentations and other marketing materials relating to ionomers.
- (2) the following main *intangible assets*:
 - (a) Know-how. Internal research reports, specifications for raw materials and end-product, process conditions and quality control methods.
 - (b) Patents. All of Dow’s patents exclusive to the Polyolefins Divested Business.
- (3) the following main contracts, agreements, leases, commitments and understandings:
 - (a) The [...] Agreement. Dow does not manufacture ionomers itself but uses the compounder [...] to manufacture ionomers pursuant to an external manufacturing agreement (the “[...] Agreement”). The [...] Agreement, which also covers other products outside the scope of the Polyolefins Divested Business, will be assigned to the purchaser as far as it relates to ionomers.
 - (b) A license to use the Amplify IO trademark. A license agreement under which the purchaser will be granted [...] right to use the Amplify IO trademark for EAA-based ionomers for a period of [...] for re-branding purposes.
- (4) the following customer and other records:
 - (a) Dow’s customer contracts, records and contact information on a global basis. All available customer records and contact details of ionomer customers globally. To the extent customers have contracts in place specifically for ionomers and these can be legally assigned, Dow will also assign those to the purchaser. For contracts requiring consent, Dow will use reasonable best efforts to obtain such consents.
 - (b) In the event that customer and other records do not exclusively relate to the Polyolefins Divested Business but also to other (retained) businesses, these customer, credit and other records will be redacted, subject to review of the Monitoring Trustee.

(3937) According to the Polyolefins First Commitments, the purchaser of the Polyolefins Divested Business must be independent of the Parties, have the financial resources and proven expertise as well as the incentive to maintain and develop the business.

(3938) Moreover, the Polyolefins First Commitments provide that the Transaction cannot be consummated before Dow or the trustee have entered into a final binding sale and purchase agreement for the sale of the Polyolefins Divested Business and the Commission has approved the purchaser and the terms of sale.

2.2. Results of the market test

(3939) The Commission considered that some issues were not addressed in the First Commitments as regards the crop protection and the polyolefins markets. However, the Commission decided to subject the First Commitments to a market test, which

was launched on 8 February 2017 (crop protection) and 9 February 2017 (polyolefins).

2.2.1. Crop Protection First Commitments

(3940) The crop protection market test mainly aimed at assessing: (i) whether the Crop Protection Divested Business had the necessary scope in terms of products, facilities, personnel and intangible assets to ensure its viability and competitiveness, (ii) whether the separation between the Licence agreement and the Supply agreement with Syngenta would create additional competition concerns, (iii) whether the licensing back of some IP to the merged entity would affect the ability of the purchaser to develop the Crop Protection Divested Business in a viable and competitive way, (iv) the criteria for the selection of the purchaser and (v) the commitments' suitability to effectively remove the Commission's competition concerns. In addition, the market test also aimed at testing the viability of the Picoxystrobin licence.

2.2.1.1. Scope of the Crop Protection Divested Business

(3941) A majority of competitors and customers considered that the AIs and formulated products included in the Herbicide and Insecticide Divisions of the Crop Protection Divested Business have the necessary scope for the purchaser to replicate DuPont's competitive constraint in the markets for herbicides and insecticides where the Commission has identified concerns.²⁵¹⁸ Similarly, the majority of competitors and customers considered that the pipeline portfolio included in the Crop Protection Divested Business has the necessary scope for the purchaser to replicate DuPont's competitive constraint as a global R&D-integrated player.²⁵¹⁹

(3942) As regards facilities, the majority of competitors considered that the production plants and formulation facilities transferred are enough to ensure the viability and competitiveness of the Crop Protection Divested Business.²⁵²⁰

(3943) As regards R&D facilities, the majority of competitors considered that the production plants and formulation facilities transferred are enough to ensure the viability and competitiveness of the Crop Protection Divested Business.²⁵²¹ Some competitors expressed some concerns as regards the exclusion of the Haskell portion of the Stine-Haskell site, [process information] for the Crop Protection Divested Business.²⁵²² According to one competitor, "*[t]he exclusion of the Haskell portion may limit the group of possible purchasers of the Divested Business to those companies, who already have similar facilities and capabilities and eliminate potential purchasers, who would otherwise be viable alternatives*".

(3944) The majority of competitors considered to be sufficient to enable the Crop Protection Divested Business to develop a viable and competitive business the existence of transition supply and toll manufacturing agreements to supply to the purchaser the

²⁵¹⁸ Questionnaire MT1 to Crop Protection Competitors, questions 1 and 2; and Questionnaire MT2 to Crop Protection Customers, questions 1 and 2.

²⁵¹⁹ Questionnaire MT1 to Crop Protection Competitors, question 3; and Questionnaire MT2 to Crop Protection Customers, question 3.

²⁵²⁰ Questionnaire MT1 to Crop Protection Competitors, questions 4 and 5.

²⁵²¹ Questionnaire MT1 to Crop Protection Competitors, question 7.

²⁵²² Questionnaire MT1 to Crop Protection Competitors, question 6.

Divested Formulated Products that are currently being manufactured by the retained facilities [...].²⁵²³

- (3945) The majority of competitors considered that the IPRs included in the Herbicide, Insecticide and R&D Divisions have the necessary scope for the purchaser of the Crop Protection Divested Business to replicate DuPont's competitive constraint in the markets for herbicides and insecticides where the Commission has identified concerns.²⁵²⁴
- (3946) The majority of competitors considered that the sales and marketing personnel as well as the personnel performing supply and technical functions transferred are enough to ensure the viability and competitiveness of the Crop Protection Divested Business.²⁵²⁵ A majority of customers also considered that the sales and marketing personnel transferred are enough to ensure the viability and competitiveness of the Crop Protection Divested Business.²⁵²⁶
- (3947) In the case of R&D personnel, the majority of competitors considered that the exclusion of some of DuPont's R&D personnel has no impact on the viability and competitiveness of the Crop Protection Divested Business as a global R&D-integrated player.²⁵²⁷ One competitor explained, however, that "*[d]ivesting the discovery function as a whole but other functions only in part would create an unbalance in the respective functions, which may eventually hamper the ability of the divested R&D Division to remain competitive*".

2.2.1.2. Licence and Supply Agreements between DuPont and Syngenta for Rynaxypyr and Cyazypyr

- (3948) The majority of competitors considered that the separation between the Licence Agreements and the Supply Agreements would negatively affect the ability of the purchaser to develop the Crop Protection Divested Business in a viable and competitive way and to replicate DuPont's competitive constraint in the markets for insecticides as well as the incentives of the purchaser to manage the molecules, renew them, offer new mixtures and final formulations.²⁵²⁸
- (3949) According to one competitor, "*[t]o fully exploit the business potential of an acquired asset, the acquirer needs to be in full control of the supply and should not be dependent on agreed volumes or other contractual obligations in such more complex relationships. [...] The separation with the option that DuPont is supplied by the purchaser in order to supply the AIs to Syngenta would in addition lead to a situation where two companies (DuPont and the purchaser) instead of just one (the purchaser) get access to competitively sensitive information about their competitor Syngenta via the supply of Rynaxypyr and Cyazypyr*".²⁵²⁹
- (3950) Another competitor added that "*the profitability of this business arrangement is secured by both the license agreement and the supply agreement working as a*

²⁵²³ Questionnaire MT1 to Crop Protection Competitors, question 8.

²⁵²⁴ Questionnaire MT1 to Crop Protection Competitors, questions 9, 10 and 11.

²⁵²⁵ Questionnaire MT1 to Crop Protection Competitors, questions 16, 17 and 18.

²⁵²⁶ Questionnaire MT2 to Crop Protection Customers, question 5.

²⁵²⁷ Questionnaire MT1 to Crop Protection Competitors, questions 19.

²⁵²⁸ Questionnaire MT1 to Crop Protection Competitors, questions 13 and 14.

²⁵²⁹ Questionnaire MT1 to Crop Protection Competitors, question 13.

*“package deal” and thus lacking the latter may have a significant negative impact on the viability of the business”.*²⁵³⁰

- (3951) Another competitor stated that “[t]he magnitude of the volumes required and the length of the Supply Agreements may have a significant bearing on determining investments required to maintain the manufacturing assets and the registration assets associated with the Insecticide Divested Formulations & products containing the Insecticide Divested AIs”.²⁵³¹
- (3952) Finally, Syngenta explained that [...].²⁵³²
- (3953) The Parties proposed to have the option of (i) entering into an agreement with the purchaser for the supply by the purchaser of Rynaxypyr and Cyazypyr to DuPont, or (ii) having the merged entity manufacture Rynaxypyr and Cyazypyr itself.
- (3954) The majority of competitors considered that under option (i) the links created between Dow/DuPont, Syngenta and the purchaser would negatively affect competition in the markets for insecticides.²⁵³³ In particular, one competitor explained that “it would lead to a situation where two companies (DuPont and the purchaser) instead of just one (the purchaser) get access to competitively sensitive information about their competitor Syngenta via the supply of Rynaxypyr and Cyazypyr, which should be avoided”. The majority of competitors did not expect costs to change under option (ii).²⁵³⁴
- (3955) In general, the majority of competitors and customers considered that the scope of the business to be divested is sufficient to ensure the Crop Protection Divested Business' viability and competitiveness in the markets for insecticides and herbicides where the Commission has identified concerns.²⁵³⁵
- (3956) In addition, the majority of competitors and customers considered that the scale (in terms of revenues associated to the Herbicide and Insecticide Divisions) and scope (in terms of the R&D assets and personnel included) of the Crop Protection Divested Business ensures that the purchaser would have the ability and incentive to maintain and develop the Crop Protection Divested Business in a viable and competitive way and replicate DuPont's role as a global R&D-integrated player in crop protection.²⁵³⁶
- (3957) Finally, one competitor mentioned as an additional element that it considers important to be part of the remedy package to ensure the emergence of an effective and viable business “the support for share services of administration, such as accounting, finance, IT, human resources, supply chain, etc at actual cost basis. It enables the purchaser to operate the business and generate profit from day 1”²⁵³⁷

²⁵³⁰ Questionnaire MT1 to Crop Protection Competitors, question 13.

²⁵³¹ Questionnaire MT1 to Crop Protection Competitors, question 14.

²⁵³² Questionnaire MT1 to Crop Protection Competitors, question 13.

²⁵³³ Questionnaire MT1 to Crop Protection Competitors, question 15.

²⁵³⁴ Questionnaire MT1 to Crop Protection Competitors, question 16.

²⁵³⁵ Questionnaire MT1 to Crop Protection Competitors, questions 25 and 26; and Questionnaire MT2 to Crop Protection Customers, questions 7 and 8.

²⁵³⁶ Questionnaire MT1 to Crop Protection Competitors, question 27; and Questionnaire MT2 to Crop Protection Customers, question 9.

²⁵³⁷ Questionnaire MT1 to Crop Protection Competitors, question 30.

2.2.1.3. Scope of the licence back

(3958) Regarding the licence back to the merged entity concerning the divested IPRs, and the divested technical AI registration data and formulated product registration data necessary for the sale, manufacture and formulation of the formulated products included in the retained business, the majority of competitors considered that this would have no effect (or even affect positively) on the ability of the purchaser to develop the Crop Protection Divested Business in a viable and competitive way and to replicate DuPont's competitive constraint in the markets where the Commission has identified concerns.²⁵³⁸

2.2.1.4. Purchaser criteria

(3959) The majority of competitors and all customers considered that the Crop Protection Divested Business is sufficiently attractive to interest suitable purchasers.²⁵³⁹

(3960) As regards the necessary characteristics that the suitable purchaser should have in order to be able to viably run the Crop Protection Divested Business, competitors and customers mentioned the following:²⁵⁴⁰

- (1) experience in regulatory matters and registration in the Union;
- (2) R&D experience;
- (3) established distribution go-to-market structure in EEA; and
- (4) financial resources for a substantial acquisition.

2.2.1.5. Suitability of the First Commitments

(3961) The majority of competitors and customers stated that the Crop Protection First Commitments would be in principle suitable to effectively remove the Commission's competition concerns raised by the Transaction in the markets for insecticides and herbicides where the Commission has identified concerns.²⁵⁴¹

(3962) Similarly, the majority of competitors and customers stated that the Crop Protection First Commitments would be in principle suitable to effectively remove the Commission's competition concerns raised by the Transaction in the crop protection markets as regards innovation competition.²⁵⁴²

2.2.1.6. Picoxystrobin licence

The majority of competitors and customers considered that the Picoxystrobin licence has the necessary scope for the purchaser of the Crop Protection Divested Business to replicate DuPont's competitive constraint in the markets for rice blast fungicides where the Commission has identified concerns.²⁵⁴³

²⁵³⁸ Questionnaire MT1 to Crop Protection Competitors, questions 21 and 22.

²⁵³⁹ Questionnaire MT1 to Crop Protection Competitors, question 32; and Questionnaire MT2 to Crop Protection Customers, question 12.

²⁵⁴⁰ Questionnaire MT1 to Crop Protection Competitors, question 33; and Questionnaire MT2 to Crop Protection Customers, question 13.

²⁵⁴¹ Questionnaire MT1 to Crop Protection Competitors, questions 37 and 38; and Questionnaire MT2 to Crop Protection Customers, questions 15 and 16.

²⁵⁴² Questionnaire MT1 to Crop Protection Competitors, question 39; and Questionnaire MT2 to Crop Protection Customers, question 17.

²⁵⁴³ Questionnaire MT1 to Crop Protection Competitors, question 23; and Questionnaire MT2 to Crop Protection Customers, question 4.

- (3963) As regards the conditions for the licence, the majority of competitors and customers considered that a duration of [duration] for the supply agreement [...] is sufficient to enable the purchaser to develop a viable and competitive business.²⁵⁴⁴ Nevertheless some competitors mentioned that "*Rice Blast will be a too small basis to develop alternative source*" and "*suggest at least 5 years of supply at cost and a further minimum period of 5 years supply at fair and reasonable terms is necessary to sustainably build up a competitive position*".
- (3964) Finally, the majority of competitors and customers considered that the Picoxystrobin licence was suitable to effectively remove the Commission's competition concerns raised by the Transaction in the markets for rice blast fungicides where the Commission has identified concerns.²⁵⁴⁵

2.2.2. Polyolefins First Commitments

- (3965) The market test was mainly aimed at assessing: (i) the overall suitability of the Polyolefins First Commitments with regard to the acid co-polymer and ionomer markets; (ii) whether the ability to compete of the eventual purchaser could be significantly impaired by an OSA; (iii) [details of Dow's financial strategy]; (iv) the suitability of the duration and pricing conditions of the supply agreements of ethylene and GAA; (v) the ability of the access rights to ensure third-party supplies and services; (vi) the suitability of the duration of the ionomer licence to re-brand the divested product; (vii) the ability to ensure customers' purchase continuity; and (viii) the sufficiency of the personnel to be transferred.

2.2.2.1. Overall suitability of the Polyolefins First Commitments

- (3966) Some respondents to the market test expressed concerns with regard to the Polyolefins First Commitments. Since the Parties will remain in the acid co-polymer and ionomer markets, one respondent indicated that: "*Under the terms of the proposed Commitments, DuPont/Dow intends to remain in the market selling ACP products as an active competitor of Purchaser. Further, should Commitments be approved, Dow's involvement in operation of both ACP production facilities located in Freeport and Tarragona, as well as Dow's supply of large quantities of raw materials (ethylene & GAA), would necessarily give employees within DuPont/Dow the advantage of knowing Purchaser's total cost of manufacture. This would undoubtedly be a competitive advantage for DuPont/Dow in acting as a competitor of Purchaser.*"²⁵⁴⁶
- (3967) With regard to ionomers, the same respondent stated: "*Since ACP is a necessary raw material for ionomer, DuPont/Dow would have a good idea of the cost of this important material based upon their operation of the Purchaser's Freeport and Tarragona plants. Further, DuPont/Dow's knowledge of Purchaser's cost to manufacture ionomers at Company X*²⁵⁴⁷ *may be ascertained by DuPont/Dow if they*

²⁵⁴⁴ Questionnaire MT1 to Crop Protection Competitors, question 24; and Questionnaire MT2 to Crop Protection Customers, question 10.

²⁵⁴⁵ Questionnaire MT1 to Crop Protection Competitors, question 38; and Questionnaire MT2 to Crop Protection Customers, question 17.

²⁵⁴⁶ Questionnaire MT3 to Polyolefins Bidders, questions 1.1 and 3.1.

²⁵⁴⁷ [...] was referred to as 'Company X' during the market test for confidentiality reasons.

*continue to utilize Company X services in conducting a portion of their ionomer manufacturing post divestiture.*²⁵⁴⁸

(3968) Others respondents were concerned with the independence and connections that will remain between the purchaser and the Parties: *“The connections between both companies will remain very strong; The divestment should become a real independant (sic) player (from technical and commercial perspective (sic)) for both material categories around the world.”*²⁵⁴⁹

(3969) However, the majority of bidders, competitors and customers considered that the Polyolefins First Commitment would effectively remove the competition concerns in the acid co-polymer and ionomer markets.

2.2.2.2. Operation of a facility on behalf of a purchaser under an OSA

(3970) The majority of bidders, competitors and customers indicated that the OSA would not significantly affect the purchaser's ability to compete. While a customer indicated that the OSA could be problematic and a bidder pointed out that due to the OSA: *“DuPont/Dow would have complete knowledge of Purchaser’s cost of manufacture (i.e. Cost of goods sold) for ACP products made in Freeport. DuPont/Dow would be supplying all the labor, a significant amount of the raw materials, as well as services which would give them knowledge of their competitor’s (i.e. Purchaser’s) cost position;”*²⁵⁵⁰ other respondents stated that these arrangements were common practice and that since Dow’s involvement would be limited to operating the facility, the purchaser's ability to compete should not be impacted.²⁵⁵¹

2.2.2.3. [Details on Dow’s financial strategy]

(3971) [Details on Dow’s financial strategy].²⁵⁵²

(3972) [Details on Dow’s financial strategy].²⁵⁵³

(3973) [Details on Dow’s financial strategy].²⁵⁵⁴

2.2.2.4. Suitability of the terms of the supply agreements of ethylene and GAA

(3974) The majority of bidders considered that the duration and pricing conditions of the supply agreements were sufficient to enable the Polyolefins Divested Business to remain a viable and competitive business.²⁵⁵⁵ One competitor suggested a shorter duration of [...],²⁵⁵⁶ and one customer indicated that the purchaser would be technically and commercially very dependent on the Parties and would not be able to compete freely.²⁵⁵⁷ However, the majority of competitors and customers agreed that

²⁵⁴⁸ Questionnaire MT3 to Polyolefins Bidders, questions 2.1 and 6.1.

²⁵⁴⁹ Questionnaire MT4-b to Polyolefins Customers, questions 1.1, 2.1, 3.1, 3.2 and 6.1; Questionnaire MT4-a to Polyolefins Competitors, questions 3.1 and 6.2.

²⁵⁵⁰ Questionnaire MT3 to Polyolefins Bidders, question 4.1.

²⁵⁵¹ Questionnaire MT4-b to Polyolefins Customers, question 4.1.

²⁵⁵² Questionnaire MT3 to Polyolefins Bidders, question 5.1; Questionnaire MT4-a to Polyolefins Competitors, question 5.1; Questionnaire MT4-b to Polyolefins Customers, question 5.1.

²⁵⁵³ Questionnaire MT3 to Polyolefins Bidders, question 5.1.

²⁵⁵⁴ Questionnaire MT3 to Polyolefins Bidders, question 5.1.

²⁵⁵⁵ Questionnaire MT3 to Polyolefins Bidders, question 7.1.

²⁵⁵⁶ Questionnaire MT4-a to Polyolefins Competitors, questions 7.1 and 7.2.

²⁵⁵⁷ Questionnaire MT4-b to Polyolefins Customers, question 7.1.

the proposed duration was sufficient and adequate to ensure viability and competitiveness.²⁵⁵⁸

2.2.2.5. Suitability of the duration of the ionomer licence to re-brand the divested product

(3975) Two competitors considered that a licence of three years would be sufficient to allow brand recognition.²⁵⁵⁹ Two customers indicated that three to five years and even five to eight years would be necessary.²⁵⁶⁰ However, at least one customer considered that 1.5 years would be sufficient for re-branding products, and the majority of bidders, competitors and customers indicated that the proposed duration of [<2 years] was sufficient and adequate.²⁵⁶¹

2.2.2.6. Ability to ensure customers' purchase continuity

(3976) The large majority of respondents considered that the proposed commitments ensure that acid co-polymer and ionomer customers will continue to purchase from the Polyolefins Divested Business.²⁵⁶²

(3977) The majority of bidders, competitors and customers considered that a commitment not to solicit customers would be sufficient to ensure the viability and competitiveness of the Polyolefins Divested Business. With regard to the length of the non-solicitation, two competitors suggested that a duration of three years would be reasonable. However, the majority did not provide a specific duration but supported the need for such commitment.²⁵⁶³

(3978) Finally, with regard to (i) the ability of the access rights to ensure third-party supplies and services and (ii) the sufficiency of the personnel to be transferred, the majority of the respondents to the market test considered the Polyolefins First Commitments sufficient to ensure the viability and competitiveness of the Polyolefins Divested Business.²⁵⁶⁴

2.3. Assessment of the First Commitments

2.3.1. Crop Protection First Commitments

(3979) The Commission found that the results of the market test highlighted a variety of risks associated with the Crop Protection First Commitments.

2.3.1.1. Technical sales

(3980) Under the Crop Protection First Commitments, the Parties committed to divesting Rynaxypyr and Cyazypyr (including IPRs and manufacturing facilities), but retained the right to supply these AIs to Syngenta. In legal terms, [remedy information].

²⁵⁵⁸ Questionnaire MT4-a to Polyolefins Competitors, question 7; Questionnaire MT4-b to Polyolefins Customers, question 7.

²⁵⁵⁹ Questionnaire MT4-a to Polyolefins Competitors, question 9.1.

²⁵⁶⁰ Questionnaire MT4-b to Polyolefins Customers, question 9.2.

²⁵⁶¹ Questionnaire MT3 to Polyolefins Bidders, question 9; Questionnaire MT4-a to Polyolefins Competitors, question 9; Questionnaire MT4-b to Polyolefins Customers, questions 9 and 9.2.

²⁵⁶² Questionnaire MT3 to Polyolefins Bidders, questions 10, 11 and 12; Questionnaire MT4-a to Polyolefins Competitors, questions 10, 11 and 12; Questionnaire MT4-b to Polyolefins Customers, questions 10, 11 and 12.

²⁵⁶³ Questionnaire MT3 to Polyolefins Bidders, question 13; Questionnaire MT4-a to Polyolefins Competitors, question 13; Questionnaire MT4-b to Polyolefins Customers, question 13.

²⁵⁶⁴ Questionnaire MT3 to Polyolefins Bidders, questions 8 (access rights), and 14 and 15 (personnel); Questionnaire MT4-a to Polyolefins Competitors, questions 8, 14 and 15; Questionnaire MT4-b to Polyolefins Customers, questions 8, 14 and 15.

- (3981) In light of the results of the market test on the Crop Protection First Commitments and of the information obtained by the Commission, the Commission considers that the separation between the Licence Agreement and the Supply Agreement for both Rynaxypyr and Cyazypyr raise two main issues.
- (3982) **First**, the proposal to separate the IPRs and technical sales involved splitting two interlinked agreements, namely the Licence and Supply Agreements. Therefore, this situation would create a complex web of rights and obligations across Syngenta, the merged entity and the purchaser. This would happen irrespective of whether or not the merged entity would manufacture the molecules or source them from the purchaser.
- (3983) [Remedy information].²⁵⁶⁵
- (3984) The Licence and Supply Agreements were negotiated jointly. The Commission considers that the rationale of the Licence and Supply Agreements cannot be separated, and the rights and obligations they create are strictly related.
- (1) [Agreement information].
 - (2) [Agreement information].²⁵⁶⁶
 - (3) [Agreement information].
 - (4) [Agreement information].
 - (5) [Agreement information].
 - (6) [Agreement information].
- (3985) In conclusion, the Commission considers that it is questionable whether DuPont can legally assign the Licence Agreements without the Supply Agreements, and whether Syngenta's consent is required. Even if the Parties claim that the risk of implementing this solution is on them, because of the upfront buyer clause, this may have a significant adverse effect on the remedy because:
- (1) the implementation of this solution would be subject to legal uncertainty which may affect the continued viability of the Crop Protection Divested Business even before it is divested to a purchaser;
 - (2) even once implemented, the solution would result in a complex arrangement between three industry players, with uncertain effects on their incentives.

(3986) **Second**, [agreement information].

(3987) [Agreement information].²⁵⁶⁷

Table 99 – [Supply information]

[...]

Source: Parties' response to Commission's request for information RFI76

²⁵⁶⁵ [Agreement information].

²⁵⁶⁶ [Agreement information] (Annexes to the Parties' response to question 4 of the Commission's request for information RFI76).

²⁵⁶⁷ In response to the Commission's request for information RFI 76, the Parties confirmed that [agreement information].

- (3988) The [agreement information] would entail a significant loss of economies of scale for the purchaser of the Crop Protection Divested Business. [Agreement information].²⁵⁶⁸
- (3989) [Agreement information].
- (3990) [Agreement information]²⁵⁶⁹.
- (3991) [Agreement information].
- (3992) [Agreement information].²⁵⁷⁰
- (3993) [Agreement information].
- (3994) [Agreement information]:
- (1) [Remedy information];
 - (2) [Agreement information].
- (3995) However, the Commission considers that the cost projections provided by the Parties are likely to significantly understate the cost-increasing effect of the remedy [remedy information].
- (3996) [Agreement information].
- (3997) The Commission thus concludes that the separation between the Licences Agreements and Supply Agreements between DuPont and Syngenta for Rynaxypyr and Cyazypyr would [agreement information].

2.3.1.2. Other issues

- (3998) The Commission considered that the Crop Protection First Commitments had some other minor risks also highlighted by market test respondents.
- (3999) As regards R&D personnel, in the Crop Protection First Commitments the Parties were only proposing to transfer [remedy information] the EMEA R&D organisation. This would put at risk the ability of the purchaser to engage in development activities in the EEA, as also explained by some respondents to the market test. In fact, in order for the purchaser to replicate DuPont's competitive constraints in the EEA, it must have access to a number of personnel at least equally proportionate to the part of DuPont's business that is included in the Crop Protection Divested Business.
- (4000) As regards R&D facilities, in the Crop Protection First Commitments, the Parties excluded the Haskell facility, [process information]. This could create problems for the purchaser to have access to [process information]. As explained in recital (3943), the exclusion of [process information] from the Crop Protection Divested Business may limit the group of possible purchasers to those companies that already have similar facilities and capabilities and eliminate potential purchasers that would otherwise be viable alternatives.
- (4001) The Crop Protection First Commitments also did not provide for any transitional services agreement for the provision of IT support related to sales processing for

²⁵⁶⁸ Annexes to the response of the Parties to questions 6 and 8 of the Commission's request for information RFI68.

²⁵⁶⁹ [Internal document] (ID11096-46). [Internal document] (ID11096-52).

²⁵⁷⁰ DuPont started to fully launch Cyazypyr in the EEA from Q4 2016 and Q1 2017 (in Ireland and the UK) [launch date].

products included in the Herbicide Division and Insecticide Division, which as explained in recital (3957) could create problems for the purchaser to operate the business and generate profits from the outset.

(4002) As regards the Picoxystrobin licence, the Crop Protection First Commitments provide for a period that was too short for supply [...], namely [duration]. This would risk the viability of such licence in the medium term as some competitors suggest (see recital (3963)).

2.3.2. *Polyolefins First Commitments*

(4003) The Commission considered that the responses to the market test suggest some risks associated with the Polyolefins First Commitments. In particular, the market test suggested that:

- (1) [details on Dow's financial strategy];
- (2) A long-term OSA could give the Parties access to key information of the Polyolefins Divested Business and a competitive advantage over the purchaser;
- (3) A non-solicitation commitment is necessary and a convenient duration could be up to three years.

3. FINAL COMMITMENTS

3.1. Description of the Final Commitments

(4004) In light of the issues described in Section X.2.2, on 17 February 2017, the Parties submitted the revised versions of three commitment packages: (i) the "Crop Protection Final Commitments" (as described in Section X.3.1.1 and included as Annex 7)²⁵⁷¹, (ii) the "Acid Co-Polymers Final Commitments" (as described in Section X.3.1.2 and included as Annex 8) and (iii) the "Ionomers Final Commitments" (as described in Section X.3.1.2 and included as Annex 9). The latter two are hereinafter referred to as the "Polyolefins Final Commitments".

(4005) The Crop Protection Final Commitments and the Polyolefins Final Commitments improve the Crop Protection First Commitments and the Polyolefins First Commitments as regards the Commission's concerns that remained in light of its evaluation of the market test.

3.1.1. Crop Protection Final Commitments

(4006) The Parties committed to transferring to the Crop Protection Divested Business not only the Licence Agreements with Syngenta for Rynaxypyr and Cyazypyr but also the Supply Agreements and other related agreements. In essence, DuPont would transfer to the purchaser the whole of the tangible and intangible assets (including contracts) relating to the Cyazypyr and Rynaxypyr businesses.

(4007) [Agreement information].

(4008) However, the Parties retain the right to enter into an agreement with the purchaser for the supply by the purchaser of Rynaxypyr and Cyazypyr for use of these AIs only in [agreement information].

²⁵⁷¹ The Parties submitted a Corrigendum to the Crop Protection Final Commitments on [date], also included as Annex 7.

- (4009) As regards R&D personnel, the Parties increased the number of personnel included in the Crop Protection Divested Business for the EMEA R&D Organisation, namely from [number of employees].
- (4010) As regards [...], the Parties commit to enter into a service provision agreement with the purchaser to provide [...] from its Haskell facility to the purchaser. Such agreement will be [remedy information].
- (4011) As regards IT support, the Parties commit if and to the extent necessary to enter into a transitional services agreement, at the Purchaser's option, for the provision by DuPont of IT support related to sales processing for products included in the Herbicide Division and Insecticide Division for up [duration], in a form that is customary for transactions of this type. [...].
- (4012) As regards the Picoxystrobin licence, the Parties extended the period for the supply [...]. Moreover, the licence was expanded to include all rice applications and not just rice blast. Finally, it was clarified that [...].

3.1.2. Polyolefins Final Commitments

- (4013) The Parties agreed to divest the Freeport ACP Facility accompanied with an OSA at the option of the purchaser and on the terms negotiated with such purchaser.
- (4014) [Details on Dow's financial strategy].
- (4015) With regard to the non-solicitation of Dow's acid co-polymer and ionomer customers at a worldwide level, the Parties commit to a duration of [...] following an Initial Transition Period ([...]) and, if applicable a Supplemental Transition Period (up to [...]).
- (4016) Additionally, the Parties included in the commitments some information that was already part of the Form RM submissions, namely: (i) the overview of the assets dedicated to ACP within the Freeport and Tarragona ACP Facilities, and those assets shared with other Dow operations on those sites; (ii) [details on Dow's Tarragona site]; and (iii) the list of ACP and ionomer products included in the Polyolefins Divested Business.
- (4017) Finally, the Parties commit to using reasonable best efforts to do the partial assignment or the split of the [...] Agreement at Closing.

3.2. Assessment of the Final Commitments

- (4018) The Commission considers that the Final Commitments, once implemented, fully and unambiguously address the competition concerns raised and are adequate and sufficient to eliminate the significant impediment to effective competition in relation to the markets for (i) herbicides for cereals, oilseed rape, sunflower, rice and pasture, (ii) chewing and sucking insecticides, (iii) fungicides for rice blast, (iv) acid co-polymers and (v) ionomers in the EEA as well as in relation to innovation competition in the crop protection industry, [remedy information].

3.2.1. Crop Protection Final Commitments

- 3.2.1.1. The Crop Protection Final Commitments will eliminate the horizontal overlaps created by the Transaction in the downstream markets as well in the innovation spaces where the Commission has identified concerns.
- (4019) The Crop Protection Final Commitments include all of DuPont's products in the downstream markets where the Commission has identified concerns, namely: cereal

herbicides, rice herbicides, pasture herbicides, oilseed rape herbicides and sunflower herbicides, chewing and sucking insecticides, as well as innovation capabilities, which would preserve the viability and competitiveness of this portfolio on a lasting basis.

- (4020) As regards rice fungicides, the Parties addressed the Commission's concerns by committing to offering an exclusive licence for the use of picoxystrobin and relevant formulated products based on picoxystrobin for the production and sale of products for rice in the EEA to the purchaser. In this case, the Commission considers the divestment of only a licence to be proportionate given that this product is used for many other applications with much higher revenues.
- (4021) Moreover, the R&D Division included in the Crop Protection Divested Business includes the large majority of the facilities, assets and employees that are currently active in the DuPont R&D Organisation. In addition, the purchaser will gain access to the relevant DuPont Crop Protection Divestment Pipeline, including a library of [number of compounds] compounds for screening, in addition to [remedy information].
- (4022) The Divestment Pipeline included in the Crop Protection Final Commitments relate to [remedy information], which comprise all overlapping innovation spaces between the Parties. Given that the Final Commitments eliminate the overlap in relation to all overlapping innovation activities of Dow and DuPont, the purchaser will be able to immediately replace DuPont as a global, fully R&D-integrated competitor in the Crop Protection industry.
- 3.2.1.2. The Crop Protection Final Commitments include a viable and competitive Crop Protection Divested Business
- (A) The Crop Protection Final Commitments include a viable Crop Protection Divested Business that addresses the Commission's concerns as regards product and price competition
- (4023) The Herbicide Division of the Crop Protection Divested Business, by including thifensulfuron methyl, tribenuron methyl, metsulfuron methyl and chlorsulfuron and formulated products containing these AIs, has a share of EEA sales in the segment of broadleaf cereal herbicides of approximately [20-30]%. In addition, by including ethametsulfuron methyl, triflusulfuron methyl, flupyrsulfuron methyl, azimsulfuron methyl and lenacil as well as formulated products containing these AIs, the Crop Protection Divested Business will have a significant presence in cereals, beets, sunflower, pasture and oilseed rape herbicides markets in the EEA.
- (4024) More specifically, the Herbicide Divestment AIs provide a comprehensive broadleaf and cross-spectrum weed control platform to meet the dynamic needs of growers. The Herbicide Division offers a broad product offering with more than [number of registrations] registrations and more than [number of registrations] pending registrations and well recognised trademarks. The Herbicide Division has a robust financial performance with around USD [sales estimate] revenues in [year] and an attractive margin of USD [sales estimate] in [year].
- (4025) The Insecticide Division of the Crop Protection Divested Business, by including Rynaxypyr, Cyazypyr and indoxacarb and the formulated products containing these AIs, provides a comprehensive insecticide control platform (including both chewing and sucking insecticides) to meet the dynamic needs of growers in the EEA. The Insecticide Division offers a broad product offering with more than [number of

registrations] registrations and more than [number of registrations] pending submissions for new registrations or uses and well recognised trademarks. The Insecticide Division has a robust financial performance with around USD [sales estimate] revenues in [year] and an attractive margin of USD [sales estimate] in [year].

- (4026) The Crop Protection Final Commitments, by transferring both the Licence Agreements and the Supply Agreements between DuPont and Syngenta for Rynaxypyr and Cyazypyr also address all the initial concerns of the Commission as regards the impact on cost competitiveness of such separation.
- (4027) The Herbicide Division and Insecticide Division will thus provide the purchaser of the Crop Protection Divested Business with a viable and attractive business for broadleaf and cross-spectrum herbicides as well as chewing and sucking insecticides globally, having access to a broad customer base.
- (4028) The transfer of the Herbicide Division and Insecticide Division will ensure immediate entry into the markets described in recital (4018) and will allow the purchaser to establish a relationship with suppliers and customers so that the new commercial structure resulting from the Final Commitments will be sufficiently workable and lasting to ensure that the significant impediment to effective competition identified by the Commission in the crop protection markets will not materialise.
- (4029) The Commission considers that the purchaser will further benefit from a stand-alone innovation organisation that will support the creation of a pipeline of molecules in the herbicide, insecticide and fungicide areas. This organisation will possess the innovation processes and tools that DuPont has developed and optimised, as well as scientists who are the named inventors of the insecticides and herbicides [remedy information] commercialised since 2007.
- (4030) The divestiture of the R&D division, including assets and pipeline molecules, will ensure that competition is fully restored in the downstream markets where concerns have been raised. This R&D structure has the necessary assets, in particular those dedicated to the development of AIs, to maintain the viability and competitiveness of the Herbicide and Insecticide Divisions by guaranteeing its ability to continue developing current and future products, and ensure all the necessary re-registrations and field tests. The Commission found that the maintenance and renewal of the downstream portfolio is a necessary element characterising the competitive interaction between the Parties on downstream markets and distinguishing them from other players such as generic players. Thanks to the divestiture of the R&D division together with the Herbicide Division, the Insecticide division, and the licence on picoxystrobin, the purchaser will thus be capable of replicating the current competitive interaction between DuPont and Dow in the downstream markets and keep its competitiveness in the medium-long term.
- (4031) The viability and competitiveness of the divested business in downstream markets is also ensured as the assets to be divested belong to one existing integrated crop protection business, rather than combining assets from different players in a business that currently does not operate on the market. The divestiture of crop protection assets from the R&D organisation reduces the risks relating to the combination of assets of different existing businesses. In particular, the complementarities between the R&D and lines of research and downstream product portfolios are preserved.

- (B) The Crop Protection Final Commitments include a viable Crop Protection Divested Business that addresses the Commission's concerns as regards innovation competition
- (4032) The divestiture of an R&D division also addresses the concerns raised by the Commission in regard to innovation competition. The purchaser of the Crop Protection Divested Business will be able to replace DuPont as a global, fully R&D-integrated competitor in the crop protection industry, and in particular in the areas where Dow and DuPont overlap, thus maintaining the rivalry with Dow's R&D activities that would otherwise have been eliminated by the Transaction.
- (4033) In particular, by including all of DuPont's assets and personnel dedicated to the discovery of new AIs as well as all patents, know-how and any other IP owned by DuPont related to its global R&D Organisation and crop protection pipeline, the Crop Protection Divested Business will be able to assume the role that DuPont currently has in crop protection innovation.
- (4034) The only DuPont discovery asset not included in the Crop Protection Divested Business is the Haskell portion of the Stine-Haskell site [...] However, the Parties commit to providing these [...].
- (4035) As regards assets and personnel dedicated to development of AIs, although the Crop Protection Divested Business does not include all DuPont's assets, it includes a large part of it, namely those that were dedicated to the herbicides, insecticides and fungicide businesses transferred. This should be enough to guarantee the purchaser capability to replicate the competitive constraint exerted by DuPont.
- (4036) If there is any asset or personnel which is not covered by the Crop Protection Final Commitments but which is both used (exclusively or not) in the Crop Protection Divested Business and necessary for its continued viability and competitiveness, that asset or an adequate substitute will be offered to potential purchasers.²⁵⁷²
- (C) Overall the Crop Protection Divested Business is a viable business
- (4037) The purchaser of the Crop Protection Divested Business will have access to all core assets throughout the value chain to be able to immediately compete in this area, including production assets (production, formulation and packaging facilities) and all tangible and intangible assets associated with them, including employees, sourcing and customer supply arrangements, customer lists and records, and contracts with distributors.
- (4038) The Crop Protection Final Commitments will include contracts (for example registration, distribution, non-compete etc.) as well as ancillary agreements (for example licence agreements, tolling and transition sale agreements, etc.) to allow the purchaser to continue to sell the products with little or no interruption in the marketplace.
- (4039) In addition, the merged entity will provide transitional product supply of Divested Formulated Products to preclude viability concerns and to ensure that the purchaser is able to take over the business as a going concern, without interruption, and that the transfer is carried out smoothly and in a timely manner. In particular, the transition supply agreements ensure that the purchaser can have access for a sufficiently long

²⁵⁷² Part 1 of the Schedule of the Crop Protection Final Commitments.

period [...] to the quantities that it needs to procure from the retained facilities until it can become totally independent of the merged entity.

- (4040) The Crop Protection Divested Business has a robust financial performance with around USD [sales estimate] revenues in [year] and an EBITDA of USD [sales estimate] in [year]. This will ensure the capability of the purchaser to finance research in crop protection. The ratio of R&D spend over revenues of the Crop Protection Divested Business corresponds to [...] % in [year]. [...], the Commission considers that the products included in the Crop Protection Divested Business ensure enough revenues to sustain the R&D platform being transferred.
- (4041) In addition, by avoiding any mix-and-match of products, assets and personnel of Dow and DuPont, the Crop Protection Final Commitments ensure the benefits of the complementarities between the current products of DuPont and its early pipeline products and lines of research, thus contributing to the viability of the divested business. [Pipeline information].

3.2.1.3. Suitable purchasers

- (4042) Several respondents to the Commission's market test considered that the Crop Protection Divested Business is sufficiently attractive and even revealed interest in purchasing it. The Parties confirmed that they have already received expressions of interest from a number of potential purchasers.
- (4043) Given the products, assets and personnel included in the Crop Protection Divested Business, the Commission considers that a company active in crop protection [remedy information] will be able to purchase this business and replicate DuPont's competitive constraint in the downstream markets where the Commission has identified concerns.
- (4044) The Commission further considers that the "up-front buyer" clause included in the Crop Protection Final Commitments is important to guarantee with the requisite degree of certainty that the Crop Protection Divested Business will be effectively divested to a suitable purchaser.²⁵⁷³

3.2.2. Polyolefins Final Commitments

- (4045) The Polyolefins Final Commitments address the concerns raised by the Commission in relation to (i) the acid co-polymer and (ii) the ionomer markets. The Final Commitments will eliminate the horizontal overlaps created by the Transaction. The Polyolefins Divested Business includes Dow's full acid co-polymer and ionomer businesses as they were before the Transaction, which will allow the purchaser to replicate Dow's competitive pressure in these markets in the EEA.
- 3.2.2.1. The Acid Co-Polymers Final Commitments would allow the purchaser to replicate Dow's competitive pressure in the ACP market in the EEA
- (4046) The Commission's concerns derive from the elimination of a significant competitive constraint from the acid co-polymer market in the EEA. The Commission considers that the Acid Co-Polymers Final Commitments would allow the purchaser to replicate Dow's competitive pressure in the ACP market in the EEA.

²⁵⁷³ Remedies Notice, paragraph 53-55.

- (4047) The Polyolefins Final Commitments proposed the divestiture of Dow's acid co-polymer plant in the EEA, the Tarragona ACP Facility. [Details on Dow's sales strategy] the results of the Commission's market investigation, which indicated that purchases of acid co-polymers are influenced by the proximity of suppliers to the geographic areas where customers are located.
- (4048) Moreover, based on the historical data provided by the Parties, [details on Dow's ACP sources for customers in the EEA].
- (4049) The divestiture of the Tarragona ACP Facility requires the separation of assets [details on Dow's Tarragona site]. These assets contribute to the current operation of the ACP business and are necessary to ensure its viability. The commitments provide for a transitional OSA between the Parties and the purchaser through which, for a limited period of time, the Parties will continue to operate the Tarragona ACP Facility on behalf (but following the instructions) of the purchaser in order to implement the separation of the shared assets. At the end of the transitional OSA, the purchaser will operate the Tarragona ACP Facility by itself.
- (4050) Furthermore, the Polyolefins Divested Business includes the Freeport ACP Facility, which at the option of the purchaser, will be divested accompanied by an OSA. The divestiture of this facility ensures that the purchaser will be able to offer the same product portfolio as Dow offered before the Transaction. In particular, the purchaser would be [details on Dow's ACP production].
- (4051) The independence of the Tarragona ACP Facility will be ensured for the duration of the transitional OSA through strict firewalls and confidentiality agreements that will ensure that any competitively sensitive information related to, or arising from, the transitional OSA will not be shared with DuPont's business that competes with the Polyolefins Divested Business. The same strict firewalls as for the transitional OSA will be in place if the purchaser opts to acquire the Freeport ACP Facility accompanied by an OSA.
- (4052) The Polyolefins Divested Business includes the transfer of all ACP products, product records and the Primacor trademark; as well as all available customer contracts and records for ACP customers globally. Together with a non-solicitation of customers for [...] and the transfer of operational and key personnel, the Commission considers that the viability and competitiveness of the Polyolefins Divested Business will be ensured. Moreover, if any asset or personnel that are not covered by the Polyolefins Final Commitments are necessary for the continued viability and competitiveness of the Polyolefins Divested Business, that asset or personnel, or an adequate substitute, will be offered to potential purchasers.²⁵⁷⁴
- 3.2.2.2. The Ionomers Final Commitments would allow the purchaser to replicate Dow's competitive pressure in the ionomer market in the EEA
- (4053) Dow does not currently manufacture ionomers itself but has ionomers manufactured by [...] under a [...] agreement. The Commission considers that the assignment or split of this agreement with regard to ionomers would allow the purchaser to replicate Dow's competitive pressure in the ionomer market in the EEA.

²⁵⁷⁴ Paragraph 4 of the Schedule of the Polyolefins Final Commitments.

(4054) The Polyolefins Divested Business includes [details on raw material supply for the production of Dow's ionomers] will ensure the supply of raw materials to [...], which is necessary to ensure the viability and competitiveness of the ionomer business.

(4055) The Ionomers Final Commitments includes the transfer of all ionomers products, product records, patents and know-how; as well [...] licence of [...] for the use of the Amplify IO trademark under which Dow sells its ionomers, to re-brand the purchaser's ionomer products. All available ionomer customer contracts and records for customers globally will also be transferred, together with a commitment not to solicit customers for [...]. The transfer of personnel is not necessary [...].

3.2.2.3. Overall viability and immediately operational business

(4056) The purchaser of the Polyolefins Divested Business will have access to all necessary assets to be able to immediately compete in the acid co-polymer and ionomer markets, including production assets and all tangible and intangible assets associated with them.

(4057) The purchaser will also benefit from supply agreements concerning the raw materials for the production of acid co-polymers, ethylene and GAA, as well as access rights for third party suppliers and service providers to ensure that the purchaser is able to switch raw material suppliers. The Polyolefins Divested Business also includes site service agreements for both facilities.

(4058) The Polyolefins Final Commitments will include contracts as well as ancillary agreements (for example licensing agreements, etc.) to allow the purchaser to continue to sell the products with little or no interruption in the marketplace.

3.2.2.4. Suitable purchasers

(4059) The majority of respondents to the Commission's market test considered that the Polyolefins Divested Business is sufficiently attractive to attract a suitable purchaser.²⁵⁷⁵ [Details on divestment process].

(4060) Given the products, assets and personnel included in the Polyolefins Divested Business, the Commission considers that a company active or with experience in the chemical industry (for example polyethylene) will be able to purchase this business and replicate Dow's competitive constraints in the acid co-polymer and ionomer markets where the Commission has identified concerns.

(4061) The Commission further considers that the "up-front buyer" clause included in the Polyolefins Final Commitments is important to guarantee with the requisite degree of certainty that the Polyolefins Divested Business will be effectively divested to a suitable purchaser.²⁵⁷⁶

4. CONCLUSION ON THE MODIFICATIONS TO THE TRANSACTION

(4062) In light of the considerations referred to in Section X.3.2, including the scope of the Crop Protection Divested Business and the Polyolefins Divested Business, the Commission considers that both the Crop Protection Final Commitments and the

²⁵⁷⁵ Questionnaire MT3 to Polyolefins Bidders, question 16; Questionnaire MT4-a to Polyolefins Competitors, question 16; Questionnaire MT4-b to Polyolefins Customers, question 16.

²⁵⁷⁶ Remedies Notice, paragraph 53-55.

Polyolefins Final Commitments are likely to create viable businesses capable of competing effectively on a lasting basis in the relevant markets. Those commitments therefore ensure that the Transaction would not result in any adverse effect on competition in any relevant markets.

- (4063) The Commission thus concludes that the Crop Protection Final Commitments and the Polyolefins Final Commitments are adequate and sufficient to eliminate the significant impediment to effective competition in relation to price and product competition in the markets for (i) herbicides for cereals, oilseed rape, sunflower, rice and pasture, (ii) chewing and sucking (including thrips) insecticides, (iii) fungicides for rice blast, (iv) acid co-polymers and (v) ionomers in the EEA as well as in relation to innovation competition in crop protection, [remedy information].

SECTION XI: CONDITIONS AND OBLIGATIONS

- (4064) Pursuant to the second subparagraph of Article 8(2) of the Merger Regulation, the Commission may attach to its decision conditions and obligations intended to ensure that the undertakings concerned comply with the commitments they have entered into vis-à-vis the Commission with a view to rendering the concentration compatible with the internal market.
- (4065) The fulfilment of a measure that gives rise to a structural change of the market is a condition, whereas the implementing steps, which are necessary to achieve that result, are generally obligations on the Parties. Where a condition is not fulfilled, the Commission's decision declaring the concentration compatible with the internal market is no longer applicable. Where the undertakings concerned commit a breach of an obligation, the Commission may revoke the clearance decision in accordance with Article 8(6)(b) of the Merger Regulation. The undertakings concerned may also be subject to fines and periodic penalty payments under Articles 14(2) and 15(1) of the Merger Regulation.
- (4066) In accordance with the distinction described in recital (4065) as regards conditions and obligations, this Decision should be made conditional on the full compliance by the Parties with Section B of the Crop Protection Final Commitments (including Schedule 1 of the Crop Protection Final Commitments), Section B of the Acid Co-Polymers Final Commitments (including Schedule 1 of the Acid Co-Polymers Final Commitments) and Section B of the Ionomers Final Commitments (including Schedule 1 of the Ionomers Final Commitments) submitted by the Parties on 17 February 2017 and all other Sections of the Crop Protection Final Commitments, Acid Co-Polymers Final Commitments and Ionomers Final Commitments should be obligations within the meaning of Article 8(2) of the Merger Regulation. The full text of the commitments is attached as an Annex to this Decision and forms an integral part thereof.

HAS ADOPTED THIS DECISION:

Article 1

The notified operation whereby The Dow Chemical Company and E.I. du Pont de Nemours and Company merge within the meaning of Article 3(1)(a) of the Merger Regulation is hereby declared compatible with the internal market and the EEA Agreement.

Article 2

Article 1 is subject to compliance by The Dow Chemical Company and E.I. DuPont de Nemours and Company with the conditions set out in Section B (including Schedule) of Annex 7, Section B (including Schedule) of Annex 8 and Section B (including Schedule) of Annex 9.

Article 3

The Dow Chemical Company and E.I. du Pont de Nemours and Company shall comply with the obligations set out in the remaining sections of Annexes 7, 8 and 9 not referred to in Article 2.

Article 4

This Decision is addressed to:

The Dow Chemical Company
2030 Dow Center
Midland, Michigan 48674
United States of America

E.I. du Pont de Nemours and Company
974 Centre Road
Wilmington, Delaware, 19805
United States of America

Done at Brussels, 27.3.2017

For the Commission
(signed)
Margrethe VESTAGER
Member of the Commission

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ANNEX 1 TO THE COMMISSION DECISION

THE COMMISSION’S ECONOMIC ANALYSIS OF PATENT DATA

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1. INTRODUCTION

1.1. The Commission's analysis of patent data shows that Dow and DuPont are important and close innovators

- (1) This annex to the Commission's Decision presents an analysis of patent data for the crop protection industry.
- (2) First, the purpose of this analysis is to measure the technological strengths of the firms involved in R&D for crop protection by using patent data. It is well-established in the economic literature that the number of citations accumulated by a patent is a good measure of its quality or its value. The Commission's analysis is based on this principle.
- (3) Second, the analysis of patent data allows as well to analyse whether Dow and DuPont are important and close competitors in terms of past innovations. In particular, the Commission selects the best quality patents of the Parties and then analysed internal documents discussing the characteristics of the related research projects. This analysis provides evidence of past innovation competition between the Parties (see also Sections V.8.8.1, V.8.8.2, V.8.8.3 of the main body of the Decision).

1.2. Citations-based measures are relevant metrics to assess the quality of innovations

- (4) It is well-known from the economic literature that simple patent counts are not informative about innovative output. Simple patent counts are rather associated with the input side of the innovative process, primarily with contemporaneous R&D expenditures. Instead, the economic literature suggests to use patent citations to measure the importance of patents (that is to say the quality or value of a patent). This amount to count the number of times each patent has been cited in subsequent patents to compute a citation-based index as a measure of innovative output. One important finding from the economic literature is that citation-based indexes are informative on the technological importance of patents (or quality) of patents.¹
- (5) On that basis, the Commission disagrees with the patent analysis proposed by the Parties since they focus only on the number of patent applications (simple patent counts) and do not consider the quality dimension of patents (see Section 3.1 for further discussion).
- (6) Citation data come directly from published patents. Indeed, when a patent is granted, a public document is published by the relevant patent office, the patent specification. The publication contains detailed information about the innovation, the inventor, and

¹ Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics. Griliches (1990), "Patent statistics as economic indicators: a survey", Journal of Economic Literature. Jaffe, Tratjenberg, Henderson (1993), "Geographic localization of knowledge spillovers as evidenced by patent citations", The Quarterly Journal of Economics. Aghion, Bloom, Blundell, Griffith, Howitt (2005), "Competition and innovation: an inverted U-relationship", The quarterly Journal of Economics. Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics. Cohen (2010), "Fifty years of empirical studies of innovative activity and performance", Handbook of Economics. Ernst and Omland (2011), "The Patent Asset Index – A new approach to benchmark patent portfolios", World Patent Information. Bloom, Schankerman, Van Reenen (2013), "Identifying technology spillovers and product market rivalry", Econometrica. Moser, Ohmstedt, Rhode (2015), "Patent citations- an analysis of quality differences and citing practices in hybrid corn", working paper available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2754341&download=yes.

the technological antecedents of the innovation with citations to previous patents, if these exist, or the general state of the art (also called previous state of knowledge). As discussed in Hall, Jaffe, Tratjenberg (2005),² *"these [patent] citations serve an important legal function, since they delimit the scope of the property rights awarded by the patent"*.

- (7) As discussed in Ernst and Omland (2011), *"generally, a relevant patent will lead to further R&D (Research & Development), which will in turn be covered by patents. These later patents will cite the prior patent as prior art"*.³ As regards European patent applications, the applicant must indicate the background art of which he is aware to the extent that it is useful for understanding the invention, including among others existing patents.⁴ Citations are then included in the (granted) patent after a search procedure done by the European Patent Office, to which the applicant must generally responds.⁵ In other jurisdictions outside the EU, the applicant can even have the legal duty to disclose any knowledge of prior art and the patent examiners at the Patent Office ultimately decide what citations a patent must include.^{6,7}
- (8) The granting of a patent means that the innovation embodied in the patent represents a novel and useful contribution over the previous state of knowledge, as represented

² Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics, page 4. See also Jaffe, Tratjenberg, Henderson (1993), "Geographic localization of knowledge spillovers as evidenced by patent citations", The Quarterly Journal of Economics.

³ Ernst and Omland (2011), "The Patent Asset Index – A new approach to benchmark patent portfolios", World Patent Information (page 3). See also Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics; Griliches (1990), "Patent statistics as economic indicators: a survey", Journal of Economic Literature; Jaffe, Tratjenberg, Henderson (1993), "Geographic localization of knowledge spillovers as evidenced by patent citations", The Quarterly Journal of Economics.

⁴ See http://www.epo.org/applying/european/Guide-for-applicants/html/e/ga_c_ii_4.html. *"This applies in particular to the background art corresponding to the prior art portion of the independent claims. Source document citations must be sufficiently complete to be verifiable: patent specifications by country and number; books by author, title, publisher, edition, place and year of publication and page numbers; periodicals by title, year, issue and page numbers"*.

⁵ *"The objective of the search is to discover the state of the art which is relevant for the purpose of determining whether, and if so to what extent, the claimed invention for which protection is sought is new and involves an inventive step"* (http://www.epo.org/law-practice/legal-texts/html/guidelines/e/b_ii_2.htm). *"Following receipt of the search report and search opinion, and prior to the first communication from the examining division, the applicant must (subject to certain exceptions) respond to the search opinion, by filing amendments to the description, claims or drawings and/or filing his observations on the objections raised in the search opinion"* (http://www.epo.org/law-practice/legal-texts/html/guidelines/e/c_ii_3_1.htm).

⁶ See Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", The Rand Journal of Economics. *"The applicant has a legal duty to disclose any knowledge of the prior art (and thus the inventor's attorney typically plays an important deciding which patents to cite), but the decision regarding which citations to include rests with the patent examiner, who is supposed to be an expert in the area and identify relevant prior art that the applicant misses or conceals."*

⁷ As mentioned in the Parties' response to the Commission request for information 1, *"patent protection can be sought via the procedures set out in the Patent Cooperation Treaty ("PCT"). If an application has been made to a foreign patent office and the EPO is named as a designated office, the international application under the PCT has the effect of a regular European patent application (so-called Euro-PCT application)"*, [information on Parties' patenting activities] [Parties' submission].

by citations. Therefore, if patent B cites patent A, it implies that patent A represents a piece of previously existing knowledge upon which patent B builds.⁸

- (9) The quality of patents in the crop protection industry is very heterogeneous, with many patents having zero or very few citations and only a few patents having a significant number of citations (see Section 3.1). This result is also well established in the economic literature.⁹ Given that patents can have very different qualities, it is important to consider the relative quality of each patent in any analysis to have a reliable assessment of the technological strength of firms involved in research for crop protection.

1.3. [Information on Parties' patent monitoring activities]

- (10) [Information on Parties' patent monitoring activities]. A key variable provided by PatentSight's web-interface is called "*Technology Relevance*", which is the number of "*worldwide citations received from later patents, adjusted for age, patent office practices and technology field*" ([...]).¹⁰ In response to question 2 of the Commission's request for information 32, [information on Parties' patent monitoring activities].
- (11) In particular, validation studies conducted by PatentSight show the importance of high-quality patents, considered as key patents and more frequently commercialised and maintained longer ([...]).¹¹ In addition, [...], considering the quality of patents is crucial because only a few patents really matter whereas the other patents have little economic value.¹²

Figure 1 – [Extract from internal document]¹³

[...]

Figure 2 – [Extract from internal document]¹⁴

[...]

- (12) The Commission also notes that [information on Parties' patent monitoring activities].¹⁵

⁸ Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics. Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", The Rand Journal of Economics.

⁹ For example: Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics.

¹⁰ <https://www.patentsight.com/>. See Parties' response to Commission's request for information RFI 32, [Parties' submission] (slide 2).

¹¹ "*Patents are only maintained if the (annual) renewal fees are duly paid in each country for which protection is sought. In general, the annuity fees increase in later years. This fee scheme is intended to limit patent protection to those innovations that have proven to be commercially successful for the proprietor while providing open access to those that have not. In case of a European patent, renewal fees have to be paid to the EPO, starting in year three from the filing date and until the grant has been published. From then on, renewal fees have to be paid in each Member State where patent protection is to be maintained.*" See Parties' response to Commission's request for information 1, [Parties' submission] (paragraphs 129-130).

¹² [Internal document] (ID7079-2287), slide 3.

¹³ [Internal document] (ID7079-1516), slide 3.

¹⁴ [Internal document] (ID7079-1516), slide 4.

¹⁵ [Internal document] (ID1056-45).

1.4. The Parties' methodology to use simple patent counts to measure technological strengths is flawed

- (13) In several submissions, the Parties claim that:
- (a) DuPont's patenting activity has remained consistently low for the period 2005-2015 compared to Bayer, BASF, Dow, Syngenta;¹⁶
 - (b) Agro-chemical patent applications for the period 2006-2015 shows a non-concentrated market structure, with a pre-merger HHI of [1500-2000] and a post-merger HHI of [1500-2000] (corresponding to a Delta of [0-100]), with a combined patent share of [10-20]% for the Parties.¹⁷
- (14) As discussed in detail in Section 3.1, the Commission disagrees with the Parties' analyses since the quality dimension of each patent is ignored. Given that patents differ greatly in their quality with most of patent providing little or no commercial benefit (see Section 3.1), the Commission considers that the methodology of simple patent counts used by the Parties to assess the technological strengths of firms involved in R&D for crop protection is flawed.
- (15) It is well-established in the economic literature that patent counts are strongly correlated with the level of R&D expenditures, and therefore patent counts constitute a better measurement of innovative input instead than a measurement of innovative output.¹⁸

1.5. Structure of the Annex

- (16) This annex is structured as follows. Section 2 presents the patent data, the process with the Parties to collect the data, a description of the variables used in the analyses, and the sample selection. Section 3 describes the results of the Commission's analysis of patent data. Appendix A, Appendix B and Appendix C present additional computations of patent shares.
- (17) Throughout this annex, reference is made to submissions related to patent data made by the Parties.

2. DATA REQUESTED FROM THE PARTIES

2.1. Data used by the Commission

- (18) In its analysis, the Commission uses patent data submitted by [...] in the response to question 3 of the Commission's request for information RFI42 ([date of submission]), in particular [internal document]. The [internal document] provides [information on Parties' patent monitoring activities] as of 31 December 2015. The dataset provided by [...] includes [information on Parties' patent monitoring activities and submissions].

¹⁶ Parties' submission entitled [Parties' submission], slide 15.

¹⁷ Parties' submission entitled [Parties' submission], para. 27 and Annex 1. Parties' submission entitled [Parties' submission], slide 42. Parties' submission entitled [Parties' submission].

¹⁸ Griliches (1990), "Patent statistics as economic indicators: a survey", *Journal of Economic Literature*. Cohen (2010), "Fifty years of empirical studies of innovative activity and performance", *Handbook of Economics*. Gilbert (2006), "Looking for Mr. Schumpeter: where are we in the competition-innovation debate?", *The University of Chicago Press Journals*, page 191: "*Patent values are highly skewed, with most providing little or no commercial benefit*".

- (19) In addition, [...] provided a dataset on its own patents as a response to the Commission's request for information 42, in the Annex [Parties' submission].
- (20) In RFI45, the Commission asks the Parties to provide additional information on:
(i) the variables included in the [...]s database on crop protection's patents and
(ii) the correspondence between their patents and their crop protection products and pipelines.

2.2. Process with the Parties to collect patent data

- (21) The Commission notes that the Parties did not mention their databases on crop protection patents [...] did not provide important competitive intelligence reports on competitors' crop protection patents in several Commission's requests for information in pre-notification and in Phase 1. [...] provided important competitive intelligence reports only at a late stage in Phase 1 (notably in response to the Commission's request for information 32) and the Parties provided their databases on crop protection patents only in Phase 2 (notably in response to the Commission's request for information 42). The paragraphs below describe the requests for information where information on patents was asked to the Parties.
- (22) Question 14 of the Commission's request for information 1, [date], asked for the databases used internally by the Parties for competitive intelligence purpose and asked to provide all reports produced for competitive intelligence purpose since 2012.¹⁹ The Commission notes that in their responses to question 14 the Parties did not mention their competitive intelligence work carried out on crop protection patents.
- (23) Question 6c of the Commission's request for information 5, [date], asked the Parties to explain in detail how they monitor the research activities and patents of other firms, to provide a detailed description of the databases used, and to provide the competitive intelligence reports on patents for the period 2013/2016.²⁰ In their response, the Parties did not provide any database and mention that [information on Parties' patent monitoring activities].
- (24) As a follow up to the Parties' response to Question 6c of the request for information 5, the Commission asked the Parties in Question 3 of the request for information 9 ([date]) to provide reports and presentations made by these third-party service providers for the period 2014-2016.²¹ The Commission notes that no (additional) documents were provided in the Parties' response.
- (25) In Question 13 of the request for information 13, sent to the Parties [date], and in question 8 of the request for information 17, sent to the Parties [date], the Commission asked the Parties to provide the raw data, with a description of the methodology and the underlying calculations, used to generate [information on Parties' patent monitoring activities].^{22,23,24} However, the data provided did not allow the Commission to replicate the patent analysis done by the Parties [information on Parties' patent monitoring activities]. This is because the data provided by the Parties

¹⁹ Question 14 of the Commission's request for information 1. [...].

²⁰ Question 6.c. of the Commission's request for information 5. [...].

²¹ Question 3 of the Commission's request for information 9. [...].

²² [Internal document] (ID1056-45).

²³ Question 13 of the Commission's request for information 9. [...]. See also paragraph (13).

²⁴ Question 8 of the Commission's request for information 17. [...].

included only patents owned by [...]. Almost all the patents owned by [...] were not included in the data provided by the Parties.²⁵ In a follow-up request for information (question 6 of the Commission's request for information 26), the Parties essentially replied that patent data related to [...] were not needed to replicate the patent analysis [information on Parties' patent monitoring activities].²⁶

- (26) As a follow-up, the Commission sent another request for information [date] (request for information 32), asking the Parties to explain the exact type of access that the Parties have to PatentSight, the reports generated through PatentSight, and additional questions on the methodology used [information on Parties' patent monitoring activities]. In their response, in addition to a detailed description of the methodology used to generate [...], the Parties provided several competitive intelligence reports on patent monitoring in the Crop protection industry.²⁷ The Parties also provided clearance to PatentSight to discuss with the Commission [...].²⁸
- (27) As a follow-up of the competitive intelligence reports provided in the Parties' response to the request for information 32 and of a phone call with PatentSight,²⁹ the Commission asked the Parties to provide additional information on the data and methodology used in these reports as well as databases used internally by the Parties to record information on crop protection patents (request for information 42, sent to the Parties [date]). The Parties submitted their internal databases on crop protection patents in their response [date].³⁰
- (28) The Commission notes that the Parties had several opportunities to submit their patent databases and the relevant competitive intelligence reports on crop protection patents (requests for information 1, 5, 9, 32). In addition, the requests for information 13, 17, and 26, while focusing on data used [information on Parties' patent monitoring activities], were also opportunities for the Parties to mention their internal databases on crop protection patents and the relevant competitive intelligence reports. The Commission finally notes that the Parties did not provide at least one competitive intelligence report on crop protection patents.³¹ Indeed, this specific report was provided to the Commission by the Department of Justice.
- (29) In the Response to the Statement of Objections, the Parties argue that they provided patent data when specifically requested by the Commission during the pre-notification phase, and mention for example the submission [...], requested in question 4 of the Commission's request for information 10.³² However, the Commission notes that these [...] are not raw data, which were available to [...] (see paragraph (19)) and were not mentioned in response to the Commission's requests for information during the pre-notification phase. As regards [...], the Parties did not provide any comment in the response to the Statement of Objections on the delay to provide access to its patent data.

²⁵ See question 6 of the Commission's request for information 26, sent to the Parties [date].

²⁶ [Internal document] (ID1056-45).

²⁷ For example [internal document].

²⁸ See response to Question 3c of the Commission's request for information 32.

²⁹ Non-confidential minutes of a conference call with PatentSight on 24 August 2016, paragraph 19 (ID6423).

³⁰ [Internal document].

³¹ [Internal document] (ID7973-17).

³² See response to the Statement of Objections, page 359.

2.3. Description of the variables used in the patent analysis

- (30) In order to perform the analysis of patent data, the Commission used the metrics developed by PatentSight.³³ As discussed above in Section 1.3, the PatentSight web-interface is also [information on Parties' patent monitoring activities].
- (31) **Patent Family.** To protect an innovation, patent applicants seek protection in several countries so that generally more than one patent publication per innovation exists. A patent family includes all patents that describe the same innovation. PatentSight allows focusing on patent families by avoiding to count multiple patents which are related to the same innovation. On average, in the crop protection industry, a patent family corresponds to 10 patents filed in different countries. The metrics calculated by PatentSight are based on patent families.
- (32) **Portfolio size.** It represents the number of active patent families that a company owned at a given date. This includes the granted patents and the pending patent applications. Pending patent applications are included since they offer a certain level of protection.
- (33) **Technology Relevance.** This citation-based indicator is the main measure of patent quality. It is based on the number of worldwide citations received from later patents, adjusted for age, patent office practices, and technology fields.
- (34) Citations to a given patent come from any subsequent patents, including from patents owned by the same firm as the one holding the cited patent (internal citations, also called self-citations), and from patents owned by different firms (called external citations). In PatentSight, the metric "*Technology Relevance*" is based on the total number of citations, while the metric "*External technology Relevance*" is based on the number of external citations received by a patent.
- (35) While the economic literature mentions a value in internal citations, in particular because firms citing their own patents may be a reflection of the cumulative nature of innovation (within a narrow field or technology trajectory), the same economic literature also mentions a potential difficulty in interpreting internal citations due to a mechanical effect, which is that internal citations increase mechanically with the size of the patent portfolio. In particular, the more patents a firm has, the higher is the probability that a citation from a new patent will be given by a patent that it already owns. Therefore, firms with a larger portfolio size may have mechanically a larger number of internal citations, regardless of whether internal citations are indicative of the value of a patent.³⁴
- (36) Moreover, internal citations may be impacted by different practices across companies, with some (bigger) companies having a tendency to cite themselves more often. For example, as discussed in Hall, Jaffe, and Tratjenberg (2005), "*it may well be that the "self-bias" increases with size (e.g., because of the presence of more active legal departments in firms with large portfolios)*".³⁵

³³ [Internal document] (ID7080-2338). See also Ernst and Omland (2011), "The Patent Asset Index – A new approach to benchmark patent portfolios", World Patent Information.

³⁴ See for example Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics, pages 32-33.

³⁵ See for example Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics, pages 32-33.

- (37) In contrast, practices in term of external citations may be less sensitive to different companies' citation practices (and therefore external citations may be a more consistent measure of patent quality across firms) since they are likely to be under a closer scrutiny, in particular because they represent a limitation on the scope of the property rights awarded by the patent. In a nutshell, the argument is that, if patent B cites patent A, it implies that patent A represents a piece of previously existing knowledge upon which patent B builds, and over which patent B cannot have a claim.³⁶ This is not the case for internal citations, which do not limit the property rights awarded by the patent application. Indeed, in the example above, if patent A and patent B are owned by the same company, then the company can claim property rights under both patents at the same time and therefore does not face in practice a limitation of property rights that the company can claim. In that sense, external citations are more "costly" for the patent applicant than internal citations.
- (38) As regards this specific case, the Commission shows below a descriptive analysis on the main characteristics of the crop protection patent portfolios of the R&D integrated firms, namely the size and average qualities of the patent portfolios. The results of this descriptive analysis are interpreted in light of the discussion above in paragraphs (35)-(37).
- (39) Table 1 shows that the sizes of patent portfolios are very different between the integrated R&D firms, with in particular [...] having a portfolio size [...] times smaller than [...], [...] times smaller than [...], and [...] times smaller than [...]. At the same time, Table 1 shows that for [...], a bigger portfolio size is also associated with higher numbers and percentages of internal citations. [...] is not discussed since the analysis of patent data shows that it had a minor impact on the past on innovations for new AIs in crop protection (see Section 3). This can already be inferred from the tables below, where [...] has [...] portfolio size and the lowest average quality.
- (40) Moreover, Table 2 shows significant differences in the quality of the patent portfolios, with a particular behaviour for DuPont which has the highest average quality among the R&D integrated firms, both in term of Technology Relevance and External Technology Relevance.
- (41) These findings suggest that DuPont [information on Parties' patent monitoring activities].³⁷
- (42) [Information on Parties' patenting activities], DuPont has [...] patent portfolio size, leading automatically to a lower number of internal citations compared to other R&D integrated firms (see also discussion above in paragraphs (35)-(37) and Table 1). Therefore, considering total citations to measure patent quality (that is to say including internal citations in addition to external citations) would underestimate the strength of DuPont, [information on Parties' patenting activities]. In particular, based on Table 2, while DuPont's patent portfolio has an average quality more than [...] time higher than [...] patent portfolio based on external citations (External technology Relevance), the average quality of DuPont's portfolio is only [...] (Technology Relevance).

³⁶ See for example Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics.

³⁷ [Internal document] (ID7064-526): [internal document extract].

- (43) As discussed in Section 3.4, compared to patent shares based on external citations only, when internal citations are included the main effects are a significant increase in the patent share of Bayer and a significant decrease in the patent share of DuPont. However, in addition to the issue that including internal citations does not allow taking into account properly [information on Parties' patenting activities], because of the mechanical effect discussed above in paragraphs (35)-(37), it not possible to ensure that the significant increase in the patent share of Bayer reflects a significant increase in the value of its patents, in particular given that [...] has from far the biggest portfolio size (almost [...] higher than [...], [...] higher than [...], and almost [...] higher than [...]).
- (44) Therefore, on the basis of the above, on balance the Commission has given more weight in the Statement of Objections to patent shares based on external citations in the present case. The Commission describes in Section 3.2.2 the comments made by the Parties in the response to the Statement of Objections on internal citations. As discussed in Section 3.3, the Commission still gives more weights in the Decision to patent shares based on external citations in the present case.

Table 1 – Relation between portfolio size and internal citations

Owner	Portfolio size (patent families)	Total number of citations received	Total number of internal citations received	% Internal citations
[Firm]	[...]	[...]	[...]	[60-70]%
[Firm]	[...]	[...]	[...]	[50-60]%
[Firm]	[...]	[...]	[...]	[40-50]%
[Firm]	[...]	[...]	[...]	[60-70]%
[Firm]	[...]	[...]	[...]	[30-40]%
[Firm]	[...]	[...]	[...]	[30-40]%

Table 2 – Portfolio size and average quality for the Big 6 companies

Owner	Number of patent families	External Technology Relevance	Technology Relevance
[Firm]	[...]	[...]	[...]
[Firm]	[...]	[...]	[...]
[Firm]	[...]	[...]	[...]
[Firm]	[...]	[...]	[...]
[Firm]	[...]	[...]	[...]
[Firm]	[...]	[...]	[...]

- (45) **Market coverage.** Patents are territorial rights in the sense that an innovation is protected only in the countries where the patent applicant owns the patents. The market coverage represents the actual market size protected by granted patents and pending patent applications. Market coverage is defined as the sum of GDP of all countries where the innovation is protected by a patent, relative the GDP of the USA.
- (46) **Competitive Impact.** This metric measures the usefulness of the patent to create sustainable competitive advantage. For each patent, the competitive impact metric is defined as the product of a patent's technology relevance and its market coverage.

This is based on the principle that a high technology relevance combined with high market coverage is likely to create high value for the patent owner.

- (47) **Patent Asset Index.** The patent asset index for a firm is calculated as the sum of the competitive impact of all active patents in the firm's patent portfolio at a given date (also called reporting data in PatentSight web-interface). This metric measures the strength of a company's patent portfolio.
- (48) In its analysis, the Commission uses the metrics "**External Patent Asset Index**" (based on external citations) and "**Patent Asset Index**" (based on total citations, that is to say including internal citations in addition to external citations) developed by PatentSight. As discussed above, the Commission give more weights to patent shares based on external citations.

2.4. Sample selection: patents filed in any EEA country

- (49) The Commission has imported in the PatentSight web interface the list of crop protection patents provided by [...] in [Parties' submission]. The Commission has also complemented the [...] dataset with the dataset provided by [...]. [...] provided its patent data in the Excel file [Parties' submission] in response to the Commission's request for information 42. Because of several issues with the matching of [...] patent data into the PatentSight web-interface, the Commission asked [...] to provide the relevant PatentSight ID in question 6 of the request for information 45. In its response, [...] provided the Excel file [Parties' submission], which was imported into the PatentSight web-interface.^{38,39}
- (50) Then the Commission has used 31 December 2015 as the reporting date in PatentSight, leading to [...] active patent families.⁴⁰ The Commission has then exported these patent families in an Excel file with the following variables for each patent:
- (a) Citations and technology relevance: number of citations received, share of external citations, technology relevance, external technology relevance, share of external technology relevance;⁴¹
 - (b) Portfolio size (number of patent included in each patent family);
 - (c) Market coverage,
 - (d) Citations-based indicators: external patent asset index;⁴²
 - (e) Current owner;
 - (f) IPC codes;⁴³

³⁸ The results of the Commission's analysis are essentially the same when we take into account only the list of crop protection patents provided by [...].

³⁹ The Excel files that allow to match the patent data provided by [...] into the PatentSight web-interface are provided to the Parties as part of the access-to-file procedure. See Excel files [Parties' submission], ID9657), [Parties' submission], ID7285-66).

⁴⁰ The patent data used by the Commission are provided to the Parties in the Excel file "M.7932 - PatentSight export (active)_2016-10-27.xlsx" as part of the access-to-file procedure (see the accompanying guide called "Guide_Patent_Analysis.docx").

⁴¹ Other variables downloaded from PatentSight are: internal technology relevance, share of internal technology relevance.

⁴² Other variables downloaded from PatentSight are: competitive impact, patent asset index, internal patent asset index, active countries.

- (g) Abstract and title;
 - (h) Filing year, First publication date, and age from first publication.⁴⁴
- (51) Then, patents filed in any EEA country were selected in order to focus on the innovations that were used in the past or likely to be used in the future in the EEA. This was done through the creation of two variables in PatentSight: a variable "GEO_EEA active" that tags all patents active on 31 December 2015 in any EEA country,⁴⁵ and a variable "GEO_EPO active" that tags all patents active at the European Patent Office on 31 December 2015.⁴⁶ These two variables were created directly by using the PatentSight interface. This leads to [...] patent families active in the EEA on 31 December 2015.
- (52) Patent families related to the family "mutations or genetic engineering" are excluded from the analysis. These patents correspond to the IPC code C12N. [...] patent families are excluded. The exclusion of these patent families is based on the restrictions of GMO-technologies in the EEA.
- (53) Patents which are exclusively related to seed treatment are also excluded from the analysis. The Commission has manually identified [...] patent families.⁴⁷ Patent families related to seed treatment and another use like herbicides, insecticides, or fungicides, are not excluded.
- (54) The Commission notes that patent families exclusively related to Plant Growth Regulators seem included in the database on crop protection patents sent by [...]. However, the Commission was not able to exclude these patents. Since the Parties don't have activities in Plant Growth Regulators, including these patents is a conservative approach since it overestimates the importance of others, like Bayer, BASF, and Syngenta, compared to Dow and DuPont.
- (55) Last, the Commission has selected the patents owned by the firms mentioned in the Parties' submission entitled [Parties' submission]⁴⁸ [internal documents].⁴⁹ This leads to a final sample of [...] patent families. The Commission notes this approach is conservative since it includes some companies that have never launched an AI in the EEA, such as Shenyang, Plant Health Care, and Rotam, for example.

⁴³ IPC codes refer to the International Patent Classification codes. Source: <http://www.wipo.int/classifications/ipc/en/index.html>.

⁴⁴ Other variables downloaded from PatentSight are: age from the first filing date, cited patents, citing patents, maximum lifetime competitive impact, maximum lifetime technology relevance, PatentSight ID, remaining lifetime.

⁴⁵ The countries considered are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany (as well as German Democratic Republic), Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, as well as Monaco.

⁴⁶ As mentioned in the Parties' response to the Commission request for information 1, [Parties' submission] (paragraph 112), in the case of a European patent, the application needs to be filed with the European Patent Office ("EPO") or a national authority of the European Patent Convention contracting state.

⁴⁷ The Commission has reviewed manually the abstract of all patent families and found [...] patents families exclusively related to seed treatment. These patent families are identified with the category "TAG_Seed patents exclusive" of the "Tag" variable in the source file "M.7932 - PatentSight export (active)_2016-10-27.xlsx".

⁴⁸ [Parties' submission], page 30, page 31, page 51.

⁴⁹ [Internal documents].

- (56) Some patent families have multiple owners. The Commission has used the following conventions to allocate each patent to a holder or owner:
- (a) When a patent family is co-owned by two Big 6 companies,⁵⁰ this patent family is allocated to first owner in alphabetical order.⁵¹
 - (b) When a patent family is co-owned by one of the Big 6 companies and another company (which is often a Japanese company), this patent family is allocated by convention to the Big 6 company.⁵² This allows to focus on the relative technological strengths of each of the Big 6 companies, which is the main focus of this analysis (see Section 3.2.1.3).
 - (c) [...] patent families are co-owned by two Japanese companies, namely Kumiai and Ihara. Given the relatively high number of these patent families, these patent families are allocated to an owner which is the combination of the two Japanese companies, namely "Kumiai_Ihara".^{53,54}
- (57) The treatment of the data described above leads to a sample of [...] patent families, among which [...] patent families ([80-90]%) are owned by the "Big 6 companies", namely Bayer, BASF, Dow, DuPont, Monsanto, and Syngenta. The category "Big 6 companies" is based on a recent report from the US Department of Agriculture.⁵⁵ As discussed in this report, Monsanto is included in this group of Big 6 companies because of its important presence in crop protection genetic traits (not relevant in the EEA) and the development of the herbicide Glyphosate, "*although Monsanto no longer conducts significant chemical R&D*" and "*its research investments in chemicals are markedly reduced*".⁵⁶
- (58) The patent data provided by [...] also allows to identify some patent families specifically related to herbicides ([...] patent families), insecticides ([...] patent families), and fungicides ([...] patent families). The Commission notes that [...] patent families cannot be explicitly related to these three categories, with a classification in the category "Other".⁵⁷
- (59) In the patent data provided by [...], two variables allow to identify patents related to mixtures:⁵⁸ [information on Parties' patent monitoring activities].
- (60) The Commission has used this information on this patent's characteristics (mixture patent or not) to calculate patent shares by excluding mixture patents. This analysis allows to focus on patents related to the research of new AIs, in particular when the analysis considers high quality patents. This is because there are essentially no

⁵⁰ The Big 6 companies include: Bayer, BASF, Dow, DuPont, Monsanto, Syngenta (see Section 3.2.1.3 for further details).

⁵¹ This concerns the patent family [...].

⁵² This concerns the following patent families: [...].

⁵³ This concerns the following patent families: [...].

⁵⁴ [...].

⁵⁵ These six firms are active both in seeds and crop protection. US Department of Agriculture (December 2011), "Research investments and market structure in the food processing, agricultural input, and biofuel industries worldwide". See also the Parties' submission entitled [Parties' submission].

⁵⁶ US Department of Agriculture (December 2011), "Research investments and market structure in the food processing, agricultural input, and biofuel industries worldwide" (pages 34 and 51).

⁵⁷ See Section 3.2.1.4 for a discussion the main firms present in this category.

⁵⁸ Several AIs can be mixed together with the aim to ensure potency, efficiency, to widen the spectrum of pests targeted, to increase convenience for farmers and to help resistance management (see Section V.1.2 of the main body of the Statement of Objections).

process patents in the group of high quality patents for the period 2000-2015 for crop protection. The Commission also notes that [information on Parties' patent monitoring activities].⁵⁹ This is further discussed in Section 3.2.1.4.

- (61) Over the [...] patent families, [...] discrepancies have been identified [discussion of Parties' approach to patent analysis]. Among these [...] patent families, BASF owns [...] patent families, Bayer owns [...] patent families, Dow owns [...] patent families, DuPont owns [...] patent families, and Syngenta own [...] patent families.
- (62) As regards the [...] patent families owned by Dow and DuPont, referred to in the previous paragraph, the Commission was able to determine in most cases whether these patent families are related to a mixture or not:
- (a) [...];
 - (b) [...];
 - (c) [...];
 - (d) [...];
 - (e) For [...] Dow's patents,⁶⁰ the Commission was not able to find a correspondence with the Dow's product and pipelines provided in the response to RFI45. The Commission has adopted a conservative approach by excluding these [...] Dow's patents for the analysis of patent shares when mixture patents are excluded. This approach can only underestimate the importance of Dow compared to Bayer, BASF, and Syngenta.
- (63) As regards the patents owned by Bayer, BASF, and Syngenta, the Commission was not in a position to determine if they are related or not to mixtures. Therefore, the Commission has adopted a conservative approach by including these patents into the analysis of patent shares when mixture patents are excluded. This approach can only overestimate the importance of Bayer, BASF, and Syngenta, compared to the Parties, in relation to the discovery of new AIs.

2.5. Limitations of the data

- (64) The Commission acknowledges that its analysis of patent data has two limitations, which are discussed below.
- (65) First, substantial time is needed for a (granted) patent to accumulate information about its citations. This means that the quality of recent patents (for example patents filed in 2013-2014, with some of these patents published even later in 2014-2016) is generally difficult to assess.⁶¹
- (66) As regards DuPont, because of this data limitation, it is likely that DuPont's technological strength in herbicides is underestimated since it has significantly developed its research in herbicides [information on Parties' patent monitoring activities] (see Section 3.4.2.1).

⁵⁹ [Internal document] (ID7079-875) (slide 7). See also the email sent by the Parties to the Commission [date] (response to the Commission's request for information 45), suggesting that [information on Parties' patent monitoring activities].

⁶⁰ [Analysis of confidential patent data].

⁶¹ Even though this issue can be somehow mitigated by controlling for age of the patent in the citation-based indicator, this issue is still likely to be present for very recent patents.

- (67) This negative bias applies as well to Dow and DuPont in fungicides, [...] (see Section 3.4.4). As regards Dow in particular, [...].
- (68) As regards other competitors, the Commission also notes [discussion of internal document content] (see Sections 3.4.2 and 3.4.3). This means that the estimated patent shares of BASF in herbicides and insecticides and of Monsanto in herbicides are likely to overestimate their innovative strength in the future.
- (69) On the basis of the above, the Commission therefore considers that the patent analysis is likely to underestimate the importance of Dow and DuPont compared to their importance in the future.
- (70) Second, while the analysis of patent data is relevant to assess the technological strength of the companies involved in R&D for crop protection, in particular at the AI level, it does not provide an analysis of their capabilities to bring innovations in the EEA through the development of final products or their commercial impact. This is relevant in particular for Japanese companies, who lack the ability to bring their innovations to the EEA and need to cooperate with one of the five R&D integrated firms. This is further discussed in Sections 3.2.1.3 and 3.3.3, and in Section V.8.6.3.4 of the main body of the Decision.

3. THE COMMISSION'S ANALYSIS SHOWS THAT DOW AND DUPONT ARE IMPORTANT AND CLOSE INNOVATORS

- (71) This Section of the Annex presents the Commission's results on the patent data analysis. It is structured as follows: (i) Section 3.1 overviews the patent data, highlighting the heterogeneity of the data; (ii) Section 3.2 describes the methodology used by the Commission in the Statement of Objections, and the Parties' critique of this methodology; (iii) Section 3.3 rebuts the Parties' critique of the Commission methodology; and (iv) Section 3.4 presents the results of the Commission's analysis of the patent data.

3.1. Patents are very heterogeneous in quality

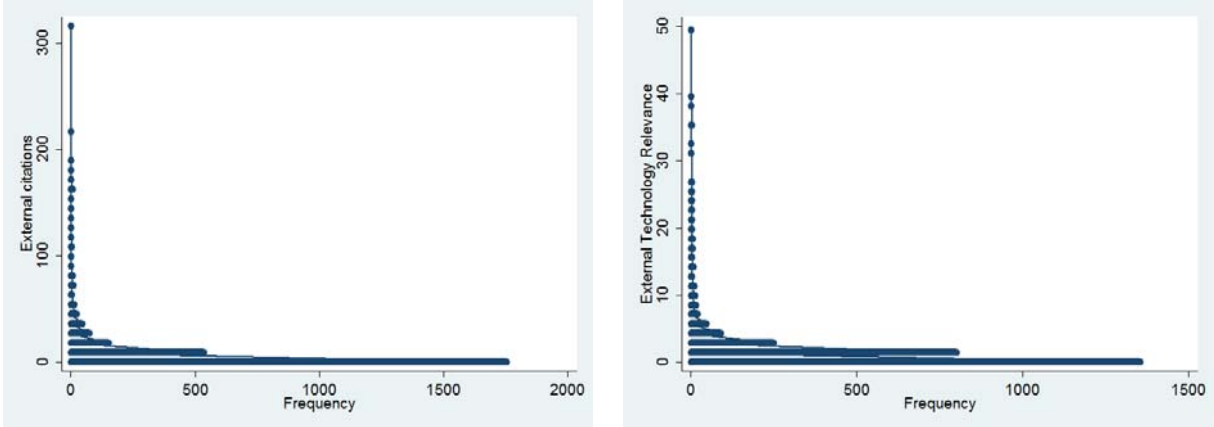
- (72) An analysis of citations and technology relevance shows that patent quality is very heterogeneous, with most of the patent families never or rarely cited and therefore having little quality, and a few patents being cited very often and thus having very high quality. In other words, patents differ greatly in their technical and economic significance, with many patents reflecting minor improvements of little economic value while a few patents prove to be very valuable.⁶² This significant heterogeneity in patent quality is also well-established in the economic literature.⁶³
- (73) As regards external citations, Table 3 and Figure 3 show that 30% of the patents have zero citations, almost 70% of the patents have fewer than 5 citations, and 90% of the patents have fewer than 20 citations.

⁶² Griliches (1990), "Patent statistics as economic indicators: a survey", Journal of Economic Literature.

⁶³ See for example: Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics; Griliches (1990), "Patent statistics as economic indicators: a Survey", Journal of Economic Literature. Gilbert (2006), "Looking for Mr. Schumpeter: where are we in the competition-innovation debate?", The University of Chicago Press Journals, page 191: "*Patent values are highly skewed, with most providing little or no commercial benefit*".

- (74) As regard the External Technology Relevance, Table 3 and Figure 3 also show an important heterogeneity with most of the patents of little quality: 63% of patent have an External Technology Relevance lower than 1, 80% of patents have an External Technology Relevance lower than 2.
- (75) As regards total citations (that is to say including internal citations in addition to external citations) and the Technology Relevance, similar findings apply where around 80% of patents have less than 15 total citations and a technology relevance lower than 4 (see Figure 4 and Table 4).
- (76) The significant heterogeneity in patent quality, with a few patents accounting for most of the external citations, implies that a simple patent counts does not give an accurate picture of the technological strength of the different firms involved in R&D for crop protection. Citation-based index are therefore more appropriate to assess the technological strengths of the different firms. This is a well-established result in the economic literature.⁶⁴

Figure 3 – Distribution of the number of external citations and External Technology Relevance



⁶⁴ See Sections 1.2 and 2.3.

Table 3 – Distribution of the number of external citations and External Technology Relevance

Distribution of external citations				Distribution of external technology relevance			
Number of external citations	Number of patent families	Percentage of patent families	Cumulative percentage	External Technology Relevance	Number of patent families	Percentage of patent families	Cumulative percentage
0	[...]	29,7%	29,7%	1	[...]	63%	63%
5	[...]	39,0%	68,7%	2	[...]	17%	80%
10	[...]	12,8%	81,5%	3	[...]	8%	88%
15	[...]	5,8%	87,3%	4	[...]	4%	92%
20	[...]	3,2%	90,5%	5	[...]	2%	94%
25	[...]	2,2%	92,7%	6	[...]	1%	95%
30	[...]	1,6%	94,3%	7	[...]	1%	96%
35	[...]	1,0%	95,4%	8	[...]	1%	96%
40	[...]	0,8%	96,2%	9	[...]	0%	97%
45	[...]	0,5%	96,7%	10	[...]	0%	97%
50	[...]	0,3%	97,0%	11	[...]	0%	97%
55	[...]	0,3%	97,3%	12	[...]	0%	98%
60	[...]	0,4%	97,7%	13	[...]	0%	98%
65	[...]	0,1%	97,8%	14	[...]	0%	98%
70	[...]	0,1%	98,0%	15	[...]	0%	98%
75	[...]	0,3%	98,3%	16	[...]	0%	98%
80	[...]	0,3%	98,6%	17	[...]	0%	98%
85	[...]	0,1%	98,7%	18	[...]	0%	99%
90	[...]	0,0%	98,7%	19	[...]	0%	99%
95	[...]	0,0%	98,7%	20	[...]	0%	99%
105	[...]	0,1%	98,8%	21	[...]	0%	99%
110	[...]	0,1%	98,9%	22	[...]	0%	99%
115	[...]	0,1%	99,0%	23	[...]	0%	99%
125	[...]	0,1%	99,1%	24	[...]	0%	99%
135	[...]	0,1%	99,2%	25	[...]	0%	99%
140	[...]	0,0%	99,3%	26	[...]	0%	99%
150	[...]	0,0%	99,3%	27	[...]	0%	100%
155	[...]	0,0%	99,3%	28	[...]	0%	100%
160	[...]	0,1%	99,4%	32	[...]	0%	100%
165	[...]	0,1%	99,5%	33	[...]	0%	100%
170	[...]	0,2%	99,7%	35	[...]	0%	100%
175	[...]	0,0%	99,7%	36	[...]	0%	100%
185	[...]	0,1%	99,9%	38	[...]	0%	100%
190	[...]	0,1%	99,9%	41	[...]	0%	100%
220	[...]	0,0%	100,0%	50	[...]	0%	100%
320	[...]	0,0%	100,0%	Total	[...]	100%	
Total	[...]	100,0%					

Figure 4 – Distribution of the number of total citations and Technology Relevance

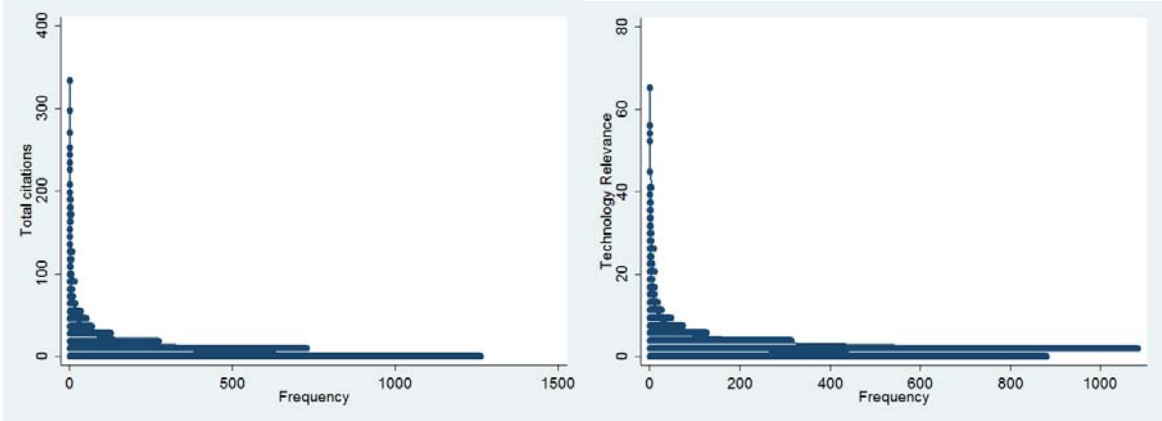


Table 4 – Distribution of the number of total citations and Technology Relevance

Distribution of total citations				Distribution of Technology Relevance			
Number of total citations	Number of patent families	Percentage of patent families	Cumulative percentage	Technology Relevance	Number of patent families	Percentage of patent families	Cumulative percentage
5	[...]	52%	52%	1,03	[...]	36%	36%
10	[...]	17%	70%	2,06	[...]	29%	65%
15	[...]	8%	78%	3,09	[...]	11%	76%
20	[...]	6%	83%	4,12	[...]	7%	83%
25	[...]	3%	87%	5,15	[...]	4%	87%
30	[...]	2%	89%	6,18	[...]	3%	90%
35	[...]	2%	91%	7,21	[...]	2%	92%
40	[...]	1%	92%	8,24	[...]	1%	93%
45	[...]	1%	93%	9,26	[...]	1%	94%
50	[...]	1%	95%	10,29	[...]	1%	95%
55	[...]	1%	95%	11,32	[...]	1%	96%
60	[...]	0%	96%	12,35	[...]	1%	96%
65	[...]	0%	96%	13,38	[...]	0%	96%
70	[...]	0%	96%	14,41	[...]	0%	97%
75	[...]	0%	97%	15,44	[...]	0%	97%
80	[...]	0%	97%	16,47	[...]	0%	97%
85	[...]	0%	97%	17,50	[...]	0%	97%
90	[...]	0%	98%	18,53	[...]	0%	98%
95	[...]	0%	98%	19,56	[...]	0%	98%
100	[...]	0%	98%	20,59	[...]	0%	98%
105	[...]	0%	98%	21,62	[...]	0%	98%
110	[...]	0%	98%	22,65	[...]	0%	98%
115	[...]	0%	98%	23,68	[...]	0%	98%
120	[...]	0%	98%	24,71	[...]	0%	99%
125	[...]	0%	98%	25,74	[...]	0%	99%
130	[...]	0%	99%	26,76	[...]	0%	99%
135	[...]	0%	99%	27,79	[...]	0%	99%
145	[...]	0%	99%	28,82	[...]	0%	99%
155	[...]	0%	99%	29,85	[...]	0%	99%
165	[...]	0%	99%	30,88	[...]	0%	99%
170	[...]	0%	99%	31,91	[...]	0%	99%
175	[...]	0%	99%	32,94	[...]	0%	99%
180	[...]	0%	99%	33,97	[...]	0%	99%
185	[...]	0%	99%	35,00	[...]	0%	100%
190	[...]	0%	99%	37,06	[...]	0%	100%
195	[...]	0%	100%	38,09	[...]	0%	100%
200	[...]	0%	100%	39,12	[...]	0%	100%
210	[...]	0%	100%	40,15	[...]	0%	100%
225	[...]	0%	100%	41,18	[...]	0%	100%
235	[...]	0%	100%	42,21	[...]	0%	100%
240	[...]	0%	100%	45,29	[...]	0%	100%
245	[...]	0%	100%	52,50	[...]	0%	100%
255	[...]	0%	100%	54,56	[...]	0%	100%
270	[...]	0%	100%	55,59	[...]	0%	100%
300	[...]	0%	100%	65,88	[...]	0%	100%
335	[...]	0%	100%	Total	[...]	100%	
Total	[...]	100%					

3.2. The Commission's methodology in the Statement of Objections and the comments of the Parties in the response to the Statement of Objections

(77) This section presents the methodology (Section 3.2.1) used in the Statement of Objections, as well as the Parties' comments on the methodology made in the response to the Statement of Objections (Section 3.2.2). For ease of exposition and in order to put into context the Parties' comments made in the response to the Statement of Objections, the main results reported in the Statement of Objections are summarised in Section 3.2.1.5. Section 3.3 presents the rebuttal of the Parties' comments made in the response to the Statement of Objections, and Section 3.4 presents the results of the Commission's analysis.

3.2.1. Methodology used in the Statement of Objections

(78) In the Statement of Objections, the Commission computed patent shares based on the elements described below.

3.2.1.1. Patent shares for crop protection, herbicides, insecticides, and fungicides measured using the variable "External Technology Relevance"

(79) The variable "External Technology Relevance" (ETR) is used as a measure of patent quality. The Commission defined four groups of patent quality in the Statement of Objections: (i) all patent families with a strictly positive ETR, (ii) all patent families whose ETR is in the top 25%, (iii) all patent families whose ETR is in the top 10%, (iv) and all patent families whose ETR is in the top 5%. High quality patents are defined as the sub-group of patents with an ETR in the top 10% and top 5%.⁶⁵

(80) For each group of patent quality, the analysis showed the corresponding threshold in terms of ETR and the corresponding number of patent families. The variable "External Patent Index" is used to measure the patent shares for the different firms involved in R&D for crop protection.

(81) The Commission has also calculated patents shares separately for herbicides, insecticides, and fungicides. [Information on Parties' patent monitoring activities].⁶⁶ The Commission notes that [information on Parties' patent monitoring activities].⁶⁷

(82) For a given category (crop protection, herbicides, insecticides, fungicides), the thresholds were kept identical across all specifications to have the same basis for comparison across different tables.

(83) In the Statement of Objections, the Commission gave more weight in its interpretation of the results on patent shares based on the top 10% patents because the Parties' products considered as blockbusters are the top 10% patents, namely Dow's Arylex⁶⁸ in herbicides and DuPont's Rynaxypyr⁶⁹ in insecticides. This is also consistent with [discussion of Parties' internal documents] (see Figure 2). Therefore, the Commission preliminarily considered in the Statement of Objections that patent

⁶⁵ The group of patent families in the top10% (respectively top 5%) in term of external technology relevance represents [50-60]% (respectively [40-50]%) of the external technology relevance over the whole sample of [...] patent families.

⁶⁶ [Parties' submission].

⁶⁷ [Internal document] (ID7079-875) (slide 7).

⁶⁸ Patent reference [...]. See also Excel file [Parties' submission], provided by [...] in the response to the Commission's request for information 45, question 7.

⁶⁹ Patent reference [...]. See also Excel file [Parties' submission], provided by [...] in the response to the Commission's request for information 45, question 7.

shares based on the sample of top 10% patents are informative, in particular if one is interested in assessing the importance of the different integrated R&D companies for patents that are the most likely to lead to blockbuster products.

3.2.1.2. Time periods for the calculations of patent shares

- (84) The patent shares were calculated by considering the patent families with a publication date between 2000 and 2015. Patent shares for the period 1990-2015 were also reported, showing similar patent shares, but the Commission considered the 2000-2015 time period as being more relevant to assess the technological strengths of the different firms involved in research for crop protection for the following reasons.
- (85) First, the period 2000-2015 shows the more recent innovation record. This is important since it appears from the patent data that Dow and in particular DuPont have become relatively more active in patenting after 2000. This dynamic is an important consideration.
- (86) Second, considering patents filed during the period 2000-2015 is consistent with the calculation of development shares for AIs launched for the period 2006-2015 (see Section V.8.7.2.2 of the main body of the Decision). Indeed, both analyses capture essentially the same innovation/discovery period since most of the AIs launched after 2005 are likely to correspond to patents filed after 2000. The Commission also notes that in a presentation provided at a meeting held on [...], the Parties used also the period 2005-2016 to provide an overview of the number of AIs launched (see Section V.8.7.2.2 of the main body of the Decision for further details).⁷⁰
- (87) Third, in a letter sent to the Department of Justice [date], the Parties proposes as well a 15-year period from 2000 to 2014 to assess the success of [...], on the basis that the discovery and commercialization period for crop protection chemicals is 10 to 15 years.⁷¹
- (88) On the basis of the above, the Commission preliminarily considered in the Statement of Objections the period 2000-2015 to assess the technological strength the technological strengths of the different firms involved in research for crop protection.
- (89) The Commission notes that the use of the 2000-2015 time period to calculate patent shares was not contested by the Parties in the response to the Statement of Objections.

3.2.1.3. Companies included in the calculation of patent shares

- (90) In the Statement of Objections, the Commission gave more weight to patent shares when Japanese companies were excluded, that is by considering patents owned by Bayer, BASF, Dow, DuPont, Syngenta, and Monsanto. This is based on the elements described below (this is discussed in details in Section V.8.6.3.4 of the main body of the Decision). In any event, it should be noted that including Japanese companies in the calculations of patent shares did not change the finding that research in crop protection is concentrated. This is because, while many Japanese companies file patents in the EEA, only few of these companies appear in the group of high quality patents (top 10%), essentially Sumitomo and Mitsui in herbicides, Nissan Chemical

⁷⁰ See Parties' presentation entitled [Parties' submission], slide 4.

⁷¹ Page 2 of the letter [Parties' submission], sent to the DoJ [date], filename [Parties' submission] (ID8841).

and Ishihara Sangyo in insecticides, Kumiai and Ihara (patents developed jointly) and Nippon Soda in fungicides.

- (91) First, while there are several Japan-based companies active in R&D crop protection, when looking at crop protection sales at global and European level, their sales are significantly lower than sales by the integrated R&D crop protection companies, namely Bayer, BASF, Dow, DuPont, and Syngenta. This gives already an indication of how small these players individually are in Europe.
- (92) Second, the primary target of the R&D effort of Japanese companies is the Japanese market. In particular, Japanese companies target domestic crops and pests. Because of the domestic focus of R&D of Japanese companies, the relevance of active ingredients discovered by Japanese companies for the EEA is generally ancillary.
- (93) Third, even when the molecules that they discover may have interesting applications in other markets, particularly in Europe, Japanese companies have limited development capabilities outside of Japan and more specifically in Europe. One factor is financial. In particular, Japanese companies (both individually considered and overall) have much more limited turnover and financial resources to invest in development compared to the integrated R&D crop protection companies, namely Bayer, BASF, Dow, DuPont, and Syngenta. The second factor is their limited global footprint, in particular in Europe, which limits their capabilities to develop formulated products adapted for Europe, in light of a very challenging regulatory environment that requires more significant financial investment. In contrast, the five global crop protection companies have the resources, ability and route to market to bring new active ingredients from the discovery stage to launch in Europe.
- (94) [Discussion of internal document].⁷²
- (95) On the basis of the above, the Commission preliminarily considered in the Statement of Objections that Japanese companies were distant competitors to the integrated R&D crop protection companies, namely Bayer, BASF, Dow, DuPont, and Syngenta. Therefore, Japanese companies were excluded from the assessment of the relative technological strengths of Dow and DuPont compared to Bayer, BASF, and Syngenta.
- (96) In any event, even when accounting for the presence of Japanese companies for robustness, the analysis of patent data in the Statement of Objections still showed that the Parties were important innovators, with significant patent shares for the highest quality patents (top 10%) in crop protection (with the merged entity being number 1 post-merger), herbicides (with the merged entity being number 1 post-merger with Dow already number 1 pre-merger), and insecticides (with the merged entity being number 1 post-merger with DuPont already a clear number 1 pre-merger).
- (97) Last, the Commission has included Monsanto in the analysis of patent shares, despite its limited technological strength in research for crop protection (see Section V.8.6.3.1 of the main body of the Decision for further details). Patent shares for Dow and DuPont were therefore calculated among the group of the Big 6 companies, namely Bayer, BASF, Dow, DuPont, Monsanto, and Syngenta.

⁷² [Internal document] (ID7973-17).

(98) The group of the Big 6 companies is based on a recent report from the US Department of Agriculture (see paragraph (57)), also cited by the Parties in their submissions.⁷³ Including Monsanto in the analysis of patent share also allows to assess in particular the claim of the Parties that Monsanto is an important innovator in crop protection.⁷⁴

3.2.1.4. Patent shares calculated with and without mixture patents

(99) In the Statement of Objections, patent shares were also calculated with and without mixture patents. Excluding mixture patents allows to assess more precisely the technological strengths of the different firms involved in research in crop protection since it allows to focus on innovations at the AI level, in particular when the high quality patents are considered.

(100) Indeed, in crop protection, innovation at AI level is much more costly, more transformative and more important for resistance management than innovations on mixtures. In particular, innovating at the AI level allows to develop new modes of action and new chemical classes, which are critical for resistance management.⁷⁵

(101) Moreover, the average overall costs for the discovery and development of a new agrochemical product brought to the market by an R&D company is estimated by Phillips McDougall at USD 286 million. The lead time of a global crop protection product discovery and development is approximately 11 years. Discovery takes 3-4 years, and development 5-6 years.⁷⁶

(102) On the basis of the above, the Commission preliminarily considered in the Statement of Objections that it was justified to put more weights on patent shares when mixture patents were excluded. Patent shares were also reported when mixture patents were included.

3.2.1.5. Summary of the results presented in the Statement of Objections

(103) This section summarises the main results presented in the Statement of Objections on patent shares for crop protection, herbicides, insecticides, and fungicides.

(104) The summary is based on patent shares for the top 10% quality patents, calculated among the Big 6 companies for the period 2000-2015, without mixture patents, and by considering external citations (that is to say excluding internal citations) to measure patent quality. Without prejudice to the considerations made above in Section 3.2.1.3, results when patents filed by Japanese companies were also reported in the Statement of Objections.

(105) The Commission notes that, even under a conservative approach that includes Japanese companies, the main findings on the concentrated industry structure and the importance of Dow and DuPont as important innovators in crop protection were still valid.

(106) As regards innovation in crop protection overall, the Commission preliminarily considered in the Statement of Objections that: (i) DuPont is a particularly important

⁷³ These six firms are active both in seeds and crop protection. US Department of Agriculture (December 2011), "Research investments and market structure in the food processing, agricultural input, and biofuel industries worldwide". See also the Parties' submission entitled [Parties' submission].

⁷⁴ See for example the Parties' submission entitled [Parties' submission].

⁷⁵ See Sections V.1.1 to V.1.4 of the main body of the Statement of Objections.

⁷⁶ See Sections V.1.1 to V.1.4 of the main body of the Statement of Objections.

innovator, with an increasing patent share when the quality of patents increases (ii) Dow has also a significant patent share for high-quality patents (top 10%), (iii) the Parties have a significant combined patent share for high quality patent families (top 10%) of [50-60]% when mixture patents are excluded, (iv) the industry structure is concentrated for the high quality patents (top 10%) with a high level of HHI, even after considering patents filed in the EEA by Japanese companies, (v) Monsanto appears to have a limited technological strength for R&D in crop protection, (vi) BASF's technological strength is decreasing for high quality patents, and its lower importance for innovations in crop protection is mainly driven by herbicides and insecticides.

- (107) As regards innovation specifically related to herbicides, the Commission preliminarily considered in the Statement of Objections that: (i) Dow is particularly important innovator in herbicides, (ii) DuPont is also an important innovator, in particular with a significant patent share for high-quality patents related to the discovery of new AIs, (iii) research in herbicides is concentrated for the high-quality patents, with a high level of HHI, even after considering patents filed in Europe by Japanese companies, (iv) the Parties have a significant patent shares for high quality patents (top 10% patents) during the period 2000-2015, at [50-60]% for innovations related to the discovery of new AIs (close to [30-40]% when Japanese companies are considered), (iv) Dow and DuPont are close competitors with innovations competing against each other, (v) Syngenta has been in the past a distant competitor to Dow and DuPont by innovating in a different segment (graminicides), (vi) BASF and Monsanto have had in the past a lower importance than other R&D integrated firms in bringing high quality innovations in herbicides, (vii) the high quality patents of the Japanese companies are mainly related to the rice crop (main crop in Japan), which is a more limited crop in the EEA and are therefore distant competitors to Dow and DuPont.
- (108) As regards innovation specifically related to insecticides, the Commission preliminarily considered in the Statement of Objections that: (i) DuPont is particularly important innovator in insecticides, with a patent share of [50-60]% for high quality patents among the Big 6 companies, (ii) Dow is also an important innovator, in particular with a patent share [...] Syngenta for high quality patents, (iii) research in insecticides is concentrated for high-quality patents, with a high level of HHI, even after considering patents filed in Europe by Japanese companies, (iv) the Parties have a significant patent shares for high quality patents for the period 2000-2015, at [60-70]% for innovations related to the discovery of new AIs (around [40-50]% when Japanese companies are considered), (v) Dow and DuPont are close competitors with competing lines of research, (vi) BASF and Monsanto have had in the past a limited role in bringing innovations in insecticides.
- (109) As regards innovation specifically related to fungicides, the Commission preliminarily considered in the Statement of Objections that: (i) DuPont is a particularly important innovator in fungicides, by reaching a patent share higher than BASF and [...] Syngenta for high quality patents related to new AIs, [...], (ii) research in fungicides is concentrated for high quality patents with a high level of HHI, even after considering patents filed in Europe by Japanese companies. Analysing the importance of Dow as an innovator is more difficult [...].
- (110) As regards the category "Other", which includes patents not classified in the categories herbicides, insecticides, or fungicides (see paragraph (58)), the Commission notes that DuPont ([30-40]%) and Bayer ([20-30]%) are the main firms

in the high quality patents (top 10%) in the period 2000-2015.⁷⁷ Therefore, the Commission preliminarily considered in the Statement of Objections that its analyses of patent shares described above were conservative, since including the patent families included in the category "Other" is likely to increase the patent share of DuPont in insecticides, leading to an even higher combined patent share for the merged entity. For the sake of clarity, it should be noted that patent families in the category "Other" are included for the analysis of patent shares in crop protection overall (see paragraph (106)).

3.2.2. *The Parties' comments in the response to the Statement of Objections*

(111) In the response to the Statement of Objections, the Parties argue that the Commission's analysis of patents is inappropriate for three main reasons:⁷⁸

- (a) The Commission's analysis uses patent shares based on the top 10% patents by quality. In particular, the Parties argue that this methodology gives a value of zero to those patents that are not within this subset, that is to say excluding 90% of patents.
- (b) The Commission's analysis focuses on external citations to measure patent quality, that is to say excluding internal citations. The Parties argue that the increase in internal citations with a firm size cannot be considered as a mechanical or artificial effect. As the share of existing market knowledge a firm has increases, the firm will have to rely more on its own knowledge in order to develop further knowledge. The Parties argue that eliminating internal citations leads to an artificial increase of the patent shares of those firms with smaller patent portfolios, which leads to an increase in the share of DuPont.
- (c) The Commission excludes patents filed by Japanese companies in Europe.

(112) In its analysis, the Parties consider all patents, independently of their quality, including patents filed by Japanese companies in Europe, and use total citations (that is to say including internal citations) to calculate the weighted-patent shares. The patent shares as calculated by the Parties are the following: [20-30]% in crop protection, [20-30]% in herbicides, [20-30]% in insecticides, and [10-20]% in fungicides.

(113) The three main comments of the Parties are assessed in Sections 3.3.1, 3.3.2, and 3.3.3.

(114) In addition, the Parties also make a number of more specific comments. These comments are addressed in Section 3.3.5, except for the third comment on mixture patents which is assessed in Section 3.3.4 and the last comment which is addressed in Section 3.3.3 since it refers to Japanese companies. The more specific comments of the Parties are listed below:

- (a) The Commission has included patents related to the AI Aminocyclopyrachlor to calculate the patent share of DuPont in herbicides. The Parties considers that including this specific patent is not appropriate since this AI was not launched in the EEA. According to the Parties, this AI was developed to be launched only in North America and Latin America, and [information on Parties'

⁷⁷ These patent shares are calculated by included all firms, including Japanese companies.

⁷⁸ See Annex 3 of the response to the Statement of Objections. See also pages 8-9 and pages 30-32 of the response to the Statement of Objections.

research activities/strategy]. The Parties also mention this AI had to be withdrawn from the US due to significant damages on non-target trees.⁷⁹ The Parties also argue that including this AI for DuPont, which was not launched in Europe, is in contradiction with the exclusion of patents from Japanese companies.⁸⁰

- (b) The Commission has used the metric "External Patent Asset Index" to measure the quality of a patent, while other metrics were also available, like the total number of citations, the technology relevance, and the patent asset index.⁸¹
- (c) The Parties argue that excluding mixture patents is a restriction that is not justified since these innovations are patented and their weights are already taken into account by weighting patents based on number of citations received.
- (d) The Parties also seem to question the PatentSight metrics used in the analysis.⁸²
- (e) The Parties argue that the Commission failed to take into account [information on Parties' patent monitoring activities; internal document content].⁸³
- (f) The Parties argue that economic studies find in general a weak positive correlation between patent and firm value and the number of citations of citations received by the patent or by the patents owned by a firm.⁸⁴
- (g) The Parties argue that citation-weighted patents are lagged indicators of a firm's current innovation efforts, while the focus of merger analysis should be on the likely effects of the merger on its current and future commitment to innovation.⁸⁵
- (h) The Parties argue that [discussion of internal document content], does not suggest in any way that Japanese companies are generally considered as partners than competitors in research activities, in particular given that Japanese companies file patents in the EEA and only [...] patents are jointly held with an integrated R&D company.⁸⁶ For these [...] patents jointly hold with a Japanese company, the Parties seem to disagree with the Commission's approach to allocate these patents to the integrated R&D firm that is the co-owner.

3.3. Rebuttal of the Parties' comments on methodology raised in the response to the Statement of Objections

3.3.1. The threshold to determine the sample in the analysis

- (115) As regards the first argument made by the Parties on the top 10% patents in term of quality to assess the innovative strength of the Parties and their competitors, the Commission notes that: (i) this sample of patents still represents more than 50% of the overall value of patents (see Section 3), and (ii) focusing on this sample allows to focus on patents potentially leading to blockbuster products (for example Dow's

⁷⁹ See response to the Statement of Objections, paragraphs 35 and 111.

⁸⁰ See response to the Statement of Objections, paragraph 247.

⁸¹ See Appendix B of Annex 3 of the response to Statement of Objections.

⁸² See Appendix B of Annex 3 of the response to Statement of Objections.

⁸³ See response to Statement of Objections, paragraph 245.

⁸⁴ See Annex 1 of the Response to the Statement of Objections.

⁸⁵ See Annex 1 of the Response to the Statement of Objections.

⁸⁶ See Annex 3 of the response to the Statement of Objections, page 14.

Arylex in herbicides and DuPont's Rynaxypyr in insecticides). Therefore, the Commission still considers that patent shares based on the sample of top 10% patents are informative, in particular if one is interested in assessing the importance of the different integrated R&D companies for innovations that are the most likely to lead to blockbuster products.

- (116) In addition, the Commission notes that in the Statement of Objections it also presented results by considering all patents above the 75th percentile (that is to say the top 25% quality patents). The top 25% sample of patent represents around 70% of the overall value of the patents (independently of the exact metric used, Technology Relevance, Patent Asset Index, External technology Relevance, and External Patent Asset Index) for crop protection, and separately for herbicides, insecticides, and fungicides.
- (117) As explained in the paragraph (115), the Commission maintains that its analysis based on the top 10% patents, as discussed in the Statement of Objections, is informative. In the results presented below, the Commission further shows that also patent shares based on the top 25%, results of which were presented in the Statement of Objections, are also informative of the innovative strength of the Parties, and in particular when assessing the importance of the different integrated R&D companies for patents that are the most likely to lead to breakthrough innovations (see paragraphs (121) and (122)).
- (118) Moreover, as a further robustness check, and applying the methodology discussed in the Statement of Objections, the Commission will also present results including the top 50% sample (see paragraph (121), (123) and (125)), which represents around 90% of the overall value of the patents for crop protection, and separately for herbicides, insecticides, and fungicides.⁸⁷
- (119) The Commission notes that there is support in the economic literature to not consider all the patents in the distribution, and to focus instead on a sample that includes the highest quality patents. Support for this approach can be found in the economic literature, including in the key papers on patent data already cited by the Commission in the Statement of Objections.
- (120) In particular, Hall, Jaffe, Tratjenberg (2005) show that for firms with fewer than the median number of citations per patents, it makes no difference how far below the median they fall (which includes as well patents with zero citations), while firms with more than the median number of citations per patent exhibit a very significant increase in market value.⁸⁸ These findings suggest that patents whose quality is below the median quality do not bring a significant value to firms.⁸⁹ This suggests

⁸⁷ The top 50% patents are patents whose quality is higher than the median (or 50th percentile) in term of Technology Relevance.

⁸⁸ Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics, pages 29-30.

⁸⁹ Another paper from Coad and Rao (2008) studies the relation between firm's growth and innovativeness ("Innovation and firm growth in high-tech sectors: A quantile regression approach", Research Policy). The innovativeness is a composite index, including notably patents and R&D expense of the firms considered. Firm's growth rates at a given year are calculated by taking differences of logs of total sales across two consecutive years. Coad and Rao (2008) find that innovativeness appears to have a small influence on firm growth for the median firm. Actually, for most of the sectors considered, there is no impact of innovativeness on firm's growth for the median firm. For firms below the median, there is clearly no impact of innovativeness on firm's growth, and sometime the impact is even negative (even

that innovations are unlikely to have an impact on firm's value when innovations are below the median quality.

- (121) In addition, Tratjenberg (1990) finds that the value of an innovation for customers is more skewed than what could be inferred from a count of citations, suggesting that a non-linear weight should be applied to citations to measure the value of an innovation.⁹⁰ Tratjenberg (1990) suggests applying two non-linear weights: (i) a 1.1 non-linear weight to measure the value for all customers that benefit from the innovation (this is considered as a proxy for the size of the market affected by an innovation), and (ii) a 1.3 non-linear weight to measure the value of an innovation for a representative customer. As discussed in Tratjenberg (1990), the fact the non-linearity is stronger for a representative customer means that citations are more informative of the value of the innovation per se, rather than of the size of the market for the products embedding those innovations.^{91, 92}
- (122) The Commission notes that applying the two non-linear weights to citations counts, as suggested by Tratjenberg (1990), supports the need to consider in the analysis only the top distribution of the patent sample. In particular, if one considers all patents (independently of their quality) and applies a 1.3 non-linear weight to citations counts, then the resulting patent shares are very similar to those obtained when the analysis is restricted to the sample of top 25% patents without non-linear weight, for crop protection, herbicides, insecticides, and fungicides (see illustration provided in Appendix A). As discussed in the previous paragraph, a 1.3 non-linear weight seems appropriate if one is interested in breakthrough innovations. The Commission also notes that looking at the top 25% patents is also similar to what is suggested [discussion of internal document content].⁹³ The economic literature therefore supports the Commission's position that restricting the analysis of patent shares to the sample of top 25% patents does not create any significant bias in patent shares, if one is interested in breakthrough innovations.
- (123) Moreover, if one considers all patents (independently of their quality) and applies a 1.1 non-linear weight to citations counts, then the patent shares are very similar to those resulting when the analysis is restricted to the sample of top 50% patents without non-linear weight, for crop protection, herbicides, insecticides, and

though most of the coefficients are not significantly different from zero). On the contrary, the impact of innovativeness on growth is significantly higher for the 90th percentile, compared to the median firm (see pages 642-645 of this economic study). Overall, this paper suggests that innovations appear to have a small influence on firm growth below the median.

⁹⁰ Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics.

⁹¹ Tratjenberg (1990), "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics, pages 182-183.

⁹² This finding of Tratjenberg (1990) is also consistent with another paper from Scherer, Harhoff, and Vopel (1997, "Exploring the tail of patented invention value", ZEW Discussion Paper No. 97-30). In this paper, the authors estimate the value of inventions by using estimates obtained directly from patent holders through a survey. The authors find the distribution of patented innovation values to be highly skewed, and find that for the top quality patents their estimated value from surveyed customers is significantly larger than other estimates from the literature using metric based on patent data (page 20 of this paper). This finding is similar to Tratjenberg (1990), suggesting that metrics using patent data (like citations counts) do not fully account for the value of innovations, in particular for the highest quality patents.

⁹³ [Internal document] (ID1273). [...] Parties in the response to the Statement of Objections (paragraph 245).

fungicides (see illustration provided in Appendix A). The economic literature therefore further supports the Commission's position that restricting the analysis of patent shares to the sample of top 50% patents as an additional robustness does not create any significant bias in patent shares.

- (124) On the basis of the above, the Commission considers that it is appropriate to calculate patent shares by relying on a sub-sample of high quality patents. In the results presented in Section 3.4 below, the Commission considers in particular the results based on the top 10% patents and top 25% patents in term of quality (that is to say with a quality measure above the 90th percentile and 75th percentile), which were already presented in the Statement of Objections.
- (125) In light of the Parties' response to the Statement of Objections, the Commission will also report and discuss the sample of top 50% patents in terms of quality. The Commission considers that verifying the robustness of its calculation against a sample of the top 50% patents in term of quality is appropriate since: (i) based on the existing literature, innovations below the median seem to have no impact or a little impact (if any) on firm's value, (ii) based on the existing literature, patents with a high number of citations have more value for customers than what the number of citations would suggest, therefore calculating patent shares based on the whole sample and using citations counts only would underestimate the importance of the high quality patents, (iii) calculating patent shares based on the full sample of patent and using a 1.1 non-linear weight on citation counts, which allows to give more importance to highly cited patents, leads to patent shares which are similar when the sample of the top 50% is used without non-linear weights (see paragraph (123)).

3.3.2. *The use of internal and external citations to measure patent quality*

- (126) As regards the argument on excluding internal citations to measure patent quality, while the Commission agrees with the Parties that internal citations are valuable for firms, in particular because firms citing their own patents may be a reflection of the cumulative nature of innovation (within a narrow field or technology trajectory), the Commission also notes that internal citations have also disadvantages to measure patent quality. The discussion below complements the discussion in Section 2.3.
- (127) First, as discussed in Hall, Jaffe, Trajtenberg (2005) and in Section 2.3, internal citations can exhibit a mechanical effect and increase automatically with the size of the patent portfolio, regardless of whether these internal citations are indicative of the type of phenomena described above. Moreover, Hall, Jaffe, and Trajtenberg (2005) also mention that this tendency to cite itself ("self-bias") may increase with the size of the patent portfolio.⁹⁴ Therefore, the Commission considers plausible that this mechanical effect can weaken the link between internal citations and patent quality.
- (128) Second, while Hall, Jaffe, Trajtenberg (2005) show that internal citations have an important impact of firm's value, they also shows that the value-relevance of internal citations declines with the size of the patent portfolio. In particular, in the case of Hall, Jaffe, and Trajtenberg (2005), for firms having an average-size patent portfolio (about 200 patent in their case), the effect of internal citations on firm's value is important, it is even more important for firms with smaller portfolios, but for firms with an important portfolio (about 1000 patents in their case), internal citations have

⁹⁴ Hall, Jaffe, Trajtenberg (2005), "Market value and patent citations", RAND Journal of Economics, page 33.

no impact on firm's value and above 1000 patents the impact of internal citations on firm's value is even negative.⁹⁵

- (129) In the present case, these two issues discussed above have to be considered in light of the importance of [...] portfolio with more than [...] patents, [...] bigger than [...], and almost [...] times bigger than [...] portfolio (see Table 1 and the discussion in Section 2.3). Moreover, as discussed in the Statement of Objections, the share of Bayer was the main one to be affected by including internal citations, with a significant increase. However, this increase in Bayer's patent share may not be related to a better quality of patents, due to the mechanical effect and the decreasing value-relevance of internal citations for large-size patent portfolio.
- (130) In the response to the Statement of Objections, the Parties argue that excluding internal citations leads to an artificial increase in the patent share of DuPont. The Commission disagrees with this comment for the reasons already discussed in Section 2.3.
- (131) In particular, [information on Parties' patenting activities]. For example, when quality is measured using external citations (External Technology Relevance), DuPont's patent portfolio has an average quality more than [...] times higher than Bayer, more than [...] times higher than Syngenta, almost [...] times higher than Syngenta, and more than [...] times higher than Dow. When quality is measured using total citations (Technology Relevance), while the difference in quality is smaller, DuPont's patent portfolio quality is still [...] times higher than Bayer, almost [...] times higher than BASF and Syngenta, and [...] times higher than Dow.
- (132) [Information on Parties' patenting activities], it has a smaller patent portfolio compared to [...], [...] times smaller than [...] portfolio and around [...] times smaller than [...] portfolios (see Table 1), leading automatically to a lower number of internal citations compared to other R&D integrated firms. Therefore, considering total citations to measure patent quality (that is to say including internal citations in addition to external citations) would underestimate the strength of DuPont, [information on Parties' patenting activities]. In particular, while based on external citations (External Technology Relevance) DuPont's patent portfolio has an average quality between [...] times higher than the patent portfolios of other integrated R&D firms, the difference is smaller when total citations (Technology Relevance) are considered with the average quality of DuPont's portfolio being between [...] times higher (see Table 2).
- (133) In its analysis, the Commission will report patent shares based on total citations (i.e including internal and external citations) and external citations only (that is to say excluding internal citations). Accordingly, the thresholds used to calculate patents shares for the top 50% and top 25% patents will be based on the technology relevance metric, which is based on total citations.⁹⁶ However, in light of the above

⁹⁵ Hall, Jaffe, Trajtenberg (2005), "Market value and patent citations", RAND Journal of Economics, page 19.

⁹⁶ As suggested by the Parties in the response to the Statement of Objections (Appendix B of Annex 3), when a measure that accounts for both external and internal citations is used, the top 10% cut-off should be based using the Technology relevance variable. This explains why the thresholds used in the analysis are different from the thresholds used in the Statement of Objections, which were based on the External Technology Relevance metric. Moreover, as explained in Section 3.2.1, the same thresholds are used across all tables in order to have the same basis for comparison across different tables.

and the discussion in Section 2.3, and as in the Statement of Objections, the Commission will put more weight in the present case on patent shares based on external citations only.

3.3.3. *Patent filed by Japanese companies in the EEA*

- (134) As regards patents filed by Japanese companies, in light of Section V.8.6.3.4 of the main body of the Decision and Section 3.2.1.3 of this Annex, the Commission considers that Japanese companies are less effective players, in particular for the EEA, and therefore should not be considered in the same way as integrated R&D companies.
- (135) In particular, while Japanese companies had some patents filed in the EEA in the past, their most successful innovations were always involving one of the integrated R&D firms in the development. Among all AIs launched in Europe after 2005 and involving a Japanese company in the development stage, close to [70-80]% of the revenues corresponds to AI where one of the integrated R&D company was also involved in the development stage. This shows that Japanese companies alone are limited in their capability to bring their innovations to consumers in the EEA, and need to one of the integrated R&D firms to channel their innovations to consumers in the EEA. This is the reason why the Commission considers that Japanese companies should not be treated in the same way as the integrated R&D companies, justifying why the Commission gives more weights to patent shares when Japanese companies are excluded.
- (136) As regards the specific comment raised by the Parties, where they seem to disagree with the Commission's approach to allocate to one of the Big 6 companies the six patents jointly owned by one of the Big 6 companies and a Japanese company, the Commission notes that this approach is consistent with the discussion above on the lack of development capabilities of Japanese companies and the necessity to use one of the global integrated R&D companies to achieve significant revenues.⁹⁷
- (137) Moreover, the Commission notes that this allocation does not create a specific bias for the patent shares of the Parties in herbicides and insecticides, and any potential bias could affect only [...] patent share in fungicides, but to a limited extent. This is based on the following reasons.
- (138) As regards insecticides, none of these six patents belongs to the top 50%, therefore this allocation rule does not have any impact the patent shares in insecticides.
- (139) As regards herbicides, only one patent belongs to the top 50% patents and this patent was effectively allocated to Monsanto. Therefore, this allocation rule leads to overestimate Monsanto's patent share in herbicides, if anything, but not the patent shares of Dow and DuPont.
- (140) As regards fungicides, [...] patents belong to the top 50% patents, BASF owns [...] patent and Dow owns [...] patents. Among the [...] patents allocated to Dow, [...] of these patents have a [...] value, around [...] for the patent asset index and close to [...] for the external patent asset index.⁹⁸ Only [...] patent allocated to Dow has a somehow significant value, around [...] for the patent asset index and [...] for the

⁹⁷ See paragraph (56)(b).

⁹⁸ [Analysis of confidential patent data].

external patent asset index,⁹⁹ but still significantly lower than the value of the patent allocated to BASF, around [...] for the patent asset index and [...] for the external patent asset index.¹⁰⁰ On that basis, BASF's patent share seems to be the most affected by the allocation rule. While the patent share of Dow seems also effected (but to a lower extent than BASF), the Commission notes that its patent share in fungicide was not a critical element in the patent analysis due to a relatively low patent share because of its [...] (see Section 3.4.4).

- (141) In the response to the Statement of Objections, the Parties also argue that [discussion of internal documents].
- (142) Last, the Commission notes that calculating patent shares among the integrated R&D companies by excluding Japanese patents is actually equivalent to allocate proportionally the patent shares of Japanese companies to each of the integrated R&D companies. This approach assumes that integrated R&D companies use to the same extent innovations developed by Japanese companies. However, data on revenues for AIs launched in the EEA (see Section V.8.7.2.2 of the Decision) shows that for the AIs launched in the EEA after 2005 and co-developed by a Japanese company and one of the five integrated R&D firms, around [60-70]% of the revenue correspond to AI co-developed by the Parties, in particular from [...]. This finding suggests that the Parties (in particular [...]) have used discovery innovations from Japanese companies more than the other integrated R&D companies, suggesting that allocating proportionally Japanese patents to each of the integrated R&D companies actually underestimates the combined patent share of the merged entity.
- (143) On the basis of the above, and as in the Statement of Objections, the Commission will present the results without and with Japanese patents filed in the EEA, but will put more weights to patent shares when Japanese companies are excluded.

3.3.4. *Exclusion of mixture patents*

- (144) As regards the exclusion of mixture patents, the Commission disagrees with the Parties that more weights should be given to patent shares that include mixture patents. As discussed in Section 3.2.1.4, excluding mixture patents allows to assess more precisely the technological strengths of the different firms involved in research in crop protection, since it allows to focus on innovations at the AI level which are more transformative, more costly, and more important for resistance management than innovations on mixtures. In other words, mixture patents do not relate to the discovery stage.
- (145) Therefore, as in the Statement of Objections, while the Commission reports the results with and without mixtures patents, it will give more weights to patent shares when mixture patents are excluded.

3.3.5. *Other specific comments raised by the Parties*

- (146) As regards the comment made by the Parties that DuPont's innovation on the AI Aminocyclopyrachlor should not be taken into account in the calculation of patent shares, the Commission disagrees for the following reasons.
- (a) The fact that Aminocyclopyrachlor was [...] does not affect the assessment of innovation competition since innovation efforts are more relevant for this

⁹⁹ [Analysis of confidential patent data].

¹⁰⁰ [Analysis of confidential patent data].

assessment and the analysis of patents considers in the same way innovation efforts made by all firms, independently of their commercial success ex post.

- (b) Moreover, in Annex 1 of the response to the Statement of Objections, the Parties appear to agree with this principle. As stated by [Parties' submission], innovation efforts are important to consider, in particular when they are targeted at the same applications, and even if unsuccessful due to uncertain nature of innovation.¹⁰¹ This was already discussed in Annex 1 of the Statement of Objections, with the concept of ex ante innovation effort (see also Section 3.4.2.3).
 - (c) In this specific case, [...] (see Section 3.4.2.3). The Commission notes that the Parties did not contest most of this evidence in the response to the Statement of Objections.
 - (d) As regards the arguments of the Parties that this [...], the Commission notes that the Parties mention [...] the argument made in the Statement of Objections was that [...] (see Section 3.4.2.3). Therefore, the Commission considers that the Parties did not provide any facts that contradict the evidence presented by the Commission in the Statement of Objections on the innovation effort made by DuPont [...].
 - (e) Last, the Commission disagrees with the Parties that including this AI in the patent analysis is inconsistent with excluding Japanese patents filed in Europe. As discussed above, Japanese companies are excluded because they lack in particular the development and commercial capabilities to bring their innovations to the EEA. This does not apply to DuPont.
- (147) As regards the argument of the Parties that the Commission should have used other metrics to measure calculate patent shares, like the number of citations received, number of external citations received, Patent Asset Index, Technical Relevance, and External Technology Relevance, the Commission considers that only the Patent Asset Index could be used to calculate patent shares, in addition to the External Patent Asset Index.
- (148) The Commission notes that both the External Patent Asset Index and the Patent Asset Index were already used in the Statement of Objections to calculate patent shares. Regarding the other measures mentioned by the Parties, they are already included by construction in the Patent Asset Index and External Patent Asset Index, since:
- (a) The total number of citations received is included in the Technology Relevance measure, which controls for the bias related to age, that is the fact that older patents are likely to receive a bigger number of citations. The Technology Relevance metric is then included in the Patent Asset Index metric (see Section 2.3 for further details on the PatentSight metrics).
 - (b) The same reasoning applies for the number of external citations, which is included in the External Technology Relevance metric, which in turn is included in the External Patent Asset Index metric.

¹⁰¹ See paragraph 59 of Annex 1 to the Response to the Statement of Objections.

- (149) In its analysis, the Commission will report results based on both the Patent Asset Index and the External patent Asset Index. Given that the Commission gives more weight on external citations to measure patent quality (see Section 3.3.2), the Commission will also give more weight to patent shares based on the External Patent Asset Index.
- (150) The Commission also notes that the Parties seem to question the relevance of the PatentSight metrics. However, the Commission disagrees with the Parties for the following reasons: (i) the PatentSight metrics are consistent with the practices used in the economic literature,¹⁰² (ii) [information on Parties' patent activities] (see Sections 1 and 2).
- (151) In the response to the Statement of Objections, the Parties argue that the Commission did not consider in particular [discussion of patent analysis and internal documents].¹⁰³ However, the Commission disagrees with the Parties for the following reasons.
- (152) First, [discussion of patent analysis and internal documents].¹⁰⁴
- (153) Second, focusing on US patents is likely to increase the importance of patents related to GMO, which are much less relevant for the EEA. [Discussion of patent analysis and internal documents].¹⁰⁵
- (154) Third, [discussion of patent analysis and internal documents].¹⁰⁶ The Commission also notes that, as recognised by the Parties in the response to the Statement of Objections, [discussion of patent analysis and internal documents].¹⁰⁷ This is consistent with the Commission's analysis, where the top 25% patents are considered as breakthrough innovations.
- (155) On the basis of the above, the Commission considers that [discussion of internal document].
- (156) As regards the argument of the Parties that the economic literature finds generally a weak correlation between patent's value and the number of citations that a patent receives, the Commission disagrees for the following reasons.
- (157) First, the Commission notes that the Parties did not explain on what basis they conclude that there is a weak correlation between patent/firm value and the number of citations received by a patent or the patents owned by a firm. Moreover, the Parties did not engage with the economic literature used by the Commission to justify its methodology to use the number of citations received by a patent to measure its quality (see Sections 1, 2.3, and 3.1).
- (158) Second, among the economic studies listed by the Parties in a footnote of Annex 1 to the response of the Statement of Objections,¹⁰⁸ the Commission notes that the Parties did not provide any discussion of those papers. Actually, the Commission considers that even the papers listed by the Parties confirm that the number of citations that a

¹⁰² Ernst and Omland (2011), "The Patent Asset Index – A new approach to benchmark patent portfolios", World Patent Information.

¹⁰³ See response to Statement of Objections, paragraph [internal document] (ID1273).

¹⁰⁴ [Internal document] (ID1273), slide 4.

¹⁰⁵ See page 74 of the response to the Statement of Objections.

¹⁰⁶ [Internal document] (ID1273), slide 2.

¹⁰⁷ [Internal document] (ID1273), slides 60 and 72.

¹⁰⁸ See footnote 27 of Annex 1 of the Response to the Statement of Objections.

patent receives is highly correlated with patent/firm value or with the value of the underlying technology. The Commission provides below a discussion of those studies.

- (a) Bessen (2008) shows that the number of citations received by a patent is significantly correlated with patent value, and that one more citation increases patent value by 4-7%.¹⁰⁹ Despite this significant positive correlation, Bessen (2008) mentions that the association between citations received and patent value has a relatively small economic significance. However, the Commission notes that Bessen (2008) estimates the value of a patent using a model of patent renewal, that is to say using patent renewal decisions by patent holders to estimate the value of holding a patent, and as noted by Harhoff, Scherer, Vopel (2003) this type of model leads generally to lower estimated patent values compared to patent values estimated through surveys.¹¹⁰ This may explain why Bessen (2008) finds that the association between citations received and patent value has a relatively small economic significance. Moreover, this type of renewal model suffers from technical issues, in particular to determine the value of most valuable patents, as noted by Harhoff, Scherer, Vopel (2003). Last, Bessen (2008) also mentions that in his model, he is measuring the effect of a patent citation on the value of the rents generated by the a patent per se, while other papers like Hall, Jaffe, and Tratjenberg (2005) measures the value of the underlying technology, which may explain why he finds a lower economic relation compared to other economic studies.¹¹¹
- (b) Allison, Lemley, Moore, and Trunkey (2003)¹¹² consider a sample of litigated patents and assume that patents that get litigated are at least a subset of the most valuable patents. By comparing the characteristics of litigated patents with general patents, they identify what makes a patent valuable. In particular, the number of citations received by a patent is one of the three most important predictors of patent litigation, with the number of prior art citations made and the number of claims included in a patent. In addition, the authors mention that "*citations received is by far the strongest predictor of litigation except for individual and small entity status*". The Commission notes integrated R&D firms in crop protection would be rather considered as big entities, suggesting that patent citation would be the most important predictor of patent value.
- (c) Gambardella, Harhoff, Verspagen (2008), while mentioning that further research needs to be done to have a full picture of what explains the value of a patent, they also mention that the number of citation received is correlated with patent value.¹¹³

¹⁰⁹ Bessen (2008), "The value of U.S. patents by owner and patent characteristics", Research Policy.

¹¹⁰ Harhoff, Scherer, Vopel (2003), "Citations, family size, opposition and the value of patent rights", Research Policy.

¹¹¹ Hall, Jaffe, Tratjenberg (2005), "Market value and patent citations", RAND Journal of Economics

¹¹² The Commission could not access online to the published version of this paper in 2004 and this paper was not provided by the Parties. The Commission relies on a 2003 version of this paper: Allison, Lemley, Moore, and Trunkey (2003), "Valuable Patents", available at the following SSRN link: https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=426020 .

¹¹³ The Commission could not access online to the published version of this paper in 2008, and this paper was not provided by the Parties. The Commission relies on a publicly available presentation dated 2011: "Patent Value: Issues, Measurement & Determinants", available at http://www.wipo.int/meetings/en/doc_details.jsp?doc_id=156079 .

- (d) Harhoff, Scherer, Vopel (2003) survey patent holders about the value attached to patents, and look at determinants of patent value. They find that among the variables that are positively correlated with patent value, like the number of backward citations, the size of the patent family, the number of citations received by a patent is also an important determinant.¹¹⁴
 - (e) In another paper, Harhoff, Narin, Scherer, and Vopel (1999) notes that despite the analysis showing a noisy relation, "*the higher an invention's economic value estimate was, the more the patent was subsequently cited*".¹¹⁵
 - (f) Lanjouw and Schankerman (2004) use four measures to build an index to measure patent quality, including the patent family size, the number of claims made in a patent, the number of backward citations, and the number of subsequent citations. While this paper mentions these four measures as metrics for patent quality, this paper still confirms the finding of the economic literature that the number of citations received by a patent is a determinant of its value.¹¹⁶
- (159) Overall, the economic literature cited by the Parties confirms that the number of citations received by a patent is significantly correlated with the value of a patent or of the underlying technology, and therefore provides useful information to assess the technological strength of the firms involved in R&D for crop protection. Moreover, the Commission notes that citation-based measures are also [information on Parties' patent monitoring activities] (see Sections 1.3 and 2.3). Last, the Commission considers that using the number of citations received by patents is a more appropriate measure of patent quality than the simple patent counts measure proposed by the Parties (see Sections 1.4 and 3.1).
- (160) As regards the arguments of the Parties that citation-weighted patents are lagged indicators of a firm's current innovation efforts, while the focus of merger analysis should be on the likely effects of the merger on its current and future commitment to innovation,¹¹⁷ the Commission notes that this point was already recognised in Section 2.5 on data limitations. This is why the Commission's analysis relies on several pieces of evidence related to past, current, and future innovations, in its conclusion in the main body of the Decision that the proposed transaction is likely to lead to a significant loss of innovation competition, in particular:
- (a) Dow and in particular DuPont have been important innovators, contrary to what the Parties claim based on R&D expenses or simple patent counts.
 - (b) The best-quality innovations of Dow and DuPont in the past were directed against each other, in herbicides and insecticides (see Sections 3.4.2.3 and 3.4.3.3). This is also the case for other innovations made in the past (see Sections V.8.8.1- V.8.8.3 of the main body of the Decision).

¹¹⁴ Harhoff, Scherer, Vopel (2003), "Citations, family size, opposition and the value of patent rights", Research Policy.

¹¹⁵ Harhoff, Narin, Scherer, and Vopel (1999), "Citation frequency and the value of patented inventions", The review of Economics and Statistics.

¹¹⁶ Lanjouw and Schankerman (2004), "Patent quality and research productivity: measuring innovation with multiple indicators", The Economic Journal.

¹¹⁷ See Annex 1 of the response to the Statement of Objections.

- (c) Dow and DuPont are currently innovating against each other in similar innovation spaces, with a limited number of alternatives (see Sections V.8.8.1-V.8.8.3 of the main body of the Decision).
- (d) Dow and DuPont had ambitious innovation targets on a stand-alone basis for the future (see Section V.8.10 of the main body of the Decision).

3.4. Commission's analysis of patent shares

- (161) The Commission presents in this section its results on patent shares. The results are based on the methodology presented in the Statement of Objections. In order to address the Parties' criticism of the Statement of Objections, the Commission will present an additional robustness scenario.
- (162) The methodology used by the Commission is as follows.
- (163) First, the Commission considers patent filed in the EEA during the period 2000-2015 and still active on 31 December 2015 (see paragraph (50)). Patent shares are reported for crop protection, and separately for herbicides, insecticides, and fungicides.
- (164) Second, the Commission excludes mixture patents since it allows to assess more precisely the technological strengths of the different firms involved in research for new AIs in crop protection.¹¹⁸
- (165) Third, the Commission will report the results by measuring patent quality using the number of external citations (that is to say excluding internal citations) and the number of total citations, but will give more weights to patent shares based on external citations.
- (166) Fourth, the Commission will report results with and without patents filed by Japanese companies in the EEA, but will give more weights to patent shares calculated without Japanese companies.
- (167) Fifth, the Commission presents the patent data using four definitions of the relevant sample: all patents, top 50%, top 25% and top 10%. Results for three of these four definitions (all patents, top 25% and top 10%) were already included in the Statement of Objections. The Commission considers the additional robustness scenario with the top 50% of patents to address the comments made by the Parties in the response to the Statement of Objections.
- (168) In interpreting the results of the patent share analysis the Commission relies on the top 10% and the top 25% of patents, and for robustness also comments on the more conservative top 50% scenario.
- (169) As indicated in the Statement of Objections, looking at the top distribution of the patents is relevant to assess the importance of the Parties and other integrated R&D companies for high-quality innovations: blockbuster innovations (top 10%) and breakthrough innovations (top 25%).
- (170) Table 5, Table 6, and Table 7, below report the main results of the analysis of patent shares and the robustness scenarios.
- (171) The Commission notes that the patent shares presented below refer to the top 10% sample, as those presented in the Statement of Objections. Moreover, the results presented below for the 25% patents and the robustness analysis on top 50% patents

¹¹⁸ Excluding process patents in addition to mixture patents leads essentially to the same results.

on the basis of external citations and for integrated R&D companies are similar to the results presented in the Statement of Objections where the top 25% patents were considered. The results presented below confirm the robustness of the Commission's patent analysis in the Statement of Objections and of its conclusions.

Table 5 – Summary of patent shares and concentration indexes (2000-2015, top 10% patents, excluding mixture patents)

Integrated R&D companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20%] ([10-20]%)	[30-40%] ([20-30]%)	[50-60%] ([30-40]%)	[3500-4000] ([3000-3500])	[1000-1100] ([600-700])
Herbicides	[30-40%] ([30-40]%)	[10-20%] ([5-10]%)	[50-60%] ([40-50]%)	[3500-4000] ([3000-3500])	[1200-1300] ([600-700])
Insecticides	[10-20%] ([10-20]%)	[50-60%] ([30-40]%)	[60-70%] ([50-60]%)	[5000-5500] ([3500-4000])	[1400-1500] ([800-900])
Fungicides	[5-10%] ([0-5]%)	[20-30%] ([10-20]%)	[20-30%] ([10-20]%)	[3000-3500] ([2500-3000])	[100-200] ([0-100])
Integrated R&D companies and Japanese companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20%] ([10-20]%)	[20-30%] ([20-30]%)	[30-40%] ([30-40]%)	[2000-2500] ([1500-2000])	[500-600] ([400-500])
Herbicides	[20-30%] ([20-30]%)	[10-20%] ([5-10]%)	[30-40%] ([30-40]%)	[2000-2500] ([2000-2500])	[500-600] ([300-400])
Insecticides	[5-10%] ([5-10]%)	[30-40%] ([20-30]%)	[40-50%] ([30-40]%)	[2500-3000] ([2000-2500])	[600-700] ([400-500])
Fungicides	[0-5%] ([0-5]%)	[10-20%] ([10-20]%)	[20-30%] ([10-20]%)	[2000-2500] ([2000-2500])	[100-200] ([0-100])

Note: Patent shares based on external citations (not in parenthesis) and based on total citations (in parenthesis) to measure patent quality.

Table 6 – Summary of patent shares and concentration indexes (2000-2015, top 25% patents, excluding mixture patents)

Integrated R&D companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%(([10-20]%)	[30-40]%(([20-30]%)	[40-50]%(([30-40]%)	[3000-3500](([2500-3000])	[900-1000](([500-600])
Herbicides	[30-40]%(([30-40]%)	[10-20]%(([5-10]%)	[40-50]%(([30-40]%)	[3000-3500](([2500-3000])	[800-900](([400-500])
Insecticides	[10-20]%(([10-20]%)	[40-50]%(([30-40]%)	[50-60]%(([40-50]%)	[4000-4500](([3000-3500])	[1100-1200](([700-800])
Fungicides	[5-10]%(([5-10]%)	[10-20]%(([10-20]%)	[20-30]%(([10-20]%)	[3000-3500](([2500-3000])	[200-300](([100-200])
Integrated R&D companies and Japanese companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20]%(([10-20]%)	[20-30]%(([10-20]%)	[30-40]%(([20-30]%)	[1500-2000](([1500-2000])	[400-500](([300-400])
Herbicides	[20-30]%(([20-30]%)	[5-10]%(([5-10]%)	[30-40]%(([30-40]%)	[1500-2000](([1500-2000])	[400-500](([200-300])
Insecticides	[5-10]%(([5-10]%)	[30-40]%(([20-30]%)	[40-50]%(([30-40]%)	[2000-2500](([2000-2500])	[500-600](([400-500])
Fungicides	[5-10]%(([0-5]%)	[10-20]%(([10-20]%)	[20-30]%(([10-20]%)	[2000-2500](([2000-2500])	[100-200](([0-100])

Note: Patent shares based on external citations (not in parenthesis) and based on total citations (in parenthesis) to measure patent quality.

Table 7 – Summary of patent shares and concentration indexes (2000-2015, top 50% patents, excluding mixture patents)

Integrated R&D companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20%] ([10-20]%)	[20-30%] ([10-20]%)	[40-50%] ([30-40]%)	[3000-3500] ([2500-3000])	[800-900] ([500-600])
Herbicides	[30-40%] ([30-40]%)	[10-20%] ([5-10]%)	[40-50%] ([30-40]%)	[3000-3500] ([2500-3000])	[700-800] ([300-400])
Insecticides	[10-20%] ([10-20]%)	[40-50%] ([20-30]%)	[50-60%] ([40-50]%)	[3500-4000] ([3000-3500])	[1100-1200] ([700-800])
Fungicides	[5-10%] ([5-10]%)	[10-20%] ([10-20]%)	[20-30%] ([10-20]%)	[3000-3500] ([3000-3500])	[200-300] ([100-200])
Integrated R&D companies and Japanese companies					
	Patent shares			Concentration indexes	
2000-2015	Dow	DuPont	Combined	HHI	Delta HHI
Crop protection	[10-20%] ([10-20]%)	[20-30%] ([10-20]%)	[30-40%] ([20-30]%)	[1500-2000] ([1500-2000])	[400-500] ([300-400])
Herbicides	[20-30%] ([20-30]%)	[5-10%] ([5-10]%)	[30-40%] ([20-30]%)	[1500-2000] ([1500-2000])	[300-400] ([200-300])
Insecticides	[5-10%] ([10-20]%)	[20-30%] ([20-30]%)	[30-40%] ([30-40]%)	[2000-2500] ([2000-2500])	[500-600] ([400-500])
Fungicides	[5-10%] ([5-10]%)	[10-20%] ([5-10]%)	[10-20%] ([10-20]%)	[2000-2500] ([2000-2500])	[100-200] ([0-100])

Note: Patent shares based on external citations (not in parenthesis) and based on total citations (in parenthesis) to measure patent quality.

3.4.1. *In crop protection, the Parties are important innovators (in particular DuPont), [...], in a concentrated industry structure*

3.4.1.1. For innovations related to the discovery of new AIs, the Parties have a significant combined patent share, in a concentrated market structure, with DuPont being a particularly important innovator

(172) Table 8 shows the patent shares among the Big 6 R&D companies in crop protection for different groups of patent quality for the period 2000-2015, when mixture patents are excluded.

- (173) Among the top 10% patents, DuPont is a particularly important innovator, number 1 pre-merger with a patent share of [30-40]% when external citations are used to measure patent quality, and number 2 pre-merger with a patent shares of [20-30]% when total citations are used to measure patent quality. [Information on Parties' patenting activities] (see Sections 2.3). The Commission also notes that Dow has a significant patent share for these high quality patents, with a patent share around [10-20]%. Overall, among these high quality patents (top 10%), the merged entity has a significant patent share in the range of [30-40]%-[50-60]%, depending on the exact measure used for patent quality, and is number 1 post-merger.
- (174) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that DuPont ([30-40]%) remains number 1 pre-merger, above Bayer who is number 2 with a [20-30]% patent share. As regards Dow, while its patent share ([10-20]%) is below Syngenta ([10-20]%), it is still [...] higher than BASF ([5-10]%). The merged entity is a clear number 1 pre-merger with a [40-50]% patent share, significantly above the number-2 Bayer.
- (175) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont ([20-30]%) is decreasing and the one of Bayer ([30-40]%) is increasing, which is expected given that DuPont has [...] patent portfolio ([...] times [...] than [...], [...] times [...] than [...], see Table 1), DuPont ([20-30]%) is still number 2 pre-merger, above Syngenta ([10-20]%). As regards Dow ([10-20]%), it still has a patent share higher than BASF ([10-20]%). Overall, the merged entity is number 1 post-merger at the same level as Bayer ([30-40]%) with a significant patent share around [30-40]%, [...] higher than Syngenta who is the next one with a [10-20]% patent share.
- (176) Overall, among these high quality patents (top 25%), the merged entity has a significant patent share in the range of [30-40]%-[40-50]% and is number 1 post-merger above Bayer or at the same level, depending on the measure used for patent quality.
- (177) The findings presented above on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.
- (178) Among the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that DuPont ([20-30]%) and Bayer ([30-40]%) are both number 1 pre-merger. As regards Dow, while its patent share ([10-20]%) is below Syngenta ([10-20]%), it is still [...] higher than BASF ([5-10]%). The merged entity is a clear number 1 pre-merger with a [40-50]% patent share, significantly above the number-2 Bayer.
- (179) Among the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont ([10-20]%) is decreasing and the one of Bayer ([30-40]%) is increasing, which is expected given that it has [...] patent portfolio ([...] times [...] than [...], [...] times [...] than [...], see Table 1), DuPont ([10-20]%) is still number 2 pre-merger, above Syngenta ([10-20]%). As regards Dow ([10-20]%), it still has a patent share higher than BASF ([10-20]%). Overall, the merged entity is number 2 post-merger with a significant patent share around [30-40]%, below Bayer ([30-40]%) but [...] higher than Syngenta ([10-20]%).

- (180) The Commission notes that, as had already been noted in the Statement of Objections, DuPont is the only company with an increase in its patent share when the quality of patents considered increases: [20-30]% for all patents, [20-30]% for the top 50%, [30-40]% for the top 25% patents, and [30-40]% for the top 10% patents when external citations are used to measure patent quality. Dow's patent share remains constant, while the patent share of other competitors, BASF, Bayer, and Syngenta, are decreasing with the quality of the patents considered. This increase in DuPont's patent shares is consistent with DuPont being active in particular for the high quality patents. Even when total citations are used to measure patent quality, DuPont is the only company that increase its patent share when the quality of patents increases, confirming its particular importance as an innovator in crop protection.
- (181) When considering the top 10% patents, research in crop protection is concentrated with a post-merger HHI of [3500-4000] (respectively [3000-3500]) and a Delta HHI of [1000-1100] (respectively [600-700]) when external citations (respectively total citations) are used to measure patent quality.¹¹⁹ This is also the case when considering the top 25% patents, with a post-merger HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [900-1000] (respectively [500-600]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in crop protection remains concentrated with a post-merger HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [800-900] (respectively [500-600]) when external citations (respectively total citations) are used to measure patent quality. The Transaction is thus likely to significantly enhance the market power of the merged entity for innovation for new AIs in crop protection.
- (182) In Appendix C, and without prejudice to the considerations made above on the significant differences between Japanese companies and integrated R&D firms, the Commission also reports patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA. As discussed in Section 3.3.3, the Commission considers that Japanese companies should not be treated in the same way of integrated R&D firms and therefore gives less weight to these patent shares.
- (183) Among the top 10% patents, even when patents filed by Japanese companies in the EEA are included (representing collectively a [20-30]% patent share), research in crop protection remains concentrated with a post-merger HHI of [2000-2500] (respectively [1500-2000]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. This is also the case among the top 25% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]% patent share, with a post-merger HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [400-500] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]% patent share, research in crop protection remains concentrated with a post-merger HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [400-500] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality.

¹¹⁹ Guidelines on the assessment of horizontal mergers, 2004, paragraph 20.

- (184) As discussed in the Statement of Objections, this analysis contradicts the argument of the Parties that research in crop protection is not concentrated once Japanese companies are considered.¹²⁰ In particular, the methodology used by the Parties suffers from important flaws: (i) the quality of patents is not taken into account when calculating patent shares, (ii) all patents applications are considered, irrespective if the patent is currently active (for example, many patent applications are actually inactive because of rejection by the patent offices), (iii) all patent applications at the worldwide level are considered, that is including many patents/innovations which are not relevant for any EEA country.
- (185) Moreover, even when Japanese companies are considered, DuPont still remains number 1 pre-merger (similar to Bayer) or number 2 pre-merger (behind Bayer) with a patent share of in the range of [20-30]% for the top 10% patents, [10-20%]-[20-30]% for the top 25% patents, and [10-20%]-[20-30]% for the top 50% patents, depending if internal citations are included or not to measure patent quality. Overall, the merged entity has a significant patent share around [30-40]% for the top 10% patents, [20-30%]-[30-40]% for the top 25% patents, and [20-30%]-[30-40]% for the top 50% patents. Last, among the samples of the top 10% patents, the top 25% patents, and the top 50% patents, the merged entity becomes number 1 post-merger above Bayer or at a similar level, depending on the measure used for patent quality.
- (186) The analysis of patent shares also shows a very limited role of Monsanto and a less important role of BASF compared to Dow, DuPont, Bayer, and Syngenta, in bringing innovations for the discovery of new AIs crop protection.
- (187) As regards Monsanto, Table 8 confirms its limited technological strength for crop protection's innovations (see also paragraph (39), Table 1 and Table 2, where Monsanto has [...] patent portfolio and the smallest average patent quality), with a very limited patent share in the range of [0-5]%, depending on the measure considered for patent quality and on the samples of patents considered (top 10%, top 25%, or top 50% patents). The limited role of Monsanto in bringing good quality innovations is also confirmed when mixture patents are included (see Table 14).
- (188) As regards BASF, Table 8 and Table 14 (see Appendix B where mixture patents are included) show that its patent share is always the lowest when compared to Bayer, Dow, DuPont, and Syngenta, in all groups of patents and for both measures of patent quality. As discussed in Sections 3.4.2.4 and 3.4.3.4, the technological strength of BASF in crop protection appears limited mainly because of its limited presence in insecticides, and to a certain extent in herbicides as well. Moreover, as discussed in Sections 3.4.2.4 and 3.4.3.4, [discussion of internal documents], suggesting that its patent share, based on past innovations, overestimates its importance for future innovations in herbicides and insecticides.

¹²⁰ See the Parties' submission entitled [Parties' submission] (Section IV, see for example Table IV-3). See also Annex 1 of the response to the Statement of Objections.

Table 8 – Patent shares among the Big 6 companies (2000-2015, crop protection, excluding mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Crop protection	Crop protection	Crop protection	Crop protection
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,42	2,95	6,40
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[20-30]%	[20-30]%	[30-40]%	[30-40]%
Combined	[40-50]%	[40-50]%	[40-50]%	[50-60]%
BASF	[5-10]%	[5-10]%	[5-10]%	[5-10]%
Bayer	[30-40]%	[30-40]%	[20-30]%	[20-30]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Crop protection	Crop protection	Crop protection	Crop protection
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,42	2,95	6,40
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[10-20]%	[10-20]%	[20-30]%	[20-30]%
Combined	[30-40]%	[30-40]%	[30-40]%	[30-40]%
BASF	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Bayer	[30-40]%	[30-40]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

3.4.1.2. Even when mixture patents are considered, despite DuPont being relatively less active in this type of innovation, the Parties are still important innovators, with a significant patent share for the merged entity in a concentrated market structure

(189) Table 14 in Appendix B shows the patent shares among the Big 6 R&D companies in herbicides for different groups of patent quality for the period 2000-2015, when mixture patents are included.

(190) As discussed in Section 3.3.4, the Commission gives limited weight to these patent shares since mixtures innovations are not relevant to assess the strength of the integrated R&D firms to innovate at the AI level. Without prejudice to these considerations, the Commission reports these patent shares for completeness only.

- (191) Among the top 10% patents, even when mixture patents are considered, DuPont appears as a particularly important innovator, number 1 pre-merger with a patent share of [30-40]% when external citations are used to measure patent quality, and number 2 pre-merger with a patent shares of [20-30]% when total citations are used to measure patent quality. [Information on Parties' patenting activities] (see Sections 2.3). The Commission also notes that Dow has a significant patent shares for these high quality patents, with a patent share around [10-20]%. Overall, among these high quality patents (top 10%), the merged entity has a significant patent share in the range of [30-40]%-[50-60]%, depending on the exact measure used for patent quality, and is number 1 post-merger or at a similar level as Bayer.
- (192) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that DuPont ([20-30]%) is still number 2 pre-merger, behind Bayer ([30-40]%) but above Syngenta ([10-20]%). Despite the decrease in DuPont's share, the merged entity will still be number 1 post-merger with a significant patent share of [30-40]%.
- (193) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, despite the decrease of its patent share, DuPont ([10-20]%) still remains number-2 pre-merger (similar to Syngenta with [10-20]%), and the merged entity will be number 2 post-merger with a [30-40]% patent share, behind Bayer ([30-40]%) but significantly above Syngenta ([10-20]%).
- (194) The findings presented above on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.
- (195) Among the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that DuPont ([20-30]%) is still number 2 pre-merger, behind Bayer ([30-40]%) but above Syngenta ([10-20]%). Despite the decrease in DuPont's share, the merged entity will still be number 1 post-merger with a significant patent share of [30-40]%.
- (196) Among the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, despite the decrease of its patent share, DuPont ([10-20]%) remains number-2 pre-merger (similar to Syngenta with [10-20]%), and the merged entity will be number 2 post-merger with a [30-40]% patent share, behind Bayer ([30-40]%) but significantly above Syngenta ([10-20]%).
- (197) The Commission notes that, even when mixture patents are considered, DuPont is the only company with a patent shares that increases with the quality of the patents considered, independently of the measure used for patent quality, confirming its particular role as an innovator by being particularly active in the high quality patents.
- (198) When mixture patents are considered, the Commission also considers that the decrease in the patent share of DuPont and the increase in the patent shares of BASF, Bayer, and Syngenta (Dow's patent share remains constant), compared to the analysis when mixture patents are excluded (Section 3.4.1.1), suggests that in the first place DuPont is relatively more active in innovations related to new AI than in innovations related to mixtures. [...], is likely to explain why DuPont is particularly important for innovations in new AIs, despite a lower R&D budget compared to other R&D integrated firms.

- (199) When considering the top 10% patents, the Commission notes that even when mixture patents are included, research in crop protection is concentrated with a post-merger HHI of [3000-3500] (respectively [3000-3500]) and a Delta HHI of [800-900] (respectively [600-700]) when external citations (respectively total citations) are used to measure patent quality. This is also the case when considering the top 25% patents, with a post-merger HHI of [2500-3000] (respectively [2500-3000]) and a Delta HHI of [600-700] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in crop protection remains concentrated with a post-merger HHI of [2500 3000] (respectively [2500-3000]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality.
- (200) When patents filed by Japanese companies in the EEA are included in the analysis, research in crop protection is still concentrated for the top 10% patents, with a post-merger HHI of [1500-2000] (respectively [1500-2000]) with a Delta HHI of [400-500] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. This is also the case for the top 25% patents, with a post-merger HHI of [1500-2000] (respectively [1500-2000]) with a Delta HHI of [300-400] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in crop protection remains concentrated, with a post-merger HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [300-400] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. The merged entity remains number 1 (above Bayer) or number 2 (behind Bayer) post-merger, with a combined patent shares in the range of [30-40]% for the top 10% patents, [20-30]% for the top 25% patents and [20-30]% for the top 50% patents, depending if internal citations are used or not to measure patent quality (see Appendix C).
- 3.4.1.3. Conclusion: the Parties (in particular DuPont) are important innovators in crop protection, in a concentrated industry structure, with a significant patent share for the discovery of new AIs
- (201) The results presented above confirm the conclusions from the preliminary assessment made in the Statement of Objections. On the basis of the above, and as concluded in the Statement of Objections, the Commission considers that the analysis of patent shares shows the following: (i) DuPont is a particularly important innovator at the AI level, and has even an increasing patent share for high quality patents, (ii) Dow is also an important innovator, (iii) the industry structure is concentrated, even after considering patents filed in Europe by Japanese companies, (iv) the Parties have a significant patent share of [50-60]% (respectively [30-40]%) for the top 10% patents, [40-50]% (respectively [30-40]%) for the top 25% patents based on external citations (respectively total citations) for innovations related to the discovery of new AIs, and even when considering an additional robustness scenario the Parties have a significant patent share of [40-50]% (respectively [30-40]%) for the top 50% patents, and around [30-40]% combined patent share when Japanese companies are considered, (v) Monsanto's technological strength is particularly limited in crop protection, (vi) BASF's technological strength is lower compared to Bayer, Dow, DuPont, and Syngenta, in particular due to its limited presence in

insecticides and to a certain extent in herbicides, and is likely to decrease in the future.

- (202) The Commission also notes that [...] (see Section 3.4.4), which is likely to decrease their patent shares compared to Bayer, BASF, and Syngenta (which have been historically active in research for fungicides), the Parties have still a significant combined patent share for innovation in crop protection.

3.4.2. *In Herbicides, the Parties are important and close innovators for new AIs*

3.4.2.1. For innovations related to the discovery of new AIs, the Parties have a significant combined patent share in a concentrated market structure, with Dow being a particularly important innovator

- (203) Table 9 shows the patent shares among the Big 6 R&D companies in herbicides for different groups of patent quality for the period 2000-2015, when mixture patents are excluded.

(204) Among the top 10% patents, Dow is a particularly important innovator, number 1 pre-merger under both measures of patent quality, with a patent share of [30-40]% when external citations are used to measure patent quality and [30-40]% when total citations are used to measure patent quality. The Commission also notes that DuPont is mainly active in these highest quality patents, which explains the increase in the patent shares of DuPont when the quality of patent considered increases. [Information on Parties' patenting activities] (see Sections 2.3). For these top 10%, DuPont has a patent share of [10-20]% based on external citations and [5-10]% based on total citations. Overall, among these high quality patents (top 10%), the merged entity has a significant patent share in the range of [40-50%]-[50-60]%, depending on the exact measure used for patent quality, and is a clear number 1 post-merger.

(205) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that Dow ([30-40]%) remains number 1 pre-merger, and the merged entity will be a clear number 1 post-merger with a [40-50]% patent share, significantly above Bayer ([10-20]%) and Syngenta ([20-30]%).

(206) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, despite the significant increase in the patent share of Bayer ([20-30]%) [...], Dow ([30-40]%) is still number 1 pre-merger, and the merged entity remains number 1 post-merger with a [30-40]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([20-30]%).¹²¹

(207) Overall, among these high quality patents (top 25%), the merged entity has a significant patent share in the range of [30-40%]-[40-50]%, and is number 1 post-merger independently of the measure used for patent quality.

(208) The findings presented above on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.

(209) Among the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that Dow ([30-40]%) is number 1 pre-

¹²¹ In herbicides, Bayer owns [...] patents, compared to [...] patents for BASF, [...] patents for Syngenta, [...] patents for Dow, [...] patents for DuPont, and [...] patents for Monsanto.

merger, and the merged entity will be a clear number 1 post-merger with a [40-50]% patent share, significantly above Bayer ([10-20]%) and Syngenta ([20-30]%).

- (210) As regards the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, despite the significant increase in the patent share of Bayer ([20-30]%) [...], Dow ([30-40]%) is still number 1 pre-merger, and the merged entity remains number 1 post-merger with a [30-40]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([20-30]%).
- (211) The Commission notes that, as had already been noted in the Statement of Objections, Dow and DuPont are the only companies with an increase in their patent shares when the quality of patent considered increase: when external citations are used to measure patent quality, Dow's patent share increases from [30-40]% for all patents to [30-40]% for the top 50% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 10% patents, and DuPont's patent share increases from [10-20]% for all patents to [10-20]% for the top 50% and top 25% patents, and to [10-20]% for the top 10% patents. This increase in Dow's and DuPont's patent shares suggests that the Parties are particular active with high quality patents in herbicides. This increasing trend for the Parties is also observed when total citations are used to measure patent quality, confirming their important role as innovators.
- (212) When considering the top 10% patents, research in herbicides is concentrated with a post-merger HHI of [3500-4000] (respectively [3000-3500]) and a Delta HHI of [1200-1300] (respectively [600-700]) when external citations (respectively total citations) are used to measure patent quality.¹²² This is also the case when considering the top 25% patents, with a post-merger HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [800-900] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in herbicides remains concentrated with a post-merger HHI of [3000-3500] (respectively [2500-3000]) and a Delta HHI of [700-800] (respectively [300-400]) for the top 50% patents when external citations (respectively total citations) are used to measure patent quality. The Transaction is thus likely to significantly enhance the market power of the merged entity for innovation for new AIs in herbicides.
- (213) In Appendix C, and without prejudice to the considerations made above on the significant differences between Japanese companies and integrated R&D firms, the Commission also report patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA. As discussed in Section 3.3.3, the Commission considers that Japanese companies should not be treated in the same way of integrated R&D firms and therefore gives less weight to these patent shares.
- (214) Among the top 10% patents, even when patents filed by Japanese companies in the EEA are included (representing collectively a [20-30]%-[30-40]% patent share, depending on the measure used for patent quality), research in herbicides remains concentrated with a post-merger HHI of [2000-2500] (respectively [2000-2500]) and a Delta HHI of [500-600] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. This is also the case

¹²² Guidelines on the assessment of horizontal mergers, 2004, paragraph 20.

among the top 25% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]%-[30-40]% patent share (depending on the measure used for patent quality), with a post-merger HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [400-500] (respectively [200-300]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, where patents filed by Japanese companies in the EEA represent collectively a [20-30]%-[30-40]% patent share (depending on the measure used for patent quality), research in herbicides remains concentrated with a post-merger HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [300-400] (respectively [200-300]) for the top 50% patents when external citations (respectively total citations) are used to measure patent quality.

- (215) While the Delta HHI is below 250 (with a post-merger HHI below 2000) for the robustness scenario with the top 50% patents when total citations are used to measure patent quality, the Commission notes that the Delta HHI is still [...] to the 250 threshold, even though using total citations dilutes the importance of DuPont given that it does not allow to fully capture [information on Parties' patenting activities] (see paragraph (43)). Moreover, the Delta HHI is above the 250 threshold for the top 10% and the top 25% patents. Last, the Commission also notes that the significant cross-shareholding among the integrated R&D companies suggests that the industry is more concentrated than a HHI analysis suggests (see Annex 5 for further details).
- (216) When Japanese companies filing patents in the EEA are considered, actually only two Japanese companies achieve a significant patent share, namely Sumitomo with a patent share in the range of [10-20]%-[20-30]% for the top 10% patents, [10-20]% for the top 25% patents, and [10-20]% for the top 50%, and Mitsui with a patent share in the range of [5-10]% for the top 10% patents, [0-5]%-[5-10]% for the top 25%, and [0-5]%-[5-10]% for the top 50%. This explains why research in herbicides remains concentrated, even after Japanese companies filing patents in the EEA are considered.
- (217) Moreover, even when Japanese companies are considered, Dow still remains number 1 pre-merger with a patent share of [20-30]% for the top 10% patents, [20-30]% for the top 25% patents, and [20-30]% for the top 50% patents. DuPont's patent share is in the range of [5-10]%-[10-20]% for the top 10% patents, [5-10]% for both the top 25%, and top 50% patents, depending if internal citations are included or not to measure patent quality. Overall, the merged entity has a combined share around [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [20-30]%-[30-40]% for the top 50% patents, and remains a clear number 1 pre-merger (see Appendix C).

Table 9 – Patent shares among the Big 6 companies (2000-2015, herbicides, excluding mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Herbicides	Herbicides	Herbicides	Herbicides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,47	2,56	4,76
Number of patent families	[...]	[...]	[...]	[...]
Dow	[30-40]%	[30-40]%	[30-40]%	[30-40]%
DuPont	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Combined	[40-50]%	[40-50]%	[40-50]%	[50-60]%
BASF	[5-10]%	[5-10]%	[5-10]%	[0-5]%
Bayer	[20-30]%	[10-20]%	[10-20]%	[10-20]%
Syngenta	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Monsanto	[5-10]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Herbicides	Herbicides	Herbicides	Herbicides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,47	2,56	4,76
Number of patent families	[...]	[...]	[...]	[...]
Dow	[20-30]%	[30-40]%	[30-40]%	[30-40]%
DuPont	[5-10]%	[5-10]%	[5-10]%	[5-10]%
Combined	[30-40]%	[30-40]%	[30-40]%	[40-50]%
BASF	[10-20]%	[10-20]%	[10-20]%	[5-10]%
Bayer	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Syngenta	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

3.4.2.2. Even when mixture patents are considered, despite DuPont being relatively less actives in this type of innovation, the merged entity remains number 1 post-merger with a significant patent share, in a concentrated market structure, with Dow being a particularly important innovator

(218) Table 15 shows the patent shares among the Big 6 R&D companies in herbicides for different groups of patent quality for the period 2000-2015, when mixture patents are included.

(219) As discussed in Section 3.3.4, the Commission gives limited to these patent shares since mixtures innovations are not relevant to assess the strength of the integrated R&D firms to innovate at the AI level. Without prejudice to these considerations, the Commission reports these patent shares for completeness only.

- (220) Among the top 10% patents, even when mixture patents are considered, Dow is a particularly important innovator, number 1 pre-merger under both measures of patent quality, with a patent share of [30-40]% when external citations are used to measure patent quality and [30-40]% when total citations are used to measure patent quality. The Commission also notes that DuPont is mainly active in these highest quality patents, which explains the increase in the patent shares of DuPont when the quality of patent considered increases. [...] (see Sections 2.3). For these top 10%, DuPont has a patent share of [10-20]% based on external citations and [5-10]% based on total citations. Overall, among these high quality patents (top 10%), the merged entity has a significant patent share in the range of [40-50]%, depending on the exact measure used for patent quality, and is a clear number 1 post-merger.
- (221) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that Dow ([20-30]%) is still number 1 pre-merger (above Bayer at [20-30]%), and the merged entity will be number 1 post-merger with a significant patent share of [30-40]%, above Bayer ([20-30]%) and Syngenta ([20-30]%).
- (222) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, despite the increase in Bayer's patent share and the decrease in DuPont's patent share ([...]), the merged entity is still number 1 post-merger with a [30-40]% patent share, above Bayer ([30-40]%) and above Syngenta ([20-30]%), with Dow ([30-40]%) being number 1 pre-merger at the same level as Bayer.
- (223) Overall, among these high quality patents (top 25%), the merged entity has a significant patent share in the range of [30-40]%, and is number 1 post-merger independently of the measure used for patent quality.
- (224) The findings presented above on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.
- (225) Among the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that Dow ([20-30]%) is still number 1 pre-merger (similar to Bayer at [20-30]%), and the merged entity will be number 1 post-merger with a significant patent share of [30-40]%, above Bayer ([20-30]%) and Syngenta ([20-30]%).
- (226) Among the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, despite the increase in Bayer's patent share and the decrease in DuPont's patent share ([...]), the merged entity is still number 1 post-merger with a [30-40]% patent share, slightly above Bayer ([30-40]%) and above Syngenta ([20-30]%), with Dow ([30-40]%) being number 2 pre-merger.
- (227) The Commission notes that, as in the Statement of Objections, Dow's and DuPont's patent shares are still increasing when the quality of patent considered increase, both when external citations and total citations are used to measure patent quality. This confirms the important role of the Parties as innovators in herbicides, by being active in particular in the high quality patents.
- (228) When mixture patents are considered, the Commission notes that the patent share of DuPont is decreasing, while the patent shares of BASF, Bayer, and Syngenta are increasing. As discussed in paragraph (198), the Commission considers that this

suggests that in the first place DuPont is relatively more active in innovations related to new AIs than in innovations related to mixtures. [...], can explain why DuPont is particularly important for innovations in new AIs, despite a lower R&D budget compared to other R&D integrated firms.

- (229) When considering the top 10% patents, the Commission notes that even when mixture patents are included, research in herbicides is concentrated with a post-merger HHI of [3000-3500] (respectively [3000-3500]) and a Delta HHI of [700-800] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. This is also the case when considering the top 25% patents, with a post-merger HHI of [2500-3000] (respectively [1500-2000]) and a Delta HHI of [400-500] (respectively [200-300]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in herbicides remains concentrated, with a post-merger HHI of [2500-3000] (respectively [2500-3000]) and a Delta HHI of [400-500] (respectively [200-300]) when external citations (respectively total citations) are used to measure patent quality.
- (230) When patents filed by Japanese companies in the EEA are included in the analysis, research in herbicides is still concentrated for the top 10% patents, with a post-merger HHI of [1500-2000] (respectively [2000-2500]) and a Delta HHI of [300-400] (respectively [200-300]) when external citations (respectively total citations) are used to measure patent quality. This is also the case for the top 25% patents, with a post-merger HHI of [1500-2000] (respectively [2000-2500]) and a Delta HHI of [200-300] (respectively [200-300]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in herbicides remains concentrated, with a post-merger HHI of [1500-2000] (respectively [1500-2000]) and a Delta HHI of [200-300] (respectively [100-200]) for the top 50% patents when external citations (respectively total citations) are used to measure patent quality.¹²³ Dow remains number 1 or number 2 pre-merger, with a combined patent shares in the range of [20-30]% for the top 10% patents, [20-30]% for the top 25% patents and of [20-30]% for the top 50% patents, depending if internal citations are used or not to measure patent quality. As regards the merged entity, it remains number 1 pre-merger with a patent share close to [30-40]%, independently of the measure used for patent quality (see Appendix C).

3.4.2.3. Dow and DuPont are close innovators for innovations in herbicides with overlapping lines of research

- (231) In order to assess closeness of competition between the Parties, the Commission has examined the innovation related to the best quality patent of DuPont in herbicides. This DuPont's patent corresponds to the patent family [...], corresponding to the AI aminocyclopyrachlor.¹²⁴

¹²³ The Commission notes that in the first case, the Delta HHI is above 250, and in the second case the post-merger HHI is close to 2000. Moreover, the Commission also notes that the significant cross-shareholding among the integrated R&D companies suggests that the industry is more concentrated than a HHI analysis suggests (see Annex 5 for further details).

¹²⁴ DuPont's response to question 8 of the Commission's request for information 44.

- (232) The Commission notes that in the Response to the Statement of Objections, the Parties did not comment on the evidence discussed below.
- (233) First, the AI aminocyclopyrachlor (launch date 2011) developed by DuPont belongs to the chemical class of pyridine carboxylic acids. The other AIs that belong to this chemical class have been developed only by Dow with four AIs, namely aminocyclopyrachlor, clopyralid, fluroxypyr, and triclopyr. The only other AI that would be potentially close to this chemical class is one AI developed by BASF, called quinclorac, but this AI still belongs to a different chemical class (quinolinic carboxylic acids) and was developed a long time ago in the 1980s (launch date 1988).^{125,126} DuPont is therefore the only and most recent challenger of Dow in this particular chemical class.
- (234) Moreover, the AI aminocyclopyrachlor developed by DuPont has an auxinic mode of action. The Commission notes that, in addition to this AI developed by DuPont (launch date 2011), the other recent AIs within this mode of action have been developed by Dow with the AIs aminopyralid (launch date 2006) and halauxifen-methyl (also called Arylex, launch recently started in 2016 in the EEA, [pipeline information]).¹²⁷ This is based on a published paper, mentioning that: "*Another new trend in weed control is the renaissance of auxinic herbicides [...], the class that provided the first modern herbicides [...]. Compounds such as aminopyralid [...], aminocyclopyrachlor [...], and halauxifen-methyl are new representatives of this long-established MoA [...]*".¹²⁸
- (235) Therefore, it appears that Dow has developed a particular expertise in the pyridine carboxylic acids chemical class and in the auxinic mode of action, and the only and most recent challenger in the past has been DuPont by developing a similar expertise with the aminocyclopyrachlor line of research.
- (236) This closeness between Dow and DuPont for research in herbicides within the same chemical class is also confirmed by looking at citation data. Indeed, the Commission found that this DuPont's patent is mainly cited subsequently by Dow for herbicides applications (with [...] citations), while the next ones are Bayer and Sumitomo with respectively [...] citations and [...] citations. This finding suggests that this line of research of DuPont is particularly close to Dow's lines of research in herbicides.^{129,130}
- (237) In addition, in the patent description corresponding to this DuPont's line of research, the Commission notes that Galium, which is an important weed targeted by current Dow's products in broadleaf weeds (see Section V.8.8.1 of the main body of the

¹²⁵ Sources: Weed Management Handbook edited by Robert E. L. Naylor page 157, https://ag.purdue.edu/btny/weedscience/Documents/52689_5_TA_HerbClassPoster_2016_Master_LR.pdf.

¹²⁶ [Internal document] (ID1328-454).

¹²⁷ [Internal document] (ID1328-454).

¹²⁸ Hansjoerg Kraehmer, Andreas van Almsick, Roland Beffa, Hansjoerg Dietrich, Peter Eckes, Erwin Hacker, Ruediger Hain, Harry John Streck, Hermann Stuebler, and Lothar Willms (2014) (Bayer Crop Sciences), "Herbicides as Weed Control Agents: State of the Art: II. Recent Achievements", Update on Weed Control Agents: Recent Achievements (pages 4-5, and Table 1).

¹²⁹ BASF cites this patent, but for fungicides applications. This analysis was carried out in the PatentSight web-interface directly.

¹³⁰ See "Patents, patent citations, and the dynamics of technological change", National Bureau of Economic Research, Adam A. Jaffe, http://www.nber.org/reporter/summer98/jaffe_summer98.html, "*citations tend to come from inventors pursuing technology related research*".

Decision), is one of the weeds where the compounds described in this patent are efficient.¹³¹

- (238) As described in the paragraphs below, [...].
- (239) As mentioned in [...]’s response to question 8 of RFI44 and to question 7 of RFI45, the AI aminocyclopyrachlor corresponds to project names [...].
- (240) [Discussion of internal documents and Parties’ research strategy].^{132,133,134}
- (241) [Discussion of internal documents and Parties’ research strategy].¹³⁵
- (242) [Discussion of internal documents and Parties’ research strategy].¹³⁶
- (243) As discussed in Section 3.3.5, considering innovation efforts made at the discovery stage is important for the assessment of innovation competition. The Commission notes that the Parties agree with the principle. In Annex 1 of the response to the Statement of Objections, [Parties’ submission] states that innovation efforts are important to consider, in particular when they are targeted at the same applications, and even if unsuccessful due to uncertain nature of innovation.¹³⁷ The AI aminocyclopyrachlor fits exactly with this principle, as it was developed in the discovery stage by DuPont to target [...], where Dow is active with several AIs.

Figure 5 – [Information on Parties’ research strategy]¹³⁸

[...]

- (244) These findings suggest that DuPont has developed in the past a line of research competing directly against Dow’s products. Therefore, had the merger happened in the past, the merged entity would have had lower incentives to develop DuPont’s position in herbicides to avoid cannibalisation with a competing AI.
- (245) As discussed in Section of V.8.8.1 of the main body of the Decision, [...]. These findings suggest that Dow and DuPont are currently close competitors in innovation for herbicides.
- (246) Based on the above, the Commission considers that Dow and DuPont are close innovation competitors in herbicides.
- 3.4.2.4. The positioning of competitors suggests that the patent shares underestimate the importance of the merged entity for research in herbicides
- (247) First, the Commission notes that the evidence discussed below was not contested by the Parties in the response to the Statement of Objections.

¹³¹ The patent description is available at:
https://worldwide.espacenet.com/publicationDetails/originalDocument?FT=D&date=20111019&DB=EPODOC&locale=en_EP&CC=EP&NR=1694651B1&KC=B1&ND=1#. See for example Table I at page 125, Table K at page 129.

¹³² [Internal document] (ID6885-55) (for example slides 10-11, slide 59).

¹³³ [Internal document] (ID6885-55) (slide 60).

¹³⁴ [Internal document] (ID6885-64) (slide 50). [Extract from internal document] (ID6885-55) slide 15 and slide 59, slide 66, slide 67).

¹³⁵ [Internal document] (ID6885-55) slide 15 and slide 59, slide 66, slide 67.

¹³⁶ [Internal document] (ID6143-24790) slide 17 [extract from internal document].

¹³⁷ See paragraph 59 of Annex 1 to the Response to the Statement of Objections.

¹³⁸ [Internal document] (ID6885-55) slide 59.

- (248) As regards DuPont, the Commission notes that [...].¹³⁹ This led to patents filed in general during the period 2014-2016.¹⁴⁰ Given that these patents are very recent, they did not have time to accumulate citations. Therefore, the analysis of patent data is likely to underestimate the strength of DuPont in innovations for herbicides.
- (249) As regards BASF, [discussion of internal document content]. Based on that, the Commission considers that the patent shares of BASF, estimated by considering past innovations, is likely to overstate the importance of BASF for future innovations in herbicides.

Figure 6 – [Extract from internal document]¹⁴¹

[...]

- (250) As regards Monsanto, the Commission notes that its importance is limited with a patent share in the range of only [0-5]% for the top 10% patents, [0-5]% for the top 25% patents, and [0-5]% for top 50% patents (see Table 9), depending on the measure used for patent quality.
- (251) This limited role of Monsanto for innovation for new AIs in herbicides is also confirmed by [discussion of internal document content].
- (252) Moreover, Monsanto is historically present for innovations related to pre-emergence applications (mainly Glyphosate-related), which is a segment where the Parties are not present. Among the [...] patents of Monsanto in the highest quality group (top 10%), which are the main determinants for the patent share of Monsanto, the first [...] patents in term of quality concern explicitly pre-plant or pre-emergence applications (in particular due to the use of Glyphosate).¹⁴²
- (253) As regards Syngenta, the Commission notes that its current sales are mostly in graminicides, suggesting that it has innovated in the past mainly in this area.¹⁴³ As a consequence, it appears that Syngenta, despite its high patent share in herbicides, would be a distant competitor to Dow and DuPont [...] (see Section V.8.8.1 of the main body of the Decision).
- (254) As regards Japanese companies who filed patents in the EEA, and without prejudice to the considerations made in above on the difference between Japanese companies and integrated R&D firms, the Commission has analysed the characteristics of the highest quality patents (top 10%) of the two main Japanese companies present in research for herbicides, namely Sumitomo and Mitsui. These patents are the main drivers of the patents shares of Sumitomo and Mitsui.
- (255) The highest quality group for Japanese companies include actually [...] patents.¹⁴⁴ Among these [...] patents, [...] patents are particularly related to the rice crop, which is not the main crop in the EEA.¹⁴⁵ The main crops in the EEA are cereals (35% of total production), maize, fruits and vegetables, vine, oilseed rape and potatoes (see

¹³⁹ [Internal document] (slides 9 and 33), (ID8006). [Internal document], slide 10 (ID6825-29270), [internal document] (ID6825-29356).

¹⁴⁰ This concern for example the following DuPont's lines of research: [information on Parties' research activities/strategy]. Source: response to the Commission's request for information 45, question 7.

¹⁴¹ [Internal document], (ID3665-22), slide 12.

¹⁴² The first [...] patents in term of quality concern are referenced under the numbers: [patents].

¹⁴³ [Internal document], (ID3665-22), slide 23.

¹⁴⁴ [Analysis based on Parties' confidential patent data].

¹⁴⁵ [...].

Section V.1.1 of the main body of the Decision). Therefore, the Commission considers that the good quality Japanese innovations have limited applications in the EEA, and therefore considers Japanese companies as distant competitors to Bayer, Dow, DuPont, and Syngenta.

(256) Based on the above, the Commission considers that: (i) the estimated patent share of DuPont is likely to underestimate its innovative strength in the future, (ii) BASF had a more limited role in the past for innovations for new AIs in herbicides compared to other R&D integrated firms, and its role in the future is likely to decrease, (iii) Monsanto has a limited role for innovations for new AIs in herbicides, (iv) Monsanto, Syngenta, and the Japanese companies are distant competitors to Dow and DuPont due to innovations in different spaces compared to Dow and DuPont.

3.4.2.5. Conclusion: the analysis of patent shares constitutes an element supporting the finding that the proposed Transaction is likely to lead to a significant loss of innovation competition for new AIs in herbicides

(257) The results presented above confirm the conclusions from the preliminary assessment made in the Statement of Objections. On the basis of the above, and as concluded in the Statement of Objections, the Commission considers that the analysis of patent shares shows the following: (i) Dow is particularly important innovator for new AIs in herbicides, (ii) DuPont has also an important role as an innovator by being particularly active in the high quality patents, (iii) research in herbicides is concentrated, with a high level of HHI, even after considering patents filed in Europe by Japanese companies, (iv) the Parties have a significant patent share for the discovery of new AIs for the period 2000-2015, with a patent share of [50-60]% (respectively [40-50]%) for the top 10% patents, [40-50]% (respectively [30-40]%) for the top 25% patents based on external citations (respectively total citations), and even when considering an additional robustness scenario the Parties have a significant patent share of [40-50]% (respectively [30-40]%) for the top 50%, and above [30-40]% when Japanese companies are considered, with Dow being number 1 pre-merger and where the estimated patent shares are likely to underestimate the future importance of DuPont, (v) Dow and DuPont are close competitors with innovations competing against each other in broadleaf weeds, when considering past innovations and current innovations for new AIs, with a limited number of alternatives, (vi) Syngenta has been in the past a distant competitor to Dow and DuPont by innovating in a different segment (graminicides), (vii) the estimated patent shares are likely to overestimate the future importance of BASF in innovations for new AIs in herbicides, (viii) Monsanto had had in the past a limited role in bringing innovations for new AIs in herbicides, (ix) the main Japanese companies, Sumitomo and Mitsui, have patents mainly related to the rice crop (main crop in Japan), which is a more limited crop in the EEA and are therefore distant competitors to Dow and DuPont.

(258) On that basis, the Commission considers that the analysis of patent data constitutes an element supporting the finding in the main body of the Decision that the proposed Transaction is likely to lead to a significant loss of innovation competition for new AIs in herbicides.

3.4.3. *In insecticides, the Parties are important and close innovators for new AIs*

3.4.3.1. For innovations related to the discovery of new AIs, the Parties have a significant patent share, in a concentrated industry structure, with DuPont being a particularly important innovator and Dow an important innovator.

- (259) Table 10 shows the patent shares among the Big 6 R&D companies in insecticides for different groups of patent quality for the period 2000-2015, when mixture patents are excluded.
- (260) Among the top 10% patents, DuPont is a particularly important innovator, number 1 pre-merger under both measures of patent quality, with a patent share of [50-60]% when external citations are used to measure patent quality and [30-40]% when total citations are used to measure patent quality. [Information on Parties' patenting activities] (see Sections 2.3). The Commission also notes that Dow has a significant patent shares for these high quality patents, with a patent share around [10-20]%. Overall, among these high quality patents (top 10%), the merged entity has a significant patent share in the range of [50-60]%-[60-70]%, depending on the exact measure used for patent quality, and is a clear number 1 post-merger.
- (261) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that DuPont ([40-50]%) remains a clear number 1 pre-merger, and the merged entity will be number 1 post-merger with a [50-60]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([10-20]%). The Patent share of Dow ([10-20]%) is also significant and similar to Syngenta ([10-20]%).
- (262) Among the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont is decreasing to [30-40]% and the one of Bayer is increasing ([30-40]%) ([...]), the merged entity remains number 1 post merger ([40-50]%), with DuPont being number 2 pre-merger, behind Bayer ([30-40]%) but significantly above Syngenta ([10-20]%).¹⁴⁶
- (263) Overall, among these high quality patents (top 25%), the merged entity has a significant patent share in the range of [40-50]%-[50-60]% and is a clear number 1 post-merger independently of the measure used for patent quality.
- (264) The findings presented above on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.
- (265) As regards the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that DuPont ([40-50]%) is a clear number 1 pre-merger, and the merged entity will be number 1 post-merger with a [50-60]% patent share, significantly above Bayer ([20-30]%) and Syngenta ([10-20]%). The Patent share of Dow ([10-20]%) is also significant and similar to Syngenta ([10-20]%).
- (266) As regards the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, while the patent share of DuPont is decreasing to [20-30]% and the one of Bayer is increasing ([30-40]%) ([...]), the merged entity remains number 1 post merger ([40-50]%), with

¹⁴⁶ In insecticides, Bayer owns [...] patents, compared to [...] patents for BASF, [...] patents for Syngenta, [...] patents for Dow, [...] patents for DuPont, and [...] patents for Monsanto.

DuPont being number 2 pre-merger, behind Bayer ([30-40]%) but significantly above Syngenta ([10-20]%).

- (267) The Commission notes that, as had already been noted in the Statement of Objections, DuPont is the only company with an increase in its patent shares when the quality of patent considered increase: [30-40]% for all patents, [40-50]% for the top 50%, [40-50]% for the top 25% patents, and [50-60]% for the top 10% patents when external citations are used to measure patent quality. Dow's patent share remains constant or slightly decreases, while the patent share of other competitors, BASF, Bayer, and Syngenta, are decreasing with the quality of the patents considered. This increase in DuPont's patent shares is consistent with DuPont being active in particular for the high quality patents, as well as Dow to a certain extent. Similar findings apply when total citations are used to measure patent quality, confirming the particular importance of DuPont as an innovator in insecticides, as well as Dow's importance to a certain extent.
- (268) When considering the top 10% patents, research in insecticides is concentrated with a post-merger HHI of [5000-5500] (respectively [3500-4000]) and a Delta HHI of [1400-1500] (respectively [800-900]) when external citations (respectively total citations) are used to measure patent quality.¹⁴⁷ This is also the case when considering the top 25% patents, with a post-merger HHI of [4000-4500] (respectively [3000-3500]) and a Delta HHI of [1100-1200] (respectively [700-800]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in insecticides remains concentrated with a post-merger HHI of [3500-4000] (respectively [3000-3500]) and a Delta HHI of [1100-1200] (respectively [700-800]) when external citations (respectively total citations) are used to measure patent quality. The Transaction is thus likely to significantly enhance the market power of the merged entity for innovation for new AIs in insecticides.
- (269) In Appendix C, and without prejudice to the considerations made above on the significant differences between Japanese companies and integrated R&D firms, the Commission also report patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA. As discussed in Section 3.3.3, the Commission considers that Japanese companies should not be treated in the same way of integrated R&D firms and therefore gives less weight to these patent shares.
- (270) Among the top 10% patents, even when patents filed by Japanese companies in the EEA are included (representing collectively a [20-30]%-[30-40]% patent share, depending on the measure used for patent quality), research in insecticides remains concentrated with a post-merger HHI of [2500-3000] (respectively [2000-2500]) and a Delta HHI of [600-700] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. This is also the case among the top 25% patents, where patents filed by Japanese companies in the EEA are included represent collectively a [20-30]%-[30-40]% patent share (depending on the measure used for patent quality), with a post-merger HHI of [2000-2500] (respectively [2000-2500]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, where patents filed by Japanese companies in the EEA represent

¹⁴⁷ Guidelines on the assessment of horizontal mergers, 2004, paragraph 20.

collectively a [20-30]%-[30-40]% patent share (depending on the measure used for patent quality), research in insecticides remains concentrated with a post-merger HHI of [2000-2500] (respectively [2000-2500]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality.

- (271) When Japanese companies filing patents in the EEA are considered, actually only one Japanese companies achieves a patent share somehow comparable to (but still below) Dow and Syngenta, namely Nissan Chemical with a patent share in the range of [5-10]%-[10-20]% for the top 10% patents, [5-10]%-[10-20]% for the top 25% patents, and of [5-10]% for the top 50% patents, depending on the measure used for patent quality. This explains why research in insecticides remains concentrated, even after Japanese companies filing patents in the EEA are considered.
- (272) Moreover, even when Japanese companies are considered, when external citations are used to measure patent quality, DuPont remains number 1 pre-merger with a patent share of [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [20-30]% for the top 50% patents. Dow's patent share is significant in the range of [5-10]%. The merged is number 1 post-merger, with a significant patent share of [40-50]% for the top 10% patents, [40-50]% for the top 25% patents, and [30-40]% for the top 50% patents. When total citations are used to measure patent quality, while the patent share of DuPont decreases to [20-30]% for the top 10% patents, [20-30]% for the top 25% patents, and [20-30]% for the top 50% patents, and the one of Bayer increases to [20-30]% for the top 10% patents, [20-30]% for the top 25% patents, and [20-30]% for the top 50% patents (as expected, see paragraph (266)), DuPont is still number 1 or 2 pre-merger, significantly above Syngenta ([5-10]%-[10-20]%), and the merged entity still remains number 1 post-merger with a patent share of [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 50% patents (see Appendix C).

Table 10 – Patent shares among the Big 6 companies (2000-2015, insecticides, excluding mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Insecticides	Insecticides	Insecticides	Insecticides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,52	4,02	9,04
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[30-40]%	[40-50]%	[40-50]%	[50-60]%
Combined	[50-60]%	[50-60]%	[50-60]%	[60-70]%
BASF	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Bayer	[20-30]%	[20-30]%	[20-30]%	[10-20]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Insecticides	Insecticides	Insecticides	Insecticides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,52	4,02	9,04
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[20-30]%	[20-30]%	[30-40]%	[30-40]%
Combined	[40-50]%	[40-50]%	[40-50]%	[50-60]%
BASF	[10-20]%	[5-10]%	[5-10]%	[5-10]%
Bayer	[30-40]%	[30-40]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

3.4.3.2. Even when mixture patents are considered, despite DuPont being relatively less active in this type of innovation, the merged entity has a significant patent share, in a concentrated market structure, with DuPont being still a particularly important innovator

(273) Table 16 shows the patent shares among the Big 6 R&D companies in insecticides for different groups of patent quality for the period 2000-2015, when mixture patents are included.

(274) As discussed in Section 3.3.4, the Commission gives limited weights to these patent shares since mixtures are not relevant to assess the strength of the integrated R&D firms to innovate at the AI level. Without prejudice to these considerations, the Commission reports these patent shares for completeness only.

- (275) Among the top 10% patents, even when mixture patents are considered, DuPont is a particularly important innovator, number 1 pre-merger under both measures of patent quality, with a patent share of [50-60]% when external citations are used to measure patent quality and [30-40]% when total citations are used to measure patent quality. [Information on Parties' patenting activities] (see Sections 2.3). The Commission also notes that Dow has a significant patent shares for these high quality patents, with a patent share of [10-20]%. Overall, among these high quality patents (top 10%), the merged entity has a significant patent share in the range of [50-60]%-[60-70]%, depending on the exact measure used for patent quality, and is a clear number 1 post-merger.
- (276) Among the top 25% patents, when external citations are used to measure patent quality, this analysis shows that DuPont ([40-50]%) is still a clear number 1 pre-merger, above Bayer (number 2 with [20-30]%), and the merged entity will be a clear number 1 post-merger with a [50-60]% patent share.
- (277) As regards the top 25% patents, when total citations (that is to say including internal citations) are used to measure patent quality, despite the increase in Bayer's patent share and the decrease in DuPont's patent share ([...]), DuPont ([30-40]%) is still number 2 pre-merger, below Bayer ([30-40]%), but significantly above Syngenta ([10-20]%), and the merged entity is still number 1 post-merger with a [40-50]% patent share.
- (278) Overall, among these high quality patents (top 25%), the merged entity has a significant patent share in the range of [40-50]%-[50-60]% and is number 1 post-merger independently of the measure used for patent quality.
- (279) The findings presented above on the basis of the top 10% and top 25% patents are essentially confirmed in the robustness scenario where the top 50% patents are considered, with similar patent shares.
- (280) Among the top 50% patents robustness scenario, when external citations are used to measure patent quality, this analysis shows that DuPont ([30-40]%) is still number 1 pre-merger, above Bayer (number 2 with [30-40]%), and the merged entity will be a clear number 1 post-merger with a [40-50]% patent share.
- (281) Among the top 50% patents robustness scenario, when total citations (that is to say including internal citations) are used to measure patent quality, despite the increase in Bayer's patent share and the decrease in DuPont's patent share ([...]), DuPont ([20-30]%) is still number 2 pre-merger, below Bayer ([40-50]%), but significantly above Syngenta ([10-20]%), and the merged entity is number 2 post-merger with a [30-40]% patent share, slightly below the number 1 Bayer and significantly above the number 3 Syngenta.
- (282) The Commission notes that, even when mixture patents are considered, DuPont is the only company with a patent shares that increases with the quality of the patents considered, independently of the measure used for patent quality, confirming its particular role as an innovator by being particularly active in the high quality patents. Dow's patent share remains constant, while the patent share of other competitors, BASF, Bayer, and Syngenta, have a tendency to decrease with the quality of the patents considered. As in Section 3.4.3.1, this increase in DuPont's patent shares is consistent with DuPont being active in particular for the high quality patents, as well as Dow, confirming their importance for innovation in insecticides by being particularly active in the high quality patents.

- (283) When mixture patents are considered, the Commission notes that the patent share of DuPont is decreasing, while the patent shares of BASF and Bayer are increasing. As discussed in paragraph (198), the Commission considers that this suggests that in the first place DuPont is relatively more active in innovations related to new AIs than in innovations related to mixtures. This difference in innovation strategy between DuPont and other R&D integrated companies, in particular like BASF and Bayer, can explain why DuPont is particularly important for innovations in new AIs, despite a lower R&D budget compared to other R&D integrated firms.
- (284) When considering the top 10% patents, the Commission notes that even when mixture patents are included, research in insecticides is concentrated with a post-merger HHI of [4500-5000] (respectively [3500-4000]) with a Delta HHI of [1200-1300] (respectively [800-900]) when external citations (respectively total citations) are used to measure patent quality. This is also the case when considering the top 25% patents, with a post-merger HHI of [3500-4000] (respectively [3000-3500]) and a Delta HHI of [800-900] (respectively [600-700]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in insecticides remains concentrated with a post-merger HHI of [3000-3500] (respectively [3000-3500]) and a Delta HHI of [800-900] (respectively [500-600]) for the top 50% patents when external citations (respectively total citations) are used to measure patent quality.
- (285) When patents filed by Japanese companies in the EEA are included in the analysis, research in insecticides is still concentrated for the top 10% patents, with a post-merger HHI of [2000-2500] (respectively [2000-2500]) and a Delta HHI of [500-600] (respectively [400-500]) when external citations (respectively total citations) are used to measure patent quality. This is also the case for the top 25% patents, with a post-merger HHI of [1500-2000] (respectively [2000-2500]) and a Delta HHI of [400-500] (respectively [300-400]) when external citations (respectively total citations) are used to measure patent quality. The Commission notes that even under the robustness scenario with the top 50% patents, research in insecticides remains concentrated with a post-merger HHI of [1500-2000] (respectively [2000-2500]) with a Delta HHI of [400-500] (respectively [300-400]) for the top 50% patents when external citations (respectively total citations) are used to measure patent quality. DuPont remains number 1 or number 2 pre-merger, with a patent share in the range of [20-30]%-[30-40]% for the top 10% patents, [20-30]%-[30-40]% for the top 25% patents and of [20-30]% for the top 50% patents, depending if internal citations are used or not to measure patent quality. As regards the merged entity, it remains number 1 pre-merger (above or similar to Bayer) with a patent share in the range of [30-40]%-[40-50]% for the top 10% patents, [30-40]% for the top 25% patents, and [20-30]%-[30-40]% for the top 50% patents, depending on the measure used for patent quality (see Appendix C).
- 3.4.3.3. Dow and DuPont are close innovators for innovations in insecticides with parallel lines of research
- (286) In order to assess closeness of competition between the Parties, the Commission has examined the innovation related to the best quality patent of Dow in insecticides. This Dow's patent corresponds to the patent family [...], corresponding to the AI

sulfoxaflor and the product Isoclast (Annex 1 registration obtained in the EEA in 2015, [pipeline information]).¹⁴⁸

- (287) [Information on Dow's strategy].^{149,150}
- (288) Section V.8.8.2 in the main body of the Statement of Objections describes further evidence of innovation competition in insecticides between the Parties, both in the past and currently, with a limited number of alternatives.
- (289) On the basis, the Commission considers that Dow and DuPont are close competitors in research for insecticides. In particular, had the merger happened in the past, the merged entity would have had lower incentives to develop Dow's position in insecticides with the sulfoxaflor AI to avoid cannibalisation of DuPont's insecticide.
- 3.4.3.4. The analysis of patent shares [...] a limited role of Monsanto and a limited role of BASF compared to Dow, DuPont, Bayer, and Syngenta in bringing innovations for the discovery of new AIs in insecticides
- (290) As regards Monsanto, it is not present for research in insecticides, with a [0-5]% patent share (see Table 10).
- (291) As regards BASF, Table 10 shows that its patent share is always the lowest when compared to Bayer, Dow, DuPont, and Syngenta, in all groups of patent quality and in both measures for patent quality, and with a decreasing patent shares for the group of highest quality patents (top 25%, top 10%).
- (292) This limited role of BASF for innovation in insecticides is also confirmed by [...] (see also Section V.8.8.2.5 of the Decision).¹⁵¹
- (293) The Commission considers that the fact that [discussion of internal document] suggests that the estimated patent share of BASF, which is based on past innovations, overestimates its innovative strength in the future for innovations for new AIs in insecticides.
- 3.4.3.5. Conclusion: the analysis of patent shares constitutes an element supporting the finding that proposed Transaction is likely to lead to a significant loss of innovation competition for new AIs in insecticides
- (294) The results presented above confirm the conclusions from the preliminary assessment made in the Statement of Objections. On the basis of the above, and as concluded in the Statement of Objections, the Commission considers that the analysis of patent shares shows that following: (i) DuPont is particularly important innovator for new AIs in insecticides, being number 1 or number 2 pre-merger, with a significant patent share of [50-60]% (respectively [30-40]%) for the top 10% patents, [40-50]% (respectively [30-40]%) for the top 25% patents, [40-50]% (respectively [20-30]%) for the top 50% patents, based on external citations (respectively total citations), (ii) Dow is also an important innovator, in particular with a patent share similar to Syngenta, (iii) research in insecticides is concentrated, with a high level of HHI, even after considering patents filed in Europe by Japanese companies, (iv) the Parties have a significant patent shares for the discovery of new AIs in insecticides for the period 2000-2015, with a [60-70]% (respectively

¹⁴⁸ [Internal document], slide 5 (ID1056-45).

¹⁴⁹ [Internal document] (ID8836-13).

¹⁵⁰ [Internal document] (ID7081-377).

¹⁵¹ [Internal document], slide 3 (ID7999).

[50-60]%) patent share for the top 10% patents, [50-60] (respectively [40-50]%) patent share for the top 25% patents based on external citations (respectively total citations), and even when considering an additional robustness scenario the Parties have a significant patent share of [50-60] (respectively [40-50]%) patent share for the top 50% patents, and significantly above [30-40] (in the range of [30-40]%-[40-50]%) when Japanese companies are considered, (v) Dow and DuPont are close competitors with competing lines of research, with a limited number of alternatives, (vi) Monsanto is absent for research in insecticides, (vii) BASF had a more limited role than other R&D integrated firms in bringing innovations for new AIs in insecticides, with the lowest patent share and a decreasing patent share for the highest quality innovations, and its role is expected to be even lower for the future.

(295) On that basis, the Commission considers that the analysis of patent data constitutes an element supporting the finding in the main body of the Decision that the proposed Transaction is likely to lead to a significant loss of innovation competition for new AIs in insecticides.

3.4.4. *In Fungicides, DuPont is an important innovator, reaching a patent share similar to BASF and Syngenta (when external citations are used to measure patent quality and without mixture patents), [...]*

(296) Table 11 shows the patent shares among the Big 6 R&D companies in fungicides for different groups of patent quality for the period 2000-2015, when mixture patents are excluded.

(297) First, the Commission notes that [...] (see Sections V.6.6 and V.8.8.3 of the main body of the Decision), and therefore considers that the patent shares of the Parties have to be interpreted [...]

(298) When external citations are used to measure patent quality, this analysis shows that DuPont has achieved a significant patent share ([20-30] for the top 10% patents, [10-20] for the top 25% patents, [10-20] for the top 50% patents) [...], similar to Syngenta ([10-20]%-[20-30]%) and above BASF ([10-20]%).

(299) As regards Dow, while its patent share is limited ([5-10] for the top 10% patents, [5-10] for the top 25% patents, [5-10] for the top 50% patents), the Commission notes that its patent related to the product Inatreq is [...] in the top [...]. As discussed in the Sections V.6.6 and V.8.8.3 of the main body of the Decision, Inatreq is an important product for Dow currently. [...]. Therefore, [...], it is not surprising that Dow's patent share is relatively limited. The Commission notes [...]. This data limitation is already indicated in Section 2.5. As discussed in details in Section V.8.8.3 of the main body of the Decision, it is important to note that the entry of Dow and DuPont is taking place at the same time as other firms face significant regulatory pressure on their existing products.

(300) Overall, the merged entity is the number 2 post-merger with a patent share of [20-30] for the top 10% patents, [20-30] for the top 25% patents, and [20-30] for the top 50% patents, significantly below Bayer ([40-50]%), but above BASF ([10-20]%) and Syngenta ([10-20]%-[20-30]%). [...], the Commission considers this combined patent share as being significant.

(301) When total citations (that is to say including internal citations) are used to measure patent quality, both the patent shares of Dow and DuPont are decreasing, such that the merged entity is number 4 post merger with a [10-20] patent share for the

top 10% and top 25% patents, and a [10-20]% patent share for the top 50% patents. However, this is expected since [...].¹⁵² In that specific case, [...] BASF, Bayer, and Syngenta, have been historically active in research for fungicides, the Commission considers that patent shares that include internal citations should be interpreted with caution because results are likely to be biased significantly against the new entrants.

- (302) Among the high quality patents (top 10%), when external citations are used to measure patent quality, research in fungicides is concentrated with a post-merger HHI of [3000-3500] and a Delta HHI of [100-200].¹⁵³ This is also the case for the top 25% patents, with a post-merger HHI of [3000-3500] with a Delta HHI of [200-300]. The Commission notes that even under the robustness scenario with the top 50% patents, research in fungicides remains concentrated with a post-merger HHI of [3000-3500] and a Delta HHI of [200-300].
- (303) When total citations are used to measure patent quality, while the HHI post-merger are high ([2500-3000] for the top 10% patents, [2500-3000] for the top 25% patents, and [3000-3500] for the top 50% patents), the Delta HHI is below 150 for the top 10%, top 25% patents, and top 50% patents.
- (304) However, as discussed above, the Commission gives a lower weight for concentration measures with total citations, due to the negative bias against the merged entity [...]. Moreover, the Commission also notes that the significant cross-shareholding among the integrated R&D companies suggests that the industry is more concentrated than a HHI analysis suggests (see Annex 5 for further details).
- (305) In Appendix C, and without prejudice to the considerations made above on the significant differences between Japanese companies and integrated R&D firms, the Commission also report patent shares under a conservative approach that includes patents filed by Japanese companies in the EEA. As discussed in Section 3.3.3, the Commission considers that Japanese companies should not be treated in the same way of integrated R&D firms and therefore gives less weight to these patent shares.
- (306) Among the high quality patents (top 10%, top 25%), when external citations are used for patent quality, patent filed by Japanese companies in the EEA represent collectively a [10-20]%. While the Delta HHI is below 150 for the top 10% patents ([100-200]),¹⁵⁴ it is above 150 for the top 25% patents ([100-200]) with a post-merger HHI of [2000-2500]. The Commission therefore considers that research in fungicides is concentrated, [...].¹⁵⁵ Moreover, the Commission notes that under the robustness scenario with the top 50% patents, research in fungicides is concentrated with a post-merger HHI of [2000-2500] and a Deal HHI of [100-200].
- (307) When total citations are used to measure patent quality, while the post-merger HHI is above 2000 for the top 10% patents, top 25% patents, and top 50% patents, the Delta HHI is below 150 for each group ([0-100] for the top 10%, [0-100] for the top 25% patents, [0-100] for the top 50% patents). However, as discussed above in paragraph (302), the Commission gives a limited weight for concentration measures with total citations, due to the negative bias against the merged entity [...].

¹⁵² In fungicides, Bayer owns [...] patents, compared to [...] patents for BASF, [...] patents for Syngenta, and [...] patents for Dow, [...] patents for DuPont, [...] patents for Monsanto.

¹⁵³ Guidelines on the assessment of horizontal mergers, 2004, paragraph 20.

¹⁵⁴ The post-merger HHI is [2000-2500] for the top 10%.

¹⁵⁵ EC Horizontal Merger Guidelines, paragraph 20.

- (308) When Japanese companies filing patents in the EEA are considered, actually only one Japanese company achieve a patent share, namely Kumiai and Ihara (for patents jointly owned) with a patent share in the range of [0-5%]-[10-20]%, depending on the measure use for patent quality. The next Japanese company is Nippon Soda with a patent share in the range of [0-5]%. This explains why research in fungicides remains concentrated (when considering external citations as a measure of patent quality), even after Japanese companies filing patents in the EEA are considered.
- (309) Moreover, when Japanese companies are considered, the Commission notes that no Japanese company has a bigger patent share than the combined share of the merged entity, in the range of [10-20%]-[20-30]% for the top 10% and top 25% patents and [10-20]% for the top 50% patents, depending on the measure used for patent quality.

Table 11 – Patent shares among the Big 6 companies (2000-2015, fungicides, excluding mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Fungicides	Fungicides	Fungicides	Fungicides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,33	2,75	5,67
Number of patent families	[...]	[...]	[...]	[...]
Dow	[5-10]%	[5-10]%	[5-10]%	[5-10]%
DuPont	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Combined	[20-30]%	[20-30]%	[20-30]%	[20-30]%
BASF	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Bayer	[40-50]%	[40-50]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Insecticides	Insecticides	Insecticides	Insecticides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,33	2,75	5,67
Number of patent families	[...]	[...]	[...]	[...]
Dow	[5-10]%	[5-10]%	[5-10]%	[0-5]%
DuPont	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Combined	[10-20]%	[10-20]%	[10-20]%	[10-20]%
BASF	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Bayer	[40-50]%	[40-50]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

- (310) For completeness, Table 17 shows the patent shares among the Big 6 R&D companies in fungicides for different groups of patent quality for the period 2000-2015, when mixture patents are included. As discussed in Section 3.2.1.4, the Commission gives limited weight to these patent shares since mixture innovations are not relevant to assess the strength of the integrated R&D firms to innovate at the AI level.
- (311) Moreover, [...], it is also likely that they don't have many patents for mixtures as well. Therefore, including mixture patents will bias even more the analysis against the Parties.
- (312) Without prejudice to the considerations in paragraphs (310)-(311), the Commission reports patent shares including mixture patents for completeness only.
- (313) Compared to Table 11 without mixture patents, when considering external citations to measure patent quality, as expected including mixture patents decreases the patent shares of both Dow ([0-5]% for the top 10% patents, [5-10]% for both the top 25% patents and the top 50% patents) and DuPont ([10-20]% for the top 10%, [10-20]% for both the top 25% patents and [10-20]% for the top 50% patents). However, the Commission notes that, when considering external citations to measure patent quality, the merged entity ([10-20%]-[20-30]%) has a patent share comparable to Syngenta ([20-30]%) and BASF ([10-20]%), [...].
- (314) As regards concentration, when mixture patents are included, the levels of post-merger HHI and Delta HHI suggest that the industry structure is not concentrated (except for the top 25% patents when Japanese companies are excluded and based on external citations). However, the Commission notes that this relies on extreme configurations, where both Parties are new entrants and by including Japanese companies or using total citations.
- (315) The results presented above confirm the conclusions from the preliminary assessment made in the Statement of Objections. As concluded in the Statement of Objections, the analysis of patent shares for fungicides shows that: (i) DuPont is an important innovator and has been able to reach a patent share for new AIs similar to BASF and Syngenta (when external citations are used to measure patent quality), [...], (ii) research in fungicides is concentrated when external citations are used to measure patent quality (which the Commission considers as the most appropriate measure [...]), even after considering patents filed in Europe by Japanese companies. Analysing the importance of Dow as an innovator is more difficult [...]. The Commission also notes that, as discussed in details in Section V.8.8.3 of the main body of the Decision, the entry of Dow and DuPont is taking place at the same time as other firms face significant regulatory pressure on their existing products.
- 3.4.5. *In the category "Other", DuPont is the main innovator with important innovations in insecticides and nematocides*
- (316) As regards the category "Other", which includes patents not classified in the categories herbicides, insecticides, or fungicides (see Section 2.4), the Commission notes that DuPont and Bayer are the main firms in the high quality patents in the period 2000-2015. This category includes [...] patents, among which [...] patents in the highest quality group (top 10%), [...] patents in the top 25% group, and [...] patents are in top 50% group.
- (317) Among the Big6 R&D integrated firms, depending on the measure used for patent quality, DuPont has the highest patent share in the range of [30-40%]-[40-50]% for

the top 10% patents, [30-40]%-[40-50]% for the top 25% patents, and of [30-40]% for the top 50% patents, followed by Bayer ([30-40]% for the top 10% patents, [20-30]%-[30-40]% for the top 25% patents, [20-30]% for the top 50% patents). When Japanese companies are included, DuPont has still the highest patent share in the range of [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and of [20-30]% for the top 50% patents, followed by Bayer ([20-30]% for the top 10% patents, [20-30]% for the top 25% patents, [20-30]% for the top 50% patents), depending on the measure used for patent quality. None of the Japanese company has a significant patent share in this category.

- (318) Looking at the abstract of the patents in the highest quality group (top 10%), which are the main drivers of the patent shares, the Commission understands that these patents are mainly related to insecticides, including nematicides. The Commission notes that in the response to the Statement of Objections, the Parties did not comment on this evidence.
- (319) Other companies present in the category are: BASF ([5-10]% for the top 10% patents, [5-10]% for the top 25% patents, [5-10]% for the top 50% patents), Dow ([5-10]%-[10-20]% for the top 10% patents, [5-10]%-[10-20]% for the top 25% patents, [5-10]%-[10-20]% for the top 50% patents), Monsanto ([5-10]% for the top 10% patents, [5-10]% for the top 25% patents, [5-10]% for the top 50% patents), and Syngenta ([0-5]% for the top 10% patents, [5-10]% for the top 25% patents, [10-20]% for the top 50% patents). The Commission notes that some of these patents seem related to Plant Growth Regulators, where Dow and DuPont are currently not active.
- (320) Therefore, the Commission considers its analyses of patent shares described in previous sections is conservative, since including the patent families included in the category "Other" is likely to increase the patent share of DuPont in insecticides, leading to an even higher combined patent share for the merged entity.
- (321) For the sake of clarity, it should be noted that patent families in the category "Other" are included for the analysis of patent shares in crop protection in Section 3.4.1.

3.4.6. Conclusion: the analysis of patent data shows that Dow and DuPont are important and close innovators in crop protection, in particular for herbicides and insecticides, supporting the finding that the proposed Transaction is likely to lead to a significant loss of innovation competition for new AIs

- (322) The Commission has analysed patent data in the crop protection industry to assess the technological importance of the integrated R&D firms. Table 5, Table 6, and Table 7 provide a summary of the main results of the analysis on patent shares. The results presented above confirm the conclusions from the preliminary assessment made in the Statement of Objections.
- (323) As in the Statement of Objections, the Commission considers that the analysis of patent shares shows the following:
- (a) Dow and DuPont are important innovators in the crop protection industry for the discovery of new AIs, in particular Dow in herbicides and DuPont in insecticides and fungicides.
 - (b) Dow and DuPont have a significant combined patent share for the period 2000-2015 for the discovery of new AIs in crop protection ([50-60]% for the top 10% patents, [40-50]% for the top 25% patents, and [40-50]% for the

top 50% patents robustness scenario, based on external citations; [30-40]% for the top 10% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 50% patents robustness scenario, based on total citations), herbicides ([50-60]% for the top 10% patents, [40-50]% for the top 25% patents, and [40-50]% for the top 50% patents robustness scenario, based on external citations; [40-50]% for the top 10% patents, [30-40]% for the top 25% patents, and [30-40]% for the top 50% patents robustness scenario, based on total citations), and insecticides ([60-70]% for the top 10% patents, [50-60]% for the top 25% patents, and [50-60]% for the top 50% patents robustness scenario, based on external citations; [50-60]% for the top 10% patents, [40-50]% for the top 25% patents, and [40-50]% for the top 50% robustness scenario patents, based on total citations).

- (c) The industry structure is concentrated with high level of HHI post-merger and Delta HHI, for crop protection, and in particular for herbicides and insecticides. The Commission also notes that the significant cross-shareholding among the integrated R&D companies suggests that the industry is more concentrated than a HHI analysis suggests (see Annex 5 for further details).
 - (d) In innovations for new AIs in herbicides, Dow and DuPont are important and close competitors (considering past innovations and current innovations) with a limited number of alternatives, Monsanto had a limited role in the past and is a distant competitor to the merging parties, BASF's importance is likely to be lower in the future, Syngenta is a distant competitor to the merging parties. As regards Japanese companies filing patents in the EEA, they are distant competitors to the merging parties due to focus on the rice crop, which is of a limited importance for the EEA.
 - (e) In innovations for new AIs in insecticides, Dow and DuPont are important and close innovators (considering past innovations and current innovations) with a limited number of alternatives, Monsanto is absent, BASF had a more limited role in the past compared to other R&D integrated firms and it is expected to be even lower for the future.
 - (f) [...], DuPont has been able to achieve a significant patent shares, suggesting that it is likely to be more important in the future than what is suggested by its current patent shares.
 - (g) Even under a conservative approach that includes patents filed in the EEA by Japanese companies, research in crop protection, and notably in herbicides and insecticides is still concentrated, and the Parties have significant patent shares: crop protection (around [30-40]%), herbicides (around [30-40]%), insecticides ([30-40]%-[40-50]%).
- (324) On that basis, the Commission considers that that analysis of patent data constitutes an element supporting the finding in the main body of the Decision that the proposed transaction is likely to lead to a significant loss of innovation competition for new AIs, notably in herbicides and insecticides.

APPENDIX A: ILLUSTRATION OF PATENT SHARES WHEN ALL PATENTS ARE INCLUDED, USING NON-LINEAR WEIGHTS

- (325) In order to illustrate the points discussed in Section 3.3.1, this appendix presents computations of patent shares when non-linear weight are applied to citations counts.
- (326) For illustrative purposes, the non-linear weight is applied to the measure of (external) technology relevance, which is based on the total number of citations received from later patents, adjusted for age, patent office practices, and technology fields. In that way, all these issues, in particular the issue that older patents are likely to receive more citations than recent patents, are already taken into account when the non-linear weight is applied. The measure of (external) technology relevance is then multiplied by the market coverage in order to obtain the (external) patent asset index for each patent family (see Section 2.3).
- (327) Table 12 reports the patent shares when all patents are used and where the non-linear weight 1.3 is applied (to focus on breakthrough innovations), and compares to the patent shares from the top 25% analysis. Table 12 shows very similar results between the two approaches.
- (328) Table 13 reports the patent shares when all patents are used and where the non-linear weight 1.1 is applied, and compares with the patent shares from the top 50% analysis. Table 13 shows very similar results between the two approaches.

Table 12 – Comparison between the patent shares based on the top 25% patents and based on all patents with the 1.3 non-linear weight (2000-2015, Big 6 companies, excluding mixture patents)

External citations (excluding internal citations)								
Quality measure: External Patent Asset Index								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Scenario	TOP 25%	Non-linear weight (1,3)	TOP 25%	Non-linear weight (1,3)	TOP 25%	Non-linear weight (1,3)	TOP 25%	Non-linear weight (1,3)
Number of patent families	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[5-10]%	[5-10]%
DuPont	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[40-50]%	[40-50]%	[10-20]%	[10-20]%
Combined	[40-50]%	[40-50]%	[40-50]%	[50-60]%	[50-60]%	[60-70]%	[20-30]%	[20-30]%
BASF	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[10-20]%	[10-20]%
Bayer	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Total citations (including internal citations)								
Quality measure: Patent Asset Index								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Scenario	TOP 25%	Non-linear weight (1,3)	TOP 25%	Non-linear weight (1,3)	TOP 25%	Non-linear weight (1,3)	TOP 25%	Non-linear weight (1,3)
Number of patent families	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[5-10]%	[0-5]%
DuPont	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%
Combined	[30-40]%	[30-40]%	[30-40]%	[40-50]%	[40-50]%	[40-50]%	[10-20]%	[10-20]%
BASF	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[5-10]%	[5-10]%	[20-30]%	[20-30]%
Bayer	[30-40]%	[30-40]%	[20-30]%	[20-30]%	[30-40]%	[30-40]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 13 – Comparison between the patent shares based on the top 50% patents and based on all patents with the 1.1 non-linear weight (2000-2015, Big 6 companies, excluding mixture patents)

External citations (excluding internal citations)								
Quality measure: External Patent Asset Index								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Scenario	TOP 50%	Non-linear weight (1,1)	TOP 50%	Non-linear weight (1,1)	TOP 50%	Non-linear weight (1,1)	TOP 50%	Non-linear weight (1,1)
Number of patent families	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[5-10]%	[5-10]%
DuPont	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[40-50]%	[40-50]%	[10-20]%	[10-20]%
Combined	[40-50]%	[40-50]%	[40-50]%	[40-50]%	[50-60]%	[50-60]%	[20-30]%	[20-30]%
BASF	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[10-20]%	[10-20]%
Bayer	[30-40]%	[30-40]%	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Total citations (including internal citations)								
Quality measure: Patent Asset Index								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Scenario	TOP 50%	Non-linear weight (1,1)	TOP 50%	Non-linear weight (1,1)	TOP 50%	Non-linear weight (1,1)	TOP 50%	Non-linear weight (1,1)
Number of patent families	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[30-40]%	[20-30]%	[10-20]%	[10-20]%	[5-10]%	[5-10]%
DuPont	[10-20]%	[10-20]%	[5-10]%	[5-10]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%
Combined	[30-40]%	[30-40]%	[30-40]%	[30-40]%	[40-50]%	[40-50]%	[10-20]%	[10-20]%
BASF	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[5-10]%	[10-20]%	[20-30]%	[20-30]%
Bayer	[30-40]%	[30-40]%	[20-30]%	[20-30]%	[30-40]%	[30-40]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

APPENDIX B: PATENT SHARES FOR THE INTEGRATED R&D COMPANIES WHEN MIXTURE PATENTS ARE INCLUDED

(329) This appendix presents the patent shares among the integrated R&D firms when mixture patents are included, as discussed in Sections 3.4.1.2, 3.4.2.2, 3.4.3.2, and 3.4.4. Table 14 reports the patent shares for crop protection, Table 15 for herbicides, Table 16 for insecticides, and Table 17 for fungicides.

Table 14 – Patent shares among the Big 6 companies (2000-2015, crop protection, including mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Crop protection	Crop protection	Crop protection	Crop protection
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,42	2,95	6,40
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[20-30]%	[20-30]%	[20-30]%	[30-40]%
Combined	[30-40]%	[30-40]%	[30-40]%	[40-50]%
BASF	[10-20]%	[10-20]%	[5-10]%	[5-10]%
Bayer	[30-40]%	[30-40]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Crop protection	Crop protection	Crop protection	Crop protection
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,42	2,95	6,40
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[10-20]%	[10-20]%	[10-20]%	[20-30]%
Combined	[20-30]%	[30-40]%	[30-40]%	[30-40]%
BASF	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Bayer	[30-40]%	[30-40]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

Table 15 – Patent shares among the Big 6 companies (2000-2015, herbicides, including mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Herbicides	Herbicides	Herbicides	Herbicides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,47	2,56	4,76
Number of patent families	[...]	[...]	[...]	[...]
Dow	[20-30]%	[20-30]%	[20-30]%	[30-40]%
DuPont	[5-10]%	[5-10]%	[5-10]%	[10-20]%
Combined	[30-40]%	[30-40]%	[30-40]%	[40-50]%
BASF	[5-10]%	[5-10]%	[5-10]%	[0-5]%
Bayer	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Syngenta	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Monsanto	[5-10]%	[5-10]%	[5-10]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Herbicides	Herbicides	Herbicides	Herbicides
Quality sub-group	All patents	TOP 25%	TOP 10%	TOP 10%
Threshold	0,00	1,47	2,56	4,76
Number of patent families	[...]	[...]	[...]	[...]
Dow	[20-30]%	[30-40]%	[30-40]%	[30-40]%
DuPont	[0-5]%	[0-5]%	[5-10]%	[5-10]%
Combined	[30-40]%	[30-40]%	[30-40]%	[40-50]%
BASF	[10-20]%	[5-10]%	[5-10]%	[5-10]%
Bayer	[30-40]%	[30-40]%	[30-40]%	[30-40]%
Syngenta	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

Table 16 – Patent shares among the Big 6 companies (2000-2015, insecticides, including mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Insecticides	Insecticides	Insecticides	Insecticides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,52	4,02	9,04
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[30-40]%	[30-40]%	[40-50]%	[50-60]%
Combined	[40-50]%	[40-50]%	[50-60]%	[60-70]%
BASF	[5-10]%	[5-10]%	[5-10]%	[0-5]%
Bayer	[30-40]%	[30-40]%	[20-30]%	[20-30]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Insecticides	Insecticides	Insecticides	Insecticides
Quality sub-group	All patents	TOP 25%	TOP 10%	TOP 10%
Threshold	0,00	1,52	4,02	9,04
Number of patent families	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[10-20]%	[10-20]%
DuPont	[20-30]%	[20-30]%	[30-40]%	[30-40]%
Combined	[30-40]%	[30-40]%	[40-50]%	[50-60]%
BASF	[10-20]%	[10-20]%	[10-20]%	[5-10]%
Bayer	[30-40]%	[40-50]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[5-10]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

Table 17 – Patent shares among the Big 6 companies (2000-2015, fungicides, including mixture patents)

External citations (excluding internal citations)				
Quality measure: External Patent Asset Index				
Category	Fungicides	Fungicides	Fungicides	Fungicides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,33	2,75	5,67
Number of patent families	[...]	[...]	[...]	[...]
Dow	[5-10]%	[5-10]%	[5-10]%	[0-5]%
DuPont	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Combined	[10-20]%	[10-20]%	[20-30]%	[20-30]%
BASF	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Bayer	[40-50]%	[40-50]%	[40-50]%	[40-50]%
Syngenta	[20-30]%	[20-30]%	[20-30]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%
Total citations (including internal citations)				
Quality measure: Patent Asset Index				
Category	Fungicides	Fungicides	Fungicides	Fungicides
Quality sub-group	All patents	TOP 50%	TOP 25%	TOP 10%
Threshold	0,00	1,33	2,75	5,67
Number of patent families	[...]	[...]	[...]	[...]
Dow	[5-10]%	[5-10]%	[5-10]%	[0-5]%
DuPont	[5-10]%	[10-20]%	[10-20]%	[10-20]%
Combined	[10-20]%	[10-20]%	[10-20]%	[10-20]%
BASF	[20-30]%	[20-30]%	[20-30]%	[10-20]%
Bayer	[40-50]%	[40-50]%	[40-50]%	[40-50]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%

APPENDIX C: PATENT SHARES WHEN PATENTS FILED IN ANY EEA COUNTRY BY JAPANESE COMPANIES ARE CONSIDERED

- (330) This appendix presents the results of the analysis of patent data when patents filed in the EEA by Japanese companies are included. The Japanese companies included in the sample are discussed in Section 2.4.
- (331) Table 18, Table 19, and Table 20 show patent shares for crop protection, herbicides, insecticides, and fungicides, when mixture patents are excluded, based on external and total citations.
- (332) Table 21, Table 22, and Table 23 show patent shares for crop protection, herbicides, insecticides, and fungicides, when mixture patents are included, based on external and total citations.

Table 18 – Patent shares in the crop protection industry, 2000-2015, based on external citations (top 10% and top 25%, Japanese companies included, excluding mixture patents)

Quality measure: External Patent Asset Index (2000-2015)								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Selection	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%
Threshold	2,95	6,40	2,56	4,76	4,02	9,04	2,75	5,67
Nobs	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[5-10]%	[0-5]%
DuPont	[20-30]%	[20-30]%	[5-10]%	[10-20]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%
Combined	[30-40]%	[30-40]%	[30-40]%	[30-40]%	[40-50]%	[40-50]%	[20-30]%	[20-30]%
BASF	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[10-20]%	[5-10]%
Bayer	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[5-10]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Sumitomo	[5-10]%	[5-10]%	[10-20]%	[20-30]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Arysta	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Adama	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Agro_Kanesho	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Chemtura	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
FMC	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ihara_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Isagro	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ishihara_Sangyo	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Jiangsu_Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kyoyu_Agri	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai_and_Ihara	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[10-20]%
Kureha	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
LG_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Meiji	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsubishi_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsui	[0-5]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nufarm	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nihon_Nohyaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Kayaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Soda	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nissan_Chem	[5-10]%	[5-10]%	[0-5]%	[0-5]%	[10-20]%	[10-20]%	[0-5]%	[0-5]%
Plant_Health_Care	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Shenyang	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
UPL	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 19 – Patent shares in the crop protection industry, 2000-2015, based on total citations (top 10% and top 25%, Japanese companies included, excluding mixture patents)

Quality measure: Patent Asset Index (2000-2015)								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Selection	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%
Threshold	2,95	6,40	2,56	4,76	4,02	9,04	2,75	5,67
Nobs	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
DuPont	[10-20]%	[20-30]%	[5-10]%	[5-10]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%
Combined	[20-30]%	[30-40]%	[30-40]%	[30-40]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%
BASF	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[10-20]%	[10-20]%
Bayer	[20-30]%	[20-30]%	[20-30]%	[20-30]%	[20-30]%	[20-30]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[5-10]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Sumitomo	[5-10]%	[5-10]%	[10-20]%	[10-20]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Arysta	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Adama	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Agro_Kanesho	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Chemtura	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
FMC	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ihara_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Isagro	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ishihara_Sangyo	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Jiangsu_Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kyoyu_Agri	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai_and_Ihara	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[5-10]%
Kureha	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
LG_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Meiji	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsubishi_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsui	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nufarm	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nihon_Nohyaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Kayaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Soda	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nissan_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Plant_Health_Care	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Shenyang	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
UPL	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 20 – Patent shares in the crop protection industry under the robustness scenario (top 50%), 2000-2015 (Japanese companies included, excluding mixture patents)

Quality measure: External Patent Asset Index (EPAI) and Patent Asset Index (PAI)								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Selection	EPAI	PAI	EPAI	PAI	EPAI	PAI	EPAI	PAI
Threshold	1,42	1,42	1,47	1,47	1,52	1,52	1,33	1,33
Nobs	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[5-10]%	[10-20]%	[5-10]%	[5-10]%
DuPont	[20-30]%	[10-20]%	[5-10]%	[5-10]%	[20-30]%	[20-30]%	[10-20]%	[5-10]%
Combined	[30-40]%	[20-30]%	[30-40]%	[20-30]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%
BASF	[5-10]%	10%	[0-5]%	[5-10]%	[0-5]%	[5-10]%	[10-20]%	[10-20]%
Bayer	[20-30]%	[20-30]%	[10-20]%	[20-30]%	[10-20]%	[20-30]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Sumitomo	[5-10]%	[5-10]%	[10-20]%	[10-20]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Arysta	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Adama	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Agro_Kanesho	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Chemtura	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
FMC	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ihara_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Isagro	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ishihara_Sangyo	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Jiangsu_Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kyoyu_Agri	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai_and_Ihara	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%
Kureha	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
LG_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Meiji	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsubishi_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsui	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nufarm	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nihon_Nohyaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Kayaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Soda	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nissan_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Plant_Health_Care	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Shenyang	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
UPL	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 21 – Patent shares in the crop protection industry, 2000-2015, based on external citations (top 10% and top 25%, Japanese companies included, including mixture patents)

Quality measure: External Patent Asset Index (2000-2015)								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Selection	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%
Threshold	2,95	6,40	2,56	4,76	4,02	9,04	2,75	5,67
Nobs	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[5-10]%	[5-10]%	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
DuPont	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%
Combined	[20-30]%	[30-40]%	[20-30]%	[30-40]%	[30-40]%	[40-50]%	[10-20]%	[10-20]%
BASF	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[10-20]%	[5-10]%
Bayer	[20-30]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%	[10-20]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Sumitomo	[5-10]%	[5-10]%	[10-20]%	[10-20]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Arysta	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Adama	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Agro_Kanesho	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Chemtura	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
FMC	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ihara_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Isagro	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ishihara_Sangyo	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Jiangsu_Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kyoyu_Agri	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai_and_Ihara	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[5-10]%
Kureha	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
LG_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Meiji	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsubishi_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsui	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nufarm	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nihon_Nohyaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Kayaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Soda	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Nissan_Chem	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[5-10]%	[10-20]%	[0-5]%	[0-5]%
Plant_Health_Care	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Shenyang	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
UPL	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 22 – Patent shares in the crop protection industry, 2000-2015, based on total citations (top 10% and top 25%, Japanese companies included, including mixture patents)

Quality measure: Patent Asset Index (2000-2015)								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Selection	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%	Top 25%	Top 10%
Threshold	2,95	6,40	2,56	4,76	4,02	9,04	2,75	5,67
Nobs	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
DuPont	[10-20]%	[10-20]%	[0-5]%	[5-10]%	[20-30]%	[20-30]%	[10-20]%	[10-20]%
Combined	[20-30]%	[30-40]%	[30-40]%	[30-40]%	[30-40]%	[30-40]%	[10-20]%	[10-20]%
BASF	[10-20]%	[5-10]%	[5-10]%	[0-5]%	[5-10]%	[5-10]%	[10-20]%	[10-20]%
Bayer	[30-40]%	[20-30]%	[20-30]%	[20-30]%	[20-30]%	[20-30]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[5-10]%	[10-20]%	[20-30]%
Monsanto	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Sumitomo	[5-10]%	[5-10]%	[5-10]%	[10-20]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Arysta	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Adama	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Agro_Kanesho	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Chemtura	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
FMC	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ihara_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Isagro	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ishihara_Sangyo	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Jiangsu_Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kyoyu_Agri	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai_and_Ihara	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Kureha	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
LG_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Meiji	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsubishi_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsui	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nufarm	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nihon_Nohyaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Kayaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Soda	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%
Nissan_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Plant_Health_Care	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Shenyang	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
UPL	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 23– Patent shares in the crop protection industry under the robustness scenario (top 50%), 2000-2015 (Japanese companies included, including mixture patents)

Quality measure: External Patent Asset Index (EPAI) and Patent Asset Index (PAI)								
Category	Crop Protection		Herbicides		Insecticides		Fungicides	
Selection	EPAI	PAI	EPAI	PAI	EPAI	PAI	EPAI	PAI
Threshold	1,42	1,42	1,47	1,47	1,52	1,52	1,33	1,33
Nobs	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Dow	[10-20]%	[10-20]%	[20-30]%	[20-30]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
DuPont	[10-20]%	[10-20]%	[5-10]%	[0-5]%	[20-30]%	[20-30]%	[10-20]%	[5-10]%
Combined	[20-30]%	[20-30]%	[20-30]%	[20-30]%	[30-40]%	[20-30]%	[10-20]%	[10-20]%
BASF	[5-10]%	[10-20]%	[5-10]%	[5-10]%	[5-10]%	[5-10]%	[10-20]%	[10-20]%
Bayer	[20-30]%	[30-40]%	[20-30]%	[20-30]%	[20-30]%	[30-40]%	[30-40]%	[30-40]%
Syngenta	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%	[10-20]%
Monsanto	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Sumitomo	[5-10]%	[5-10]%	[10-20]%	[5-10]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%
Arysta	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Adama	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Agro_Kanesho	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Chemtura	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
FMC	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ihara_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Isagro	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Ishihara_Sangyo	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%	[0-5]%	[0-5]%
Jiangsu_Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kyoyu_Agri	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Kumiai_and_Ihara	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[0-5]%
Kureha	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
LG_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Meiji	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsubishi_Chemical	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Mitsui	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nufarm	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nihon_Nohyaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Kayaku	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nippon_Soda	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Nissan_Chem	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[5-10]%	[5-10]%	[0-5]%	[0-5]%
Plant_Health_Care	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Rotam	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Shenyang	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
UPL	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%	[0-5]%
Total	100%	100%	100%	100%	100%	100%	100%	100%

CASE M.7932 – DOW/DUPONT

ANNEX 2 TO THE COMMISSION DECISION

ASSESSMENT OF THE ECONOMIC STUDIES SUBMITTED BY THE PARTIES ON THE COMPETITIVE CONSTRAINT BROUGHT BY GENERICS

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1. INTRODUCTION

- (1) The Parties have submitted several economic analyses that aimed at assessing the competitive constraint brought by generic products on their own products when they lose patent protection.
- (2) Paragraph 28 of the Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings¹ (hereafter the “Horizontal Merger Guidelines”) states that “[t]he merging firms’ incentive to raise prices is more likely to be constrained when rival firms produce close substitutes to the products of the merging firms than when they offer less close substitutes.”
- (3) The analysis of competitive constraints brought by specific products in a market is regularly performed in the context of the assessment of closeness of competition between merging firms, typically on the basis of transactional data. In industries characterized by R&D resulting in patented products, competition conditions faced by products resulting from this R&D process may change to a significant extent at the time when these products can be copied and brought to the market by other suppliers (referred to as “generic suppliers”).
- (4) The present Decision shows, in particular in its Sections [...] that, in the agrochemical industry, R&D is a key driver of the industry and that inventions are effectively and efficiently protected by patent applications. The Commission has therefore assessed the Parties’ submissions as such type of analysis can be informative on the level of competitive constraint brought on the Parties by generic suppliers.

2. DATA SUBMITTED BY THE PARTIES

2.1. Description of the Parties’ submissions

- (5) The Parties first submitted their arguments in the first draft Form CO,² dated [...]. These arguments were later developed in three economic analyses, dated [...] (hereafter referred to as “Submission #1”),³ dated [...] (“Submission #2”),⁴ and dated [...] (“Submission #3”).⁵ Finally, the Parties supplemented their arguments in their response to the Statement of Objections (“Submission #4”).⁶
- (6) Most of the time, the underlying data and methodology were not provided along these submissions, as requested by DG Competition Best Practices for the submission of economic evidence,⁷ but as the result of requests for information RFI 6, RFI 8, RFI 9, RFI 10 and RFI 13 for Submission #1 (“Submission #1 data”),^{8,9} RFI 44 for Submission #3 (“Submission #3 data”),¹⁰ and orally for

¹ Official Journal C 031, 5.2.2004, pages 5-18.

² Draft Form CO, [...] (ID477).

³ Parties’ submission entitled [...], dated [...] (ID706).

⁴ Parties’ submission entitled [...], dated [...] (ID7829-11117).

⁵ Parties’ response to the decision to initiate proceedings pursuant to Article 6(1)(c) of the Merger Regulation (the “Article 6(1)(c) Decision”), annex 4, entitled [...], dated [...] (ID6097).

⁶ Parties’ response to the Statement of Objections, annex 5, entitled [...], dated [...] (ID10040).

⁷ DG Competition Best Practices for the submission of economic evidence, accessible at http://ec.europa.eu/competition/antitrust/legislation/best_practices_submission_en.pdf.

⁸ Parties’ response to Commission’s requests for information RFI 6, question 26 (ID765), submitted on [...]; RFI 8, question 20 (ID709), reiterated in RFI 9 question 20 and RFI 10, question 6b (ID1376), submitted on [...], [...] and RFI 13, questions 10-12 (ID3653), submitted on [...], [...].

Submission #2 (“Submission #2 data”).¹¹ These economic analyses, together with their underlying data and the responses to follow-up questions are collectively referred to as “Submissions on generics” or “Submissions”.

- (7) The analysis of the Parties focuses on two of [...] active ingredients, [...] and [...], because (i) [...]¹² and (ii) [...].

2.2. Description of the data

- (8) Several datasets have been used by the Parties for the purpose of these Submissions: (i) [...] transaction data, (ii) a dataset reporting entry years of generic products in each EEA country, and (iii) datasets reporting product specific information.

2.2.1. [...] transaction data

- (9) Data on prices and margins are computed on the basis of [...] transaction data related to [...] and [...] products, which were aggregated over combinations of products as well as country and year. The Parties provided the underlying transaction data as well as two aggregated versions.

- (10) The relevant variables used in the Parties’ analysis are the following:¹³
- (a) *Year*: the year in which the transaction occurred ([...]);
 - (b) *Country*: the country in which the transaction took place (only EEA country were considered in the analysis);
 - (c) [...] *Product Name*: One of the names identifying each product ([...]) which was used to select products containing the active ingredients of interest;
 - (d) *Volume*: The volume of product exchanged in the transaction;
 - (e) *Net Sales in Local Currency*: The value of the transaction in local currency;¹⁴
 - (f) *Net Sales in USD*: The value of the transaction in USD;¹⁵

⁹ The Commission notes that the figure in slide 9 of Submission #1 differs from the graph generated by the related code provided by the Parties.

¹⁰ Parties’ response to Commission’s request for information RFI 44, question 2, received on [...] (ID6789), [...].

¹¹ Parties’ response to Commission’s oral request, received on [...].

¹² Submission #1, slide 5.

¹³ Other variables are reported in the aggregated datasets, for example variables allowing identifying customers. Other variables were also reported in the underlying transaction data, such as variables related to variable costs but the Parties did not provide explanations on how these variables were used in the computation of the standard margin.

¹⁴ The Commission used the annual exchange rates published by the European Central Bank (hereafter referred to as “European Central Bank annual exchange rates”) to convert local currencies into euros, namely for the Czech koruna (http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=120.EXR.A.CZK.EUR.SP00.A), for the Danish krone (http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=120.EXR.A.DKK.EUR.SP00.A), for the Hungarian forint (http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=120.EXR.A.HUF.EUR.SP00.A), for the Norwegian krone (http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=120.EXR.A.NOK.EUR.SP00.A), for the Polish zloty (http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=120.EXR.A.PLN.EUR.SP00.A), for the Swedish krona (http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=120.EXR.A.SEK.EUR.SP00.A) and for the United Kingdom pound sterling (http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=120.EXR.A.GBP.EUR.SP00.A).

¹⁵ Note that the two aggregated datasets are not consistent in the currencies used for reporting sales values. The Commission understands that one reported sales value only in USD, while the other one reported

(g) *Standard Margin*: A measure of absolute margin in local currency per transaction which was already present in the raw data submitted by the Parties;¹⁶

(h) *Currency*: the currency of the local currency variables.

2.2.2. Dataset reporting the entry years of generic products

(11) For a given country and a given active ingredient, the Parties report the patent expiry year as well as two different entry dates related to the introduction of generic products.¹⁷ The first date identifies the year, after patent expiry, when the first competitor with a supply agreement with [...] for the active ingredient enters. The second date identifies the year, after patent expiry, when the first competitor with a supply source independent from [...] for the active ingredient enters. “Generic entry” is then meant to be the earlier of the two measures. The Parties do not provide any information related to the type of products that is meant to be the “generic product” introduced by the “generic entrant” against [...] products.

(12) Table 1 provides a summary view, for [...] and [...] active ingredients, of the patent expiry year and the generic entry year and supplier, by country, as reported by the Parties.

Table 1 – Patent expiry and generic entry by country, as reported by the Parties, for [...] and [...] active ingredients

[...]

Source: Submissions on generics

Note: Countries with empty cells have not been provided by the Parties.

2.2.3. Datasets reporting product specific information

(13) The Parties submitted information on patent protection of [...] mixtures and [...] mixtures,¹⁸ as well as information that allowed converting the different units of volume reported in the transaction data into kilograms,¹⁹ so as to allow prices and margins to be expressed per kilogram of active ingredient. This conversion is necessary to compare and aggregate prices and margins across products, as products typically differ in their concentrations of active ingredients.

2.3. Limitations of the data

(14) The data provided suffer from several limitations.

(15) First, the Submissions are based on the analysis of prices per kilogram of an active ingredient, [pricing information extracted from internal documents].²⁰

them in local currencies, despite contradictory indications by the Parties (see [...] email dated [...] which claimed that all currencies were in USD).

¹⁶ This variable was reported in the second aggregated dataset.

¹⁷ Submission #1 data, file name [...] submitted on [...].

¹⁸ Parties’ response to Commission’s requests for information RFI 13, questions 11-12 (ID3653).

¹⁹ Submission #1 data, file name [...] and file name [...] submitted on [...], and Parties’ response to Commission’s requests for information RFI 13, question 10 (ID3653).

²⁰ [Information extracted from internal documents]. See for example [internal document] (ID9304-66, [internal document]), slides 25-27; [internal document] (ID9304-67, [internal document]), page 23. Similar elements can be found in [internal document]. See Parties’ reply to Commission’s Article 11(3) Decision of [...].

- (16) In their Submission #4, the Parties argue that “*although the SO correctly states that farmers care about cost per hectare treated, it does not account for the fact that [pricing information] the price per hectare is fundamentally linked to this price per kilogram of active ingredient. [...] This means that inferences made using the price per kg can be extrapolated to the price per hectare treated.*”²¹ While there is a clear proportional link, for a given product and a given application, between the price per kilogram of an active ingredient, the price per kilogram of the formulated product and the price per hectare treated for this application, such proportionality is likely to differ between formulated products and, as a consequence, are likely to provide different weights to each product in the price indexes, margins and Lerner indexes computed by the Parties and the Commission.
- (17) Given this limitation, the Commission doubts that the Submissions on generics capture the essence of competition between generics and branded products, as they do not focus their analysis on the variable of choice of customers.
- (18) Second, the Parties provide no indication on the process through which [...] transaction data were collected from [...] and how it was further treated by its economic consultants, [...]. It is therefore not clear to the Commission what amounts were reported internally in [...] systems and the currencies used in that system, and how such amounts and currencies have then be treated to generate the data submitted to the Commission.^{22,23} This is particularly a concern as the Parties indicated that they encountered problems related to currencies in creating the datasets submitted to the Commission.²⁴ As a consequence, even though the Commission uses in this annex sales value and margins provided in local currencies, the reliability of such data remains uncertain.
- (19) Third, the data present only [...] side of the story as [...] did not provide similar data.
- (20) Fourth, reaching conclusions on the effect of some market events (patent expiry, generic entry) is, in general, difficult when the data do not provide enough visibility both before and after such events. For [...], patent expiry occurred between [...] and [...] and generic entry occurred after [...] in all countries apart from a few ones (namely [...]). Only [...] years or less of data are available to observe the effects potentially related to generic entry. For [...], patent expiry occurred in [...]. The data available, which begins in [...], do not allow observing possible changes related to patent expiry.
- (21) Fifth, the data display volumes and revenues, thus prices, related to the sales of formulated products as well as their composition, but they do not provide any detail on the contribution of each active ingredient in the final price of the formulated products. The Parties have therefore made assumptions for the purpose of computing the contribution of each active ingredient to the price of each transaction related to a

²¹ Submission #4, section A.1. The Parties also mention in this section that “*the SO ignores the fact that [pricing information] but they do not attempt to explain the apparent contradiction between such statement and [...].*”

²² In their Submission #3, the Commission understands from the code submitted that the Parties converted first each local currency other than euros into US dollars, using either the mean over the available years of the exchange rates attached to that currency reported in the dataset or the exchange rate attached to that currency reported for the last year, and then converted the result into euros, using yearly exchange rates (for which no source is indicated). The sources and motivation for this specific exercise are not clear to the Commission.

²³ The Parties do not address this point in their response to the Statement of Objections.

²⁴ See email from [...], dated [...], which states that [...].

formulated product. Such assumption would not necessarily reflect the true contribution of the active ingredient.²⁵

- (22) Sixth, [...] and [...], only account for a part of the crop protection portfolio of the Parties.
- (23) Therefore, given these other limitations, the Commission doubts that any conclusion reached on the basis of one (or two) active ingredient(s) of one of the two Parties could extend to other active ingredients and to both Parties.
- (24) The Commission understands that the Parties' Submissions used non inflation-adjusted prices and, without prejudice to an assessment by the Commission of the relevance of the methodology developed by the Parties, the Commission uses the same methodology.
- (25) The Commission also notes some issues with margin values reported in [...] transaction data, in particular margins [...]%. In order to remove likely data errors, the Commission excludes from all its computations using margins observations from [...] transaction data with reported margins [...] of their related price.^{26,27}

3. PARTIES' VIEWS

3.1. Methodology followed by the Parties

- (26) The Parties provide a qualitative analysis of the data based on the evolution over time of volumes, prices and margins, in light of market events such as patent expiry and "generic entry". In other words, the Parties aim at assessing graphically the causality of market events, such as patent expiry or generic entry, by solely identifying whether downwards changes in price or margin occurred in similar periods than these events. No attempt is made to evaluate the possible statistical relationship between the evolutions of these parameters, nor to estimate and test such causality claims through, for example, a thorough econometric analysis.
- (27) On three occasions, the Parties compute an EEA-wide "price index" for each active ingredient: for the straight products,²⁸ for the [...] mixture,²⁹ and for various [...] groups of mixtures.³⁰ A price index is a normalized average of prices, weighted by volumes, and specific attention should be made whenever products appear, or disappear, in the period covered by the price index. In both occasions, the Parties used non inflation-adjusted prices.
- (28) As regards the straight products, the Parties did not include in their analysis countries in which the straight [...] or the straight [...] were not present in [...], the first year of analysis.³¹ A country-specific average price was then computed for each country and normalized to 100 in [...]. Then the price index was computed by averaging the

²⁵ See Section 4.1.1 for more details.

²⁶ Outliers represent [...]% of the observations used in the analysis and [...]% of the sales at EEA-level over the period. The most notable outliers are related to the product [...].

²⁷ Although the Parties acknowledge this fact in their Submission #4, figures 11 and 12, they do not address this point in their response to the Statement of Objections.

²⁸ Submission #1, slide 9.

²⁹ Submission #2, slide 7.

³⁰ Submission #4, figures 2, 3 and 4.

³¹ The countries not included in the price index for straight products are: [...]. The countries included in the price index for straight products are: [...].

country-specific normalized average price, weighting them by the sales of these products in each country.

- (29) As regards the [...] mixtures,³² the same methodology could not be followed as many of these mixtures appeared later than [...]. As a consequence, the Parties changed their computation methodology. They first create a product-country-specific price index. They ignore products sold in [...] and, for the products present in [...], they normalize their product-country-specific price index at 100 in [...]. They then compute an EEA-wide price index by averaging the product-country-specific price indexes across countries and products, weighting them by the sales of the products in their country. Whenever a “new” product appears after [...], it is not factored in the price index up to the year in which it appears. At this stage, the product-country-specific price index of the “new” product is normalized at the value of the EEA-wide price index in the year in which it appears. The EEA-wide price index is further computed by averaging all product-country-specific price indexes of products present in a given year, weighting them by the sale of the products in their country. (For example, if the EEA-wide price index equals 120 in 2012, and a product was introduced in 2012 in a country, then the related product-country-specific price index will be normalized at 120 in 2012, and the EEA-wide price index will be computed as of 2012 by averaging all product-country-specific price indexes of products present in 2012, using their sales as weights.) As a result of this methodology, no country is excluded contrary to the methodology followed by the Parties for the straight products.

3.2. Results derived by the Parties

- (30) According to the Parties, “*both prices and margins of mixtures are constrained by generic competition*”³³ and generic suppliers exert a significant competitive constraint on branded manufacturers when an active ingredient loses its patent protection. Overall, the Parties argue that branded manufacturers can respond to generic entry by reducing prices and/or by introducing new innovative mixtures.³⁴
- (31) With regard to the introduction of new mixtures, the Parties argue that the pressure of generic competition forces branded manufacturers to introduce new formulations³⁵ including off-patent active ingredients and other active ingredients, leading to formulated products that bring substantial quality improvements: “*[n]ew products need to offer growers substantive benefits or they will not be adopted, since the original product is still available. Indeed, the new [...] mixtures that have been introduced in recent years all represent substantial quality improvements over older formulations.*”³⁶ The Parties further argue that this competition in innovation “for” the market is the result of the competitive constraint generated by the generic suppliers.³⁷

³² The Parties did not specify the methodology followed for the price indexes computed in their Submission #4.

³³ Submission #3, section 2.1 and page 16.

³⁴ Form CO, [...].

³⁵ According to the Parties, [...] introduced mixtures in [...] countries out of the [...] countries reported for the sales of straight [...], and in [...] countries of the [...] reported for straight [...].

³⁶ Submission #3, page 5.

³⁷ Submission #4, section 2.1, pages 6-8, among other.

4. COMMISSION'S ASSESSMENT

4.1. The Parties' analyses suffer from data limitations and methodological issues

4.1.1. Any inferences from the Submissions on generics suffer from important limitations

- (34) Before assessing further the usefulness of the data submitted in the context of the Submissions on generics and the Parties' related claims, it is necessary to emphasize that these Submissions suffer from a number of important flaws and limitations which limit the inferences that can be derived from them.
- (35) First, the definition used by Parties to identify generic entry is incorrect.
- (36) In the Parties' data, summarized in Table 1, generic entry is very often identified to occur when a supplier first sells a product containing an active ingredient for which it has a supply agreement with [...]. As a result, [...] is reported to be the "generic supplier" of [...] in [...] as well as of [...] in [...]. [...] is also reported to be the "generic supplier" of [...] in [...] as well as of [...] in [...].
- (37) This approach is at odds with the Parties' own assessment of generic suppliers. The Form CO identifies [...] as branded manufacturers⁴⁶ and not as generic suppliers.⁴⁷
- (38) Second, the Submissions do not specify whether the product introduced by the "generic supplier" is indeed a generic copy of the straight product or of an existing mixture containing this active ingredient, or whether the "generic product" introduced is a patented mixture made partly with [...] active ingredient. This lack of clarity is particularly detrimental in light of the fact that branded manufacturers like [...] would typically not engage in the marketing of genericized version of an existing active ingredient (what is generally meant by "generic product") but would rather create new patented mixtures on the basis of their own active ingredients or on active ingredients supplied from competitors.
- (39) The Commission considers [...] as [...] and branded manufacturers, which would typically aim at getting supply of competitors' active ingredients for the purpose of creating new patented mixtures, [...].⁴⁸ Such strategy has different motivations and potentially different market consequences compared to the introduction of a copy of existing products (which is generally meant by "generic entry").⁴⁹
- (40) The focus of the Parties' Submissions is to understand the effects of the actual or potential entry of generic products on the pricing and margins of [...] products based upon [...] and [...]. These analyses should therefore focus on the entry of products that qualify to be generic products and should not consider products introduced by [...], as explained above.⁵⁰

⁴⁶ Form CO, [...].

⁴⁷ Form CO, [...].

⁴⁸ Form CO, [...].

⁴⁹ Note that when a generic supplier considers the introduction of a generic product, it usually considers sourcing the active ingredients from its original supplier, a branded manufacturer, as this facilitates its registration process. This is also typically beneficial to the original supplier. Selling an active ingredient to generic suppliers allows maintaining a certain volume of production and, therefore, achieving economies of scale in the production of this active ingredient. These economies of scale will in turn decrease the cost of production of all the branded manufacturer's own mixtures using this active ingredient. See Parties' response to the Article 6(1)(c) Decision, paragraph 22.

⁵⁰ In their Submission #4, section A.2, page 29, the Parties mention that they "have conducted the analysis using either indications of generic entry to show conservatively that even if the producer is a branded

- (41) Moreover, to the extent that there are situations in which entry from R&D suppliers is reported as “generic entry” by the Parties while no generic entry from generic suppliers occurred, the Parties’ analyses will overstate the effect of generic suppliers as soon as a decrease in price occurred around the time of entry by R&D supplier, as the Parties would falsely associate that price decrease to the entry of and competition from a generic product.⁵¹
- (42) As a consequence, any effect identified by the Submissions in relation to the competitive constraint brought by the introduction of generic products is likely to be overestimated.
- (43) Third, [...] reports transaction data for [...] only after its patent expiry. This does not allow to observing the evolution of [...] sales in periods surrounding patent expiry, as only transactions occurring after its patent expiry are reported.
- (44) Fourth, the Parties compute the price of an active ingredient in a formulated product by assuming that any changes in price in the formulated product impacts the price of the active ingredient in this formulated product in proportion of its volume in the formulated product.
- (45) For example, assuming that a formulated product is composed of two active ingredients, AI1 for 25% of its volume and AI2 for 75% of its volume, and that this formulated product is sold at EUR 100 per kilogram in a given transaction, then the price related to AI1 would be computed as $25\% * 100 = \text{EUR } 25$ per kilogram. Should another transaction of this same formulated product be priced at EUR 120 per kilogram, then the price related to AI1 would be computed as $25\% * 120 = \text{EUR } 30$ per kilogram. Such change would amount to a 20% increase in the price of the active ingredient AI1, even though, in reality, the price increase of the formulated product might be, for example, the exclusive consequence of a change in price of the active ingredient AI2.
- (46) In other words, one consequence of this assumption is that the computation of prices of a given active ingredient in a formulated product does not guarantee to represent the specific value this active ingredient generates in the formulated product.
- (47) The computation of the price of each active ingredient of a formulated product requires to make such type of assumption as the data provided by the Parties display volumes and revenues, thus prices, related to the sales of formulated products as well as their composition, but they do not provide any detail on the contribution of each active ingredient in the final price of the formulated products. The Commission follows the assumption proposed by the Parties.
- (48) Fifth, the Submissions do not attempt to control for the heterogeneity of the data that could be caused, for example, by [...] change in cost structure,⁵² market trends, country characteristics or product characteristics. On the contrary, the Submissions are based on description of graphical evolution over time of volume, price and margin, in light of market events such as patent expiry and “generic entry”. No attempt is made to evaluate the possible statistical relationship between the

manufacturer supplying a genericised version of the product, [...] is still constrained”. No other details are provided.

⁵¹ This example addresses the Parties’ claim, in their Submission #4, section A.2, page 29, that “[t]here is no basis for concluding that [the definition used to identify generic entry in our previous analyses] overstates the effect of generic suppliers”.

⁵² See Section [...] of the present Decision [...].

evolutions of these parameters, nor to estimate and test such causality claims through, for example, a thorough econometric analysis.⁵³

(49) In their Submission #4, the Parties claim that “*the SO’s claims ignore the fact that the [...] paper put forward evidence based on margins, and conclusively showed that margin trends exhibited similar trends to the price trends. In other words, our previous submissions have already shown that the large decrease in price of products that are subject to generic entry is not caused by decreases in the costs of those products.*”⁵⁴

(50) Nevertheless, this does not address the main point of the Commission which is that the data report products which are very heterogeneous, at the very least in terms of usage (different mixtures may have different usages) and market conditions (each country being a specific relevant geographic market). For example, the margin of a *specific* formulated product in a *specific* geographic market can decrease because of a price decrease by its supplier, in reaction to price constraint from other products in this geographic area; because of an increase in cost of its supplier, possibly unrelated to the market conditions attached to the formulated product; or because of a shift in demand in the relevant product and geographic market. While all these elements, among others, are relevant for the analysis of the evolution of the products price and margin, the Parties restrict their analyses to identifying whether such price/margin changes are timely related to patent expiry and/or “generic entry”, and *de facto* restrict themselves from understanding whether such price/margin changes are not in fact related to or caused by other factors.

4.1.2. *The Parties’ analyses exclude or dismiss products which do not fit their conclusions without proper justifications*

(51) In their Submissions on generics, the Parties exclude various types of products from their analysis but do not provide convincing justifications for such exclusion. The Commission notes that one common characteristics of these products is that the evolution of their price/margin do not fit the conclusions the Parties wish to demonstrate.

4.1.2.1. [...] mixtures with “new AIs”

(52) In their Submission #4, the Parties distinguish “[m]ixtures of newly developed AIs and existing AIs” from “[m]ixtures of existing AIs only [for which s]ome of the mixture partners may still be patent-protected at the time the mixture is introduced.”⁵⁵

(53) The Parties do not define more precisely these classifications but further state that “[w]ithin the context of [...], relevant examples [of mixtures with new AIs] include [...] (introduced in [...] on the basis of the then new [...] AI) and [...] (introduced in [...] on the basis of the then new [...] AI)”,⁵⁶ and relevant examples of mixtures with existing AIs would “include [...] and [...].”⁵⁷

(54) According to the Parties, “[i]mportantly, any generic competition relating to non-patented AIs in mixtures involving newly developed AIs should not be expected to have a significant impact on prices of that mixture. This applies in particular if the

⁵³ The Parties do not address this point in their response to the Statement of Objections.

⁵⁴ Submission #4, section A.3.

⁵⁵ Submission #4, pages 6-7.

⁵⁶ Submission #4, pages 6-7.

⁵⁷ Submission #4, pages 7.

*mixture including the new AI is significantly differentiated from existing products on the market, and if the newly developed AI is not also sold in a straight version. Newly developed AIs are the result of extensive and costly R&D efforts and receive patent protection precisely in order to prevent competitors from free-riding on these efforts. This applies regardless of whether the newly developed AI is sold straight or in mixtures. Newly developed AIs represent an innovation response to the threat of generic entry, not a price response.*⁵⁸

- (55) The Parties then show that “the price indices for those [...] products containing newly-introduced AIs (or other AIs that were not subject to generic entry) show no price declines.”⁵⁹
- (56) The Commission understands the argument of the Parties to be related to the fact that (i) “new AIs” are patent-protected on their own, while “existing AIs” could be off-patent, and that (ii) patent-protection plays a significant role in immunizing products from competition.
- (57) The Commission notes that [...] mixtures based upon [...], developed either with newly developed active ingredients or with existing active ingredients, are all patent protected⁶⁰ and, therefore, benefit from patent protection, as do new active ingredients themselves.
- (58) Therefore, *on the basis of the argument provided by the Parties*, no distinction can be made between mixtures with “new AIs” and mixtures with “existing AIs”. This being said, the Commission reiterates that the Submissions on generics suffer from important limitations, in particular, as discussed in Section 4.1.1, from the fact that the Submissions do not attempt to control for the heterogeneity of the data.

4.1.2.2. [...] mixtures with “existing AI” [...]

- (59) According to the Parties, “[...] *mixture appears to be a special case - the vast majority ([...]) of sales of [...] were not subject to generic entry until [...] or [...] ([...]). As such, we would not necessarily expect to see a decline in the (EEA-level) price of [...] mixtures either, at least prior to the date generic entry occurred.*”⁶¹
- (60) The Commission notes that the Parties did not provide any justification why “generic entry” occurred late for these mixtures, whereas, according to its conclusions, the anticipation of generic entry should have had a constraining effect on the price and margin of these products, which the Commission notes that it did not have.⁶²

4.1.2.3. [...] mixtures with “existing AIs” other than [...] or [...]

- (61) According to the Parties, “*although the prices for other off-patent mixtures increase around the time of patent-expiry, as shown in Figure 1 above [reproduced in this Annex as Figure 10], these mixtures had [...] sales until [...] (typically around [...] % of [...] overall [...] sales) and therefore are not representative of the overall competitive constraint imposed by generic entry.*”⁶³
- (62) In other words, the Parties’ conclusions do not hold for these mixtures but the volume effect is deemed not to be significant enough to alter the Parties’ claims.

⁵⁸ Submission #4, pages 7-8.

⁵⁹ Submission #4, page 10.

⁶⁰ Parties’ response to Commission’s requests for information RFI 13, questions 11-12 (ID3653).

⁶¹ Submission #4, page 9. See also Submission #3, section 2.2.2 and figure 7.

⁶² See Section 4.9 for further elements.

⁶³ Submission #4, page 10.

(63) The Commission notes that the Parties' argumentation on the competitive pressure from generics does not incorporate any element related to volumes and that, indeed, the Parties' conclusions do not hold for these mixtures.

4.1.3. The Parties' computations of price indexes are not consistent across their Submissions

(64) Section 3.1 explains the two different computation methodologies followed by the Parties in their Submissions: for the production of the price index for straight products from [...] onwards,⁶⁴ the Parties have excluded countries in which no straight [...] or straight [...] was sold in [...]; for the production of the price index for [...] mixtures from [...] onwards,⁶⁵ the Parties have averaged product-country-specific price indexes.

(65) Whenever the Commission refers to "the Parties' computational methodology", it refers to the second methodology, used for [...] mixtures, but from [...] onwards.

4.2. Product types (straight product, mixtures) and national markets are key differentiators for the assessment

(66) The data show that the notion of, for example, "[...]" encompasses in fact many different products: on the one hand, [...] straight and, on the other hand, several mixtures containing [...] along with other active ingredients. These mixtures can themselves be of different nature: some mixtures contain other patented active ingredients (and are therefore patent protected), some contain off-patented active ingredients but would then typically be themselves patented.⁶⁶

(67) Figure 1 shows the evolution of [...] sales of [...] products in the EEA.⁶⁷ Note that, as [...] has few mixtures, they are displayed individually. In Figure 1, the dynamic of straight products and of its mixtures differ, even at EEA level. Sales value decreases over time for the straight [...], while mixtures are introduced at different points in time, with different types of evolutions: [...] mixtures are present throughout [...] and achieve relatively limited and stable sales value in particular after [...]; [...] are also present throughout the period but their sales value increases [...] and then remains stable during [...] when it decreases; and [...] mixtures are introduced in [...] and, since then, their sales have increased.

(68) In other words, straight products and mixtures seem to have different dynamics and these dynamics seem to be also different between mixtures based upon the same active ingredient: they have different years of introduction and exhibit different evolution of sales over time.⁶⁸

(69) As a consequence, any interpretation of aggregated measures (for example sales value, volume, price index) should factor in that some of the characteristics of these aggregated measures might in fact be due to the aggregation of elements which have different evolutions over time, possibly driven by different forces.

⁶⁴ Submission #1, slide 9.

⁶⁵ Submission #2, slide 7.

⁶⁶ Parties' response to Commission's requests for information RFI 13, questions 11-12 (ID3653).

⁶⁷ The sales values are not inflation-adjusted.

⁶⁸ Identical observations can be made for [...]. See Figure 11 in Section 4.7.

Figure 1 – Evolution of [...] sales of [...] products in the EEA ([...], in value)

[...]

Source: Commission's analysis of the Submissions on generics

Note: Local currencies are converted into euros using the European Central Bank annual exchange rates
Sales values are not inflation-adjusted

- (70) The data also show that there are significant variations across countries. This is consistent with the findings that the downstream markets for finished formulated products are national in their geographic scope.⁶⁹ For example, the introduction of generic products varied across countries despite identical patent expiry across the EEA, in [...]: generic entry is reported to have occurred in [...] in [...] and in [...] in [...]. The number of mixtures present in each market also varied across markets: in [...], [...] supplied [...] different products containing [...] in [...] and [...] in [...].
- (71) The data eventually show that, for each of [...] and [...] products, the size of the national markets vary significantly. Table 2 presents the importance of each national market with respect to [...] sales of [...] as well as of [...]. The importance is measured in terms of [...] sales value in [...] as well as in terms of the average of [...] sales value over [...]. More precisely, the importance is calculated by summing [...] sales (in EUR) for each country in [...], and over [...] with average sales being calculated over the selling years.⁷⁰
- (72) The most important markets for [...] sales of [...] appear to be [...], accounting collectively for approximately [...] % of the average sales in the EEA over [...]. As regards [...], the most important markets for [...] sales appear to be [...], representing collectively [...] % of the average sales in the EEA over [...].

Table 2 – [...] sales of [...] and [...] products by country ([...] and [...] average, in value)

[...]

Source: Commission's analysis of the Submissions on generics

Note: Local currencies are converted into euros using the European Central Bank annual exchange rates
Sales values are not inflation-adjusted

- (73) As a consequence, any assessment of the competitive constraints brought by generics on [...] products has to assess separately the impact on the straight product and on the various mixtures, and to factor in relevant country specific characteristics.

4.3. Methodology followed by the Commission

- (74) The Commission uses the data submitted by the Parties in support of their Submissions on generics, in order to test the claims made by the Parties. In light of the factual elements discussed in Section 4.2, in particular the existence of strong composition effect between countries and within each country, the Commission will tend to combine an EEA-wide approach with a country specific approach, separating straight products from mixtures.
- (75) In doing so, the Commission uses several measures: prices and price indexes, margins and Lerner indexes.

⁶⁹ Section [...] of the present Decision [...].

⁷⁰ The sales values are not inflation-adjusted.

4.3.1. *Evolution of price indexes and change in products prices*

- (76) The evolution of prices can be first explored through EEA-wide price indexes. The Commission uses two types of price indexes: one “customer-oriented” price index, which mimics the Parties’ computational methodology of price indexes, and one “supplier-oriented” price index, which is explained below.
- (77) The “customer-oriented” price index can be interpreted as an average price change as experienced by the customers. The underlying price indexes are product-country-specific therefore reflecting the price changes experienced by customers. By averaging these product-country-specific price changes, the EEA-wide index provides an average of these price changes.
- (78) From the perspective of the suppliers, the revenues generated by an active ingredient are collected on a price per kilogram basis, irrespectively of the product in which the active ingredient is embedded. An alternative price index could be computed by averaging the price per kilogram of each active ingredient,⁷¹ across all products containing this active ingredient sold in a given year in the EEA, weighting the price per kilogram of an active ingredient related to a product by the volume of this active ingredient in this product. The picture that emerges from this “supplier-oriented” price index is quite different from the one provided by the “customer-oriented” price index, as shown in Section 4.8.1.
- (79) In their Submission #4, the Parties claim that *“the ‘supplier-oriented’ prices combine the sales for all mixtures in which a given AI is used, thereby incorrectly attributing all revenues associated with a mixture to the AI for which the ‘supplier-oriented’ price is being calculated. Any true ‘supplier-oriented’ price should account only for the specific value generated by that specific AI.”*
- (80) The Commission recalls that the “supplier-oriented” price index weights the price per kilogram of an active ingredient by the volume of this active ingredient in this product. It therefore embodies only its “volume share” of the changes in prices of the formulated products. Nevertheless, as indicated in Section 4.1.1, the Commission recognizes that the “supplier-oriented” price index suffers from the same shortcomings as all other indexes in these analyses, in particular those developed by the Parties. Therefore, the Parties cannot use this argument to dismiss the “supplier-oriented” price index without acknowledging that their own analysis suffers from the exact same shortcomings.
- (81) From a methodological point of view, the Commission also recognizes, in particular in Section 4.2, that statistics created over several products suffer from strong composition effects, that is that statistics created over several countries, and even within one single country, provide a description of the situation which does not account for the diversity of dynamics between products in a given country, as well as for the diversity of dynamics between countries.
- (82) In order to provide a better view at country level, the Commission distinguishes between straight products and mixtures and computes, for each country, whether the average price of [...] and [...] products (straight or mixtures) changed before and after generic entry.⁷²

⁷¹ For that purpose, all prices are expressed in euros. See footnote 14.

⁷² The Commission notes that, despite the fact that these methodological elements were spelled out in the Statement of Objections, the Parties’ response to the Statement of Objection, in particular their

(83) More precisely, the changes in average price are constructed in the following manner.⁷³ A timespan of eight years is defined around the year of generic entry: four years before generic entry and four years after generic entry. The year of generic entry, in the middle of this time span, is not included in the computations described below.⁷⁴ For each country, products are allocated into the categories described in Figure 2 for [...], and in Figure 1 for [...]. Then, a yearly category-specific price is created for each category and for each year in the timespan (when available) by averaging all prices of all products belonging to that category in a given year, using sales value of each product on this given year as weights for the average.⁷⁵ The pre-entry category-specific price is then constructed by averaging the four yearly category-specific prices, computed before generic entry. A post-entry category-specific price is also constructed by averaging the four yearly category-specific prices, computed after generic entry. The category-specific price changes are then generated for each category as the difference between the post-entry category-specific price and the pre-entry category-specific price. Eventually, the changes in price result from weighting the category-specific price changes across all categories, using as weights the total sales value of each category over the entire timespan.⁷⁶

4.3.2. *Change in products margins and changes in products Lerner indexes*

(84) Margins (in value) typically reflect the absolute contribution of a product to the profits of its supplier. Changes in margin levels can be related to many factors, for example market structure (for example, a margin decrease can be related to a decrease in price triggered by the entry of an aggressive competitor), result from a demand shift (the price and production being then adjusted to response to this external factor) or be the consequence of changes in the supplier's cost structure (in that case, irrespective of the change in price, the margin can increase because the associated variable cost has decreased).

(85) While the evolution of margins provides some elements of understanding of the suppliers' strategy, it can be complemented by the Lerner index ("LI"). The Lerner index amounts to the mark-up of price p over marginal cost mc associated to a product, that is the *margin*, expressed a percentage of the price. The Lerner index is therefore also referred to as the "relative margin" (to the price). For a given firm i selling a product j , the Lerner index can be written as:

$$LI_{ij} = \frac{p_{ij} - mc_{ij}}{p_{ij}} = \frac{\text{margin}_{ij}}{p_{ij}}$$

Submission #4, does not address them. Moreover, the Parties' analysis continues to aggregate countries and even, sometimes, straight and several mixtures (for example in Submission #4, figure 4).

⁷³ The prices are not inflation-adjusted.

⁷⁴ Such time span was taken so as to mitigate possible anticipations and lags in [...] reactions to generic entry, as well as to mitigate any other effects that could have taken place punctually before or after generic entry.

⁷⁵ Categories with observations only before or only after generic entry are excluded in the analysis. Note that a product with sales only before or only after generic entry will be taken into account in its category. Countries with no category present before and after generic entry are also excluded from the analysis.

⁷⁶ Another interesting exercise would have been to compute such change before patent expiry and after generic entry. Unfortunately, no data is available before patent expiry for [...]. For [...], as generic entry occurred most often several years avec patent expiry, there are not enough data points after generic entry for most of the countries.

- (86) The Lerner index reflects the magnitude of the margin reached on a given product, expressed as a share of its price, and should range from 0% (in a hypothetical purely competitive market with no fixed costs) to 100%. A high level Lerner index means that the supplier manages to extract high margins from its sales.
- (87) Changes in Lerner index are meant to reflect changes in market power of a supplier.⁷⁷ Therefore, when assessing the effect of a market event on a supplier's market power or relative margins, the Commission computes the Lerner index before and after generic entry and assesses the magnitude of the change.⁷⁸
- (88) More precisely, the changes in Lerner indexes are constructed in the following manner. A timespan of eight years is defined around the year of generic entry: four years before generic entry and four years after generic entry. The year of generic entry, in the middle of this time span, is not included in the computations described below.⁷⁹ For each country, the products of interest (straight or mixtures) of each active ingredient are grouped together in a category. Then, a yearly category-specific Lerner index is created for these categories and for each year in the timespan (when available).⁸⁰ A pre-entry Lerner index is then constructed by averaging the four yearly category-specific Lerner indexes, computed before generic entry.⁸¹ A post-entry Lerner index is also constructed by averaging the four yearly category-specific Lerner indexes, computed after generic entry. The change in Lerner index is the difference, in percentage points, between the post-entry Lerner index and the pre-entry Lerner index.
- (89) Whenever the Lerner index already reaches a high level before the market event, a limited decrease could be related, for example, to the fact that the marginal cost is of a limited magnitude compared to the price. In particular, a change in price of a significant but not drastic nature could have a limited influence on the Lerner index. For example, a Lerner index of 90% would decrease by only 1.1 percentage points to 88.9% if the price was to change by 10%, keeping the cost constant.
- (90) Nevertheless, the limited change in Lerner index could also be related to a simultaneous decrease in price and in marginal cost around the market event of interest. Indeed, if the price and the variable cost decrease by the same ratio, the Lerner index remains constant.

⁷⁷ See, for example, Tirole (1998), *The theory of industrial organization*, MIT press, section 1.1, page 66.

⁷⁸ The Commission performs the change in Lerner index around generic entry as it can perform this exercise for both active ingredients. Because of data limitations, a similar exercise around patent expiry cannot be performed for [...]. Another interesting exercise would have been to compute such change before patent expiry and after generic entry. Unfortunately, no data is available before patent expiry for [...]. For [...], as generic entry occurred most often several years after patent expiry, there are not enough data points after generic entry for most of the countries

⁷⁹ Such time span was taken so as to mitigate possible anticipations and lags in [...] reactions to generic entry, as well as to mitigate any other effects that could have taken place punctually before or after generic entry.

⁸⁰ Categories with observations only before or only after generic entry are excluded in the analysis. Note that a product with sales only before or only after generic entry will be taken into account in its category. Countries with no category present before and after generic entry are also excluded from the analysis.

⁸¹ The prices and the margins are not inflation-adjusted.

4.4. “Generic entry” often occurred many years after patent expiry

- (91) Irrespective of the shortcomings of the data submitted by the Parties, notably the fact that branded manufacturers are often reported to be generic suppliers,⁸² the data show that patent expiry of each of [...] and [...] did not readily trigger introduction of generic products.
- (92) Table 3 displays, for each country and each of [...] and [...], the number of years between patent expiry and “generic entry” (as reported by the Parties).
- (93) This analysis provides several insights. First, there is a wide difference across products and countries, ranging from 0 to 12, calling for country specificities to play an important role in explaining such differences.
- (94) Second, this heterogeneity is not only driven by the size of the markets. For example, generic entry occurred [...] of patent expiry of [...] in [...] and [...] after in [...], but [...] after in [...] and [...] after in [...]. As regards [...], generic entry occurred [...] after patent expiry in [...], but [...] after in [...], [...] after in [...], [...] after in [...] and [...] after in [...].

Table 3 – Duration between patent expiry and generic entry (in years)

[...]

Source: Commission’s analysis of the Submissions on generics

- (95) Consequently, the Commission concludes that patent expiry did not readily trigger generic entry in a significant number of EEA countries in the case of [...] and [...] products and, thus, that, in those cases, branded manufacturers did not suffer competitive pressure from the introduction of generic products for several years after patent expiry.

4.5. Straight products had a limited importance, in value, which further decreased over time

- (96) Figure 2 shows the evolution of [...] sales of products containing [...] in [...], on a yearly basis between [...] and [...].⁸³ The expiry of [...] patent occurred in [...], and generic entry is reported to have occurred in [...] and in [...]. The products are classified in two categories: on the one hand, straight [...] and, on the other hand, various [...] mixtures. Amongst these mixtures, two have been isolated: [...] mixtures, emphasised by the Parties, and [...] mixtures.
- (97) The figure shows that [...]. In [...], patented mixtures accounted for at least [...] % of the sales.

Figure 2 – Evolution of [...] sales of [...] products in [...] ([...], in value)

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Sales values are not inflation-adjusted

⁸² See Section 4.1.

⁸³ The sales values are not inflation-adjusted.

- (98) The same pattern can be observed for [...] in [...], as shown in Figure 3.⁸⁴ In [...], patent expiry occurred in [...] and generic entry is reported to have occurred in [...] ([...]) and in [...] ([...]).

Figure 3 – Evolution of [...] sales of [...] products in [...] ([...], in value)

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Sales values are not inflation-adjusted

- (99) Table 4 shows that this trend is common across EEA countries and both active ingredients. It reports, for each country and for each active ingredient, the percentage of sales of straight products, with respect to total sales of products based upon this active ingredients, in the first year of appearance of the straight product in the data (the straight product is not supplied in all EEA countries in [...]) as well as in [...]. The instances in which this share remains constant, [...] for [...].⁸⁵

Table 4 – Evolution of the share of [...] sales of straight active ingredient in proportion of [...] overall sales of products containing this active ingredient ([...], in value)

[...]

Source: Commission’s analysis of the Submissions on generics

- (100) In their Submission #1, the Parties argue that [...] of [...] sales of [...] (respectively [...]) in the EEA were affected by generic entry. The Commission notes that these figures concern only the sales of straight products [...]. As a consequence, the relevance of Submission #1, which focused on straight products, is limited.

4.6. Effect of the introduction of generic products on the price and margins of straight products

4.6.1. *At EEA level, the introduction of generic products does not seem to have an effect on the price of straight [...] and of straight [...]*

4.6.1.1. EEA-level “customer-oriented” price index, using local currencies

- (101) Notwithstanding the fact that (i) the importance of the straight product for [...] and [...] is limited and decreasing over the period [...],⁸⁶ and (ii) significant variations occur amongst countries,⁸⁷ Figure 4 and Figure 5 provide a first view on the overall evolution of a “consumer-oriented” price index summarizing the price of the straight products in the EEA, using the Parties’ computation methodology described in Section 4.1.2.⁸⁸

⁸⁴ The sales values are not inflation-adjusted.

⁸⁵ In their Submissions on generics, the Parties mention that formulated products containing only the active ingredients [...] and/or [...] account for [...] % of [...] sales (see Form CO, [...]). However, the Commission notes that, in [...], formulated products containing only [...] and/or [...] accounted for [...] % of [...] sales. Based on Phillips McDougall report, Phillips McDougall Product Directory 2013 Market (see Parties’ response to Commission’s request for information RFI 1, question 17), the following active ingredients are understood to be used as primary active ingredients for [...]. Among those sales, the sales of straight [...] and straight [...] account for [...] %.

⁸⁶ See Section 4.5.

⁸⁷ See Section 4.1.2.

⁸⁸ The price index has been computed following the methodology used in the Submissions on generics, and the prices are not inflation-adjusted. This has been done without prejudice to an assessment by the Commission of the relevance of the methodology developed by the Parties.

Figure 4 – Evolution of the price of [...] products in the EEA ([...], “consumer-oriented” price index following the Parties’ computation methodology)

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Prices are not inflation-adjusted

Figure 5 – Evolution of the price of [...] products in the EEA ([...], “consumer-oriented” price index following the Parties’ computation methodology)

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Prices are not inflation-adjusted

- (102) The “consumer-oriented” price index of the straight [...] remained in a corridor between [...] % and [...] % up to the patent expiry, in [...], when it experienced a decrease of close to [...] percentage points. Then it remained in a corridor between [...] % and [...] % until [...], after which it decreased by [...] percentage points to around [...] %.⁸⁹ Nevertheless, the price index decrease in [...] seems unrelated to generic entry, as the most important markets for [...] did not experience such “generic entry” before [...], when [...] entered in [...].
- (103) As regards the straight [...], the price index remained in a corridor between approximately [...] % and [...] % between [...] and [...] even though important markets are reported to have experienced generic entry, in particular [...] (in [...]) and [...] (in [...]). After [...] the price index decreased to around [...] % in [...] and, after, evolved in a corridor between [...] % and [...] %. Nevertheless, the Parties report that generic entry occurred several years before [...], when the price index of [...] decreased substantially ([...] in [...], [...] in [...], [...] in [...] and in [...]).
- (104) At an EEA level, the evolution of the price of both straight products show that changes in price of the straight products do not seem to occur at the same time as, or even a few years after, generic entry.

4.6.1.2. The Parties’ criticism related to the importance of [...]

- (105) The Parties have argued that “*the price index as calculated by the Commission is disproportionately impacted by the price of one mixture, [...], that is primarily sold [...].*”⁹⁰
- (106) From a methodological point of view, the Commission recognizes, in particular in Section 4.2, that statistics created over several products suffer from strong composition effect, that is that statistics created over several products, even within one single country, provide a description of the situation which does not account for the diversity of dynamics between products in a given country, as well as for the diversity of dynamics between countries.
- (107) For this exact same reason, the Parties cannot claim that some countries need to be excluded from the computation of the price index, without providing convincing

⁸⁹ The overall decrease of around [...] % is less pronounced than in the Parties’ analysis (see Submission #1, slide 9), which shows a decrease of [...] % of the price index for straight [...]. This difference is caused by the limited number of countries included in the Parties’ analysis: only [...] countries are included to construct the price index, while the Commission considers, for each year, all EEA countries in which straight [...] has been sold during [...] consecutive years.

⁹⁰ Submission #3, section 2.2.2 and figure 7.

evidence that the remaining countries all share the same market conditions and therefore can be meaningfully included in the same price index. This is also the reason why the Commission performs both exercises: at an EEA-wide level as well as at a country level.

4.6.2. *At country level, the introduction of generic products does not seem to have a systematic and significant effect on [...]’s relative margin related to straight [...] and straight [...]*

(108) Moving away from aggregated prices, Figure 6 and Figure 7 provide a first view on the possible effects related to the introduction of generic products by showing the evolution, in [...], of (i) [...]’s margin related to sales of straight [...], and (ii) [...]’s Lerner index related to the sales of straight [...], that is the ratio between [...]’s margin and [...]’s price of straight [...].⁹¹

(109) In the examples of [...] in [...], [...]’s margin related to straight [...] did decrease, [...], but the Lerner index remained stable over time, suggesting that neither patent expiry nor the introduction of generic products had any impact on [...]’s margin related to straight [...].

Figure 6 – Evolution of [...]’s margin and [...]’s Lerner index of straight [...] in [...]
([...])

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Prices and margins are not inflation-adjusted

Figure 7 – Evolution of [...]’s margin and [...]’s Lerner index of straight [...] in [...]
([...])

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Prices and margins are not inflation-adjusted

(110) In order to provide some guidance as to whether other markets than [...] also experienced similar patterns, that is if [...] managed to maintain its margin around generic entry, the Commission computed change in Lerner indexes before and after generic entry in each country. Table 5 and Table 6 display changes in, respectively, price and Lerner index related to generic entry, for each country, ranking these changes downwards. Note that some countries are not listed, typically because of the lack of sales data.

Table 5 – Change between [...]’s average price of straight [...] and straight [...] computed over four years before generic entry and four years after generic entry

[...]

Source: Commission’s analysis of the Submissions on generics

*Note: Local currencies are converted into euros using the European Central Bank annual exchange rates
Prices are not inflation-adjusted*

⁹¹ The prices and the margins are not inflation-adjusted.

Table 6 – Change between [...]’s average Lerner indexes for straight products computed over four years before generic entry and four years after generic entry

[...] ⁹²

Source: Commission’s analysis of the Submissions on generics

Note: [...]

Prices and margins are not inflation-adjusted

(111) Overall, [...]’s average price of straight [...] and straight [...] experienced [...] price decreases at EEA-level. Nevertheless, [...] managed to maintain its relative margin at [...] levels: for straight [...], above [...] % in all reported countries and at [...] % at EEA-level; for straight [...], above [...] % in [...] out of [...] reported countries and at [...] % at EEA-level. This is in line with [...]’s internal documents [...]. ^{93,94}

(112) In conclusion, the Commission is of the view that even though [...]’s price of straight [...] and [...] have evolved downwards over time at EEA level, in many countries, including important markets like [...], [...] maintained [...] relative margins for its straight [...] and its straight [...].

4.7. Mixtures have been introduced in great numbers and had significant impact on sales

(113) The data submitted by the Parties show that [...].

Figure 8 – Number of mixtures with [...] and [...] introduced by [...] over [...]

[...]

Source: Commission’s analysis of the Submissions on generics

(114) Notwithstanding the sheer number of mixtures introduced, the impact of these introductions in terms of sales is also significant and mixtures represent more than [...] % of the sales value of each of [...].

(115) For [...], Figure 9 shows that, at the EEA level, the sales of [...] mixtures have [...] increased over time, both in absolute value and as a share of the sales value of [...] products, and that mixtures amount to more than [...] % of the sales value in [...]. ⁹⁵ While some mixtures have been sold for years before [...] patent expiry, others have been introduced around that period. ⁹⁶ These later mixtures mostly combine [...] with other patented active ingredients and their share of the sales of [...] products [...]. In addition, a number of mixtures with off-patent active ingredients still benefits from patent protection.

(116) For [...], the data available do not allow to track the introduction of mixtures before its patent expiry but Figure 1 shows that, at EEA level, mixtures, which all benefit from a certain level of patent protection, represent a significant share of the sales of [...] products, and that this share has increased over time from around [...] % in [...] to around [...] % in [...].

⁹² The decrease is mainly driven by the changes in [...].

⁹³ For example, [...] (ID3987-117), slide 22, [...].

⁹⁴ The Commission also notes that the limited change in Lerner index could also be caused by a decrease in price and in marginal cost, in particular for straight [...] which experienced a [...]. See [...] (ID3987-117), slide 7, which mentions that [...].

⁹⁵ The sales values are not inflation-adjusted.

⁹⁶ [...]. See [...] (ID6082-62).

Figure 9 – Evolution of [...]’s sales of [...] products in the EEA ([...], in value)

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Local currencies are converted into euros using the European Central Bank annual exchange rates
Sales values are not inflation-adjusted

(117) The same pattern can be observed for each EEA country. Table 4 shows that the sales of straight [...] represent a [...] share of the sales value of [...] products [...] in [...]. As regards [...], the same situation occurs. The share of straight [...] in [...] is [...] in its [...] most important markets ([...]) and [...] in the other important ones ([...]).

4.8. Effect of the introduction of generic products on the price and margins of mixtures

4.8.1. *At EEA level, the introduction of generic products does not seem to have an effect on the price of [...] mixtures and of [...] mixtures*

4.8.1.1. EEA-level “customer-oriented” price index, using local currencies

(118) Notwithstanding the fact that significant variations occur amongst countries,⁹⁷ Figure 4 and Figure 5 provide a first view on the overall evolution of a “customer-oriented” price index summarizing the price of mixtures in the EEA.⁹⁸

(119) The “customer-oriented” price index of [...] mixtures does not exhibit any [...] decrease over the period [...], during which it remains between [...]% and [...]%. While the price index lost around [...] percentage points when [...] patent expired in most EEA countries ([...]), it further gained [...] percentage points in [...], at a time when [...] lost patent protection in its [...] most important markets, [...]. Therefore, the Parties’ claim that mixtures also experienced [...] price drops as a result of the competitive constraint brought by the introduction of generic products does not seem to hold at EEA level.

(120) As regards [...] mixtures, their “customer-oriented” price index remained fairly constant [...]. Nevertheless, the Parties report that generic entry occurred several years before [...], when the price index decreased [...]. Therefore, here also, the Parties’ claim that mixtures also experience significant price drops as a result of the competitive constraint brought by the introduction of generic products does not seem to hold at EEA level.

(121) In their Submission #4,⁹⁹ the Parties distinguish “[m]ixtures of newly developed AIs and existing AIs” ([...] and [...]) from “[m]ixtures of existing AIs only [for which s]ome of the mixture partners may still be patent-protected at the time the mixture is introduced” (including [...] and [...]), and produce a figure reproduced in Figure 10.

(122) Figure 10 shows that the price index of [...] mixtures, as computed by the Parties, (i) decreased [...] as of [...], much before [...] patent expiry, casting doubts on any relationships between the two events, and (ii) increased after [...] patent expiry.

(123) Moreover, the price index of [...] mixtures, as computed by the Parties, [...].

⁹⁷ See Section 4.1.2.

⁹⁸ The price index has been computed following the methodology used in the Submissions on generics. This has been done without prejudice to an assessment by the Commission of the relevance of methodology.

⁹⁹ Submission #4, pages 6-7.

- (124) Finally, the price index of [...] “mixtures with other AIs”, as computed by the Parties, increased [...] by [...] percentage points at the time of [...] patent expiry.
- (125) The Parties’ analysis clearly shows that none of the groups of [...] mixtures behave as claimed by the Parties, that is that [...] and [...] price index decreases occurred around patent expiry or subsequent generic entry.

Figure 10 – Evolution of the price of [...] products in the EEA, as reported by the Parties ([...])

[...]

Source: Submission #4, Figure 2

- (126) The Parties also claim that “*the SO’s inclusion of these products [namely mixtures which include a newly introduced AI] in their assessment of the impact of generic entry on the price of mixtures biases their analysis to finding no effect of generic entry.*”¹⁰⁰ Nevertheless, as explained in Section 4.1.2, the Parties seem to differentiate these two groups of mixtures on the basis of their relative patent protection while, in fact, all mixtures in the analysis are patent protected and, on that basis, cannot be differentiated.
- (127) Overall, the evolution of prices of mixtures for each of [...] active ingredients does not seem to be consistent with the Parties’ claim that generic entry constrained the prices of these mixtures.

4.8.1.2. EEA-level “supplier-oriented” price index, expressed in euros

- (128) As discussed in Section 4.1.2, the Commission also suggests complementing this assessment by a “supplier-oriented” price index. Figure 11 and Figure 12 exhibit the overall evolution of this “supplier-oriented” price index at EEA level.¹⁰¹

Figure 11 – Evolution of the price of [...] products in the EEA ([...], “supplier-oriented” price index)

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Local currencies are converted into euros using the European Central Bank annual exchange rates
Prices are not inflation-adjusted

Figure 12 – Evolution of the price of [...] products in the EEA ([...], “supplier-oriented” price index)

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Local currencies are converted into euros using the European Central Bank annual exchange rates
Prices are not inflation-adjusted

- (129) The “supplier-oriented” price index of [...] mixtures shows a [...] increase between [...], where it reaches approximately [...].% After the patent expiry of [...] in most EEA countries, in [...], the price index increased by close to [...] percentage points, and continued to [...] increase up to [...].% in [...], at which stage it [...] increased to reach around [...].% in [...].

¹⁰⁰ Submission #4, section 2.2.1, page 11.

¹⁰¹ The prices are not inflation-adjusted.

- (130) The “supplier-oriented” price index of [...] mixtures shows also an increasing pattern [...] as of [...]. In [...], it reaches close to [...]%, and then remains in a corridor between [...]% and [...]%. In this period, it lost around [...] percentage points between [...] and [...], and regained them [...] between [...] and [...].
- (131) Overall, the pictures that emerges from these “supplier-oriented” price indexes is that the average price of mixtures has increased [...] over time, and seem to have experienced little changes that could be timely related to patent expiry or generic entry.
- 4.8.2. *At country level, the introduction of generic products does not seem to have a systematic effect on the price of [...] mixtures and of [...] mixtures*
- 4.8.2.1. The example of [...]
- (132) At each country level, the dynamics seem to differ across mixtures. For example, in [...], the price of [...] mixtures (isolated by the Parties – see dedicated Section 4.9) decreased in [...] but it did not change when [...] lost its patent protection in [...] in [...] (see Figure 13). On the other hand, other patented mixtures introduced few years before [...] patent expiry had a price increase trend which was punctually stopped in [...] and recovered its previous increase trajectory as of [...]. Eventually, the price of other mixtures increased [...] in 2012. Cumulating each of these effects, the price of all [...] mixtures increased in [...] during the period surrounding [...] patent expiry in [...].¹⁰²
- (133) In their Submission #4, the Parties argue that “*the Commission’s analysis shows that prices [in [...]] of the [...] mixture (Figure 14 in Annex 2 to the SO) [...] declined in the period between the patent expiry dates of each of [...] and [...] [as] the SO’s argument fails to take account of the fact that [...] patent protection already expired in the year [...] and that farmers have the possibility to tank-mix [...].*”¹⁰³ The Commission notes that, while the patent protection of [...] expired in [...], the [...] mixtures were introduced several years after, in [...]. The price index of [...] mixtures in [...] experiences a decrease between [...] which appears to be a downwards price adjustment after its introduction in [...].
- (134) Overall, the evolution of price of [...] mixtures in [...] is not consistent with the Parties’ claim that the pricing of these mixtures is [...] impacted by patent expiry or generic entry in [...]. If anything, such price evolutions suggests that patent expiry or generic entry had no effect on the pricing of [...] mixtures, and is consistent with the view that [...] is able to successfully put in place a differentiation strategy against generic products, by shifting away demand to mixtures.¹⁰⁴

Figure 13 – Evolution of the price of [...] mixtures in [...] ([...], in value)

[...]

Source: *Commission’s analysis of the Submissions on generics*

Note: *Prices are not inflation-adjusted*

¹⁰² Submission #2, slide 7.

¹⁰³ Submission #4, section 2.2.2 page 13 and footnote 24.

¹⁰⁴ See Section [...] of the present Decision [...].

Figure 14 – Evolution of the price of other patented mixtures of [...] in [...] ([...], in value)

[...]

Source: Commission's analysis of the Submissions on generics

Note: Prices are not inflation-adjusted

Figure 15 – Evolution of the price of other mixtures of [...] in [...] ([...], in value)

[...]

Source: Commission's analysis of the Submissions on generics

Note: Prices are not inflation-adjusted

4.8.2.2. Country-specific changes of price of [...] mixtures and [...] mixtures around generic entry

(135) In order to provide a view at country level, the Commission has computed, for each country, whether the price of [...] mixtures and [...] mixtures changed before and after generic entry.

(136) More precisely, the changes in price are constructed in the following manner.¹⁰⁵ A timespan of eight years is defined around the year of generic entry: four years before generic entry and four years after generic entry. The year of generic entry, in the middle of this time span, is not included in the computations described below.¹⁰⁶ For each country, products are allocated into the categories described in Figure 2 for [...], and in Figure 1 for [...]. Then, a yearly category-specific price is created for each category and for each year in the timespan (when available) by averaging all prices of all products belonging to that category in a given year, using sales value of each product on this given year as weights for the average.¹⁰⁷ The pre-entry category-specific price is then constructed by averaging the four yearly category-specific prices, computed before generic entry. A post-entry category-specific price is also constructed by averaging the four yearly category-specific prices, computed after generic entry. The category-specific price changes are then generated for each category as the difference between the post-entry category-specific price and the pre-entry category-specific price. Eventually, the changes in price displayed in Table 7 result from weighting the category-specific price changes across all categories, using as weights the total sales value of each category over the entire timespan.¹⁰⁸

(137) Table 7 displays the changes between the price after and before generic entry, for each country, ranking these changes downwards. Note that some countries are not listed, typically because of the lack of sales data for mixtures.

¹⁰⁵ The prices are not inflation-adjusted.

¹⁰⁶ Such time span was taken so as to mitigate possible anticipations and lags in [...]’s reactions to generic entry, as well as to mitigate any other effects that could have taken place punctually before or after generic entry.

¹⁰⁷ Categories with observations only before or only after generic entry are excluded in the analysis. Note that a product with sales only before or only after generic entry will be taken into account in its category. Countries with no category present before and after generic entry are also excluded from the analysis.

¹⁰⁸ Another interesting exercise would have been to compute such change before patent expiry and after generic entry. Unfortunately, no data is available before patent expiry for [...]. For [...], as generic entry occurred most often several years after patent expiry, there are not enough data points after generic entry for most of the countries.

- (138) There are several elements worth noting. First, the changes differ significantly across countries, which confirm the fact that each country has specific circumstances that need to be fully taken into account for a proper assessment to be made.
- (139) Second, many countries, in particular important markets, do not exhibit any [...] downwards changes in price, or even exhibit upwards changes in price: [...]. On the other hand, some countries, like [...], experienced [...] downwards price changes. This suggests that there is not a systematic pattern that [...] was [...] constrained in its pricing behaviour by the threat of generic entry.
- (140) Third, over all countries, the changes are limited and positive for [...], and limited and negative for [...].
- (141) This suggests that, overall, [...]’s prices of [...] mixtures and of [...] mixtures have not been systematically and [...] constrained by patent expiry or generic entry and that, for some important countries as well as at EEA-level for [...], [...] had the ability to increase its prices of [...] mixtures and of [...] mixtures.

Table 7 – Change between [...]’s average prices of mixtures computed over four years before generic entry and four years after generic entry

[...] ^{109,110,111,112}

Source: Commission’s analysis of the Submissions on generics

Note: [...]

*Local currencies are converted into euros using the European Central Bank annual exchange rates
Prices are not inflation-adjusted*

4.8.2.3. Country-specific changes in Lerner index related to [...] mixtures and [...] mixtures around generic entry

- (142) In order to complement the effects on prices, Table 8 displays, for each country and for mixtures of each [...] and [...], the changes in Lerner index around generic entry. The computation of these changes in Lerner index follows the methodology explained in Section 4.6.2, with the additional element that, contrary to the case of straight products, mixtures have been divided in several categories (see Figure 2 for [...] and in Figure 1 for [...]).¹¹³ The pre-entry Lerner index is constructed by averaging the four yearly category-specific Lerner indexes, computed before generic entry, for each category and then across categories using as weights the total sales value of each category over the timespan. The post-entry Lerner index is also constructed by averaging the four yearly category-specific Lerner indexes, computed after generic entry, for each category and then across categories using as weights the total sales value of each category over the entire timespan. The change in Lerner index is the difference, in percentage points, between the post-entry Lerner index and the pre-entry Lerner index.¹¹⁴

¹⁰⁹ [...].

¹¹⁰ As in the case of [...].

¹¹¹ The decrease is mainly driven by the changes in [...].

¹¹² The aggregated figure is not [...] influenced by changes in [...], since these countries, together, account for [...] % of total sales (in USD) which are used for the weighting of the countries reported.

¹¹³ The prices and the margins are not inflation-adjusted.

¹¹⁴ Another interesting exercise would have been to compute such change before patent expiry and after generic entry. Unfortunately, no data is available before patent expiry for [...]. For [...], as generic entry occurred most often several years after patent expiry, there are not enough data points after generic entry for most of the countries.

- (143) As for the changes in price, the changes vary significantly across countries and between the two active ingredients.
- (144) As regards [...] mixtures, most of the changes are positive or close to zero, meaning that the market power of [...] seems to have increased or remained constant in most countries.
- (145) As regards [...] mixtures, the most important markets experienced an increase in Lerner indexes [...] while other important markets had a decrease [...].
- (146) Moreover, over all countries, the changes are limited and positive for both [...] mixtures [...] and for [...] mixtures ([...]).
- (147) This suggests that, in most countries but also at EEA level, [...] did not seem to experience [...] change in market power with regards to its ability to price its [...] mixtures and its [...] mixtures.

Table 8 – Change between [...]’s average Lerner indexes for mixtures computed over four years before generic entry and four years after generic entry

[...]

Source: Commission’s analysis of the Submissions on generics

Note: [...]

Local currencies are converted into euros using the European Central Bank annual exchange rates
Prices and margins are not inflation-adjusted

4.9. On the specific [...] mixtures

- (148) In their Submission #2 and #3, the Parties isolated [...] mixtures.¹¹⁵ On the basis of an analysis of the evolution of their aggregated price and margin in [...], the Parties claim that “[t]he competitive constraints exerted by generic suppliers is not limited to straight products but it extends to mixtures” and that this “mixture analysis [...] provides further support to [the Parties’] conclusion that combined market shares in key overlap areas [...] are likely to significantly overstate the impact of the proposed transaction”.¹¹⁶
- (149) The assessment of the data related to these specific mixtures does not seem to allow the Commission to validate the Parties’ claims.
- (150) First, these specific mixtures, first introduced in [...], after the patent expiry of [...], represent only a minority share of the sales of mixtures containing either [...] or [...], and this share has been decreasing in recent years, from around [...] % in [...] to around [...] % in [...] (see Figure 16).

Figure 16 – Evolution of [...]’s sales of [...] mixtures, as a share of mixtures containing either [...] or [...] ([...])

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Local currencies are converted into euros using the European Central Bank annual exchange rates
Sales values are not inflation-adjusted

¹¹⁵ Submission #2 is solely devoted to the [...] mixtures [...] (slide 5). Submission #3, section 2.2.1 extends the initial analysis with a margin analysis.

¹¹⁶ Submission #2, slide 18.

- (151) Second, over [...], [...] mixtures benefited, and to some extent still benefit, from patent protection.¹¹⁷ [...] was itself patent protected until [...] in most EEA countries but for [...] where patent expired in [...]. [...] applied for patent protection for mixtures of [...] (that would run until [...]). The argumentation of the Parties does not attempt to provide a separate analysis of each of these various events and to test whether their claim holds consistently.
- (152) As a matter of illustration, the Parties fail to address the fact that its claim that generic entry exert a competitive constraint on the price of mixtures is inconsistent with (1) the price increase of these mixtures at the time when [...] lost patent protection in its main market ([...])¹¹⁸ and (2) the fact that, in [...], for example, the price of [...] mixtures did not change in [...], when [...] lost its patent protection in [...] (see Figure 13).
- (153) More precisely regarding the first point, in their Submission #2,¹¹⁹ the Parties indicate that the price index of [...] mixtures decreased by around [...] percentage points between [...] (when [...] lost patent protection in all EEA markets but for [...]) and stayed constant up to [...]. But it then gained around [...] percentage points between [...] (when [...] lost patent protection in [...]), after which it stayed more or less constant.
- (154) Third, both analyses based, at country level, on all mixtures of [...] and on all mixtures of [...] show that there is no consistent pattern of changes in price index or changes in Lerner index with respect to generic entry (see Table 8).¹²⁰ Therefore, the Parties' claims cannot be derived in a consistent manner across countries, suggesting that country or product specific elements are necessary to further inform the assessment of the effects of generic entry on [...]’s mixtures.
- (155) Fourth, in the absence of further country and product specific elements that could explain the market dynamics of [...] mixtures, the Commission recalls that both analyses based, at EEA level, on all mixtures of [...] and based on all mixtures of [...] show¹²¹ that, at EEA level, the price index remains constant over time, suggesting that, overall, “generic entry” only exerted a limited competitive constraint on these mixture products (see Figure 4 and Figure 5).
- (156) In light of the above, the Commission is unable to validate the Parties' general claims that [...]’s prices of [...] mixtures have been significantly constrained by patent expiry or generic entry, using the data provided in the Submissions on generics.

4.10. Effect of the introduction of generic products on innovation in mixtures

- (157) In their Submissions #3 and #4, the Parties argue that: (i) “*the introduction of [...] mixtures [of different active ingredients] has in large part been driven by competition from generic manufacturers*”, (ii) the Article 6(1)(c) Decision “*appears to accept [point (i)]*”, and (iii) the “*Parties’ response to generic competition clearly results in consumer being better off*”.¹²²

¹¹⁷ Submission #1 data, annexes 11.1 (ID6082-62) and 12.1 (ID6082-63).

¹¹⁸ This criticism was made in the Article 6(1)(c) Decision and it was not addressed by the Parties.

¹¹⁹ Submission #2, slide 7.

¹²⁰ See Section 4.8.

¹²¹ See Section 4.8.

¹²² Submission #3, section 2.1. See also Parties' response to the Article 6(1)(c) Decision, paragraphs 31-33.

- (158) As regards point (iii), the Parties provide a list of [...] mixtures and attach to them some “consumer benefits”, without providing further evidence than their mere statement, as well as few extracts related to benefits in terms of resistance.¹²³
- (159) As regards points (i) and (ii), the Commission understands that, even after the expiry of patents, R&D players often pursue defence strategies to limit competition from generics, such as: (a) the market segmentation strategy with the use of mixtures (sometimes by combining off-patent active ingredients with on-patent active ingredients) to differentiate their product offerings from generic manufacturers, (b) the cost improvement strategy to maintain their variable costs below generic manufacturers’ variable costs, so that generic manufacturers are less competitive on a variable cost basis, and (c) the use of patents on formulated products/mixtures to combat generics.¹²⁴ [...].¹²⁵
- (160) The Parties’ argument is mainly that the constraint brought by generic suppliers induce R&D suppliers to bring new mixtures on the market. The Commission notes the three following elements.
- (161) First, the Parties have stated at multiple occasions that resistance is a key driver of innovation in the crop protection industry¹²⁶ but they fail to take that constraint into consideration in their Submissions on generics.
- (162) Second, the Parties’ argument is not relevant for the assessment of downstream competition for formulated products, which occurs between existing or forthcoming mixtures and products. To that respect, mixtures brought to the market by branded manufacturers are patent protected and, consequently, cannot be copied by generic products, and the Parties’ Submissions do not take into account the effective market segmentation strategy branded manufacturers put in place with mixtures to differentiate from generic manufacturers. Such successful strategies suggest that the competitive pressure from generic companies is limited.
- (163) Third, the Parties’ argument is also not relevant for the innovation competition assessed in this Decision, which focuses on the discovery of new active ingredients and not the creation of mixtures made of known active ingredients.

4.11. The transaction data show that [...] could “appropriate” profits resulting from its inventions related to [...] and [...] products both during and after patent protection

4.11.1. The importance of the notion of “appropriability” for the competitive assessment of innovation competition

- (164) Appropriability is an important feature of any competitive assessment of innovation¹²⁷ which, according to Shapiro (2012),¹²⁸ attempts to account for “*the extent to which innovators can appropriate the social benefits their innovation have*

¹²³ Submission #4, section 2.1, page 7. This section also distinguishes mixtures of newly developed and existing actives ingredients from mixtures of only existing actives ingredients, without providing any objective reasons why they should be distinguished for the purpose of the assessment of the competitive constraints brought by generic products on the downstream markets for formulated products.

¹²⁴ See Section [...].

¹²⁵ See Section [...].

¹²⁶ Response to the Statement of Objections, paragraphs 9, 18 among others.

¹²⁷ See Section [...] of the present Decision [...].

¹²⁸ Shapiro (2012), “Competition and innovation. Did Arrow hit the bull’s eye?”, chapter 7 of *The Rate and Direction of Inventive Activity Revisited*, University of Chicago Press.

caused.”¹²⁹ Shapiro (2012) continues by stating that “[t]he conditions of appropriability can greatly affect innovation incentives.”

(165) The Form CO describes the crop protection industry as an industry in which suppliers patent their inventions (for example active ingredients, formulations, mixtures, production processes) and subsequently benefit from patent protection for a given period of time, allowing them to recoup their investment in research and development. The Parties’ Submissions on generics portray an industry in which patent expiry triggers generic entry which, in turn, significantly constrains the Parties’ ability to maintain prices at levels set during the period in which they enjoyed patent protection. In other words, according to the Parties, the ability to extract profits from an invention is limited to the period of patent protection and does not extend after that.

(166) The Commission considers that, at least in the case of [...]’s products based upon [...],¹³⁰ such a claim is not validated by the Commission’s assessment of data provided in the Parties’ Submissions on generics.

4.11.2. Patent protection allows [...] to recoup profits on its patented products (mixtures)

(167) Most, if not all, of [...]’s mixtures based upon [...] and [...] benefit from some level of patent protection. Table 7 tracks the evolution of price of [...] mixtures and [...] mixtures before and after patent expiry of each active ingredient, and shows that (i) the changes in price differed significantly across countries and (ii) many important markets did not exhibit any significant downwards change in price. Moreover, Table 8 shows that changes, at country level, in Lerner index around generic entry for mixtures of each [...] and [...], do vary significantly across countries and between the two active ingredients. Most of these changes are positive for [...] mixtures, suggesting that the market power of [...] seems to have increased in most countries.

(168) Overall, the loss of patent protection for the main active ingredient does not seem to have impacted the ability of [...] to recoup profits from its further patented inventions, the mixtures.¹³¹

4.11.3. The loss of patent protection does not prevent [...] from continuing to recoup profits on its off-patented products (straight products)

(169) As regards the active ingredients which lost patent protection, Table 6 shows that many countries, in particular important markets, do not exhibit any significant or drastic downwards change in Lerner index related to straight products, and that, over all countries, the changes are limited for straight [...] and for straight [...].

¹²⁹ Shapiro (2012), section 7.4.2.

¹³⁰ The Parties did not provide data prior to the patent expiry of [...].

¹³¹ In their Submission #4, section 2.3.2, the Parties conclude that “it is not valid to argue that by introducing mixtures, R&D players are fully able to protect the extent to which the profits from any individual innovation venture can be appropriated.” This is not the Commission’s argument, which is that the loss of patent protection from the main active ingredient does not seem to impact the ability of [...] to recoup profits from the mixtures it brings to the market, which are themselves patent protected. In other words, patent protection granted to mixtures does not seem to be impeded by the loss of patent protection of the ingredients of the mixtures and, therefore, [...]’s appropriability seems to be significant for the mixtures subject to these analyses.

- (170) Overall, the loss of patent protection for the main active ingredient does not seem to have impacted the ability of [...] to recoup profits from its off patented straight products.
- 4.11.4. *Products lifecycle suggests that [...] is able to maintain its market power for mixtures despite losing patent protection on the underlying straight products*
- (171) The analysis proposed so far typically average prices by pooling together products sold in the same year, assuming implicitly that events occurring in a given year affect all products equivalently, even though product are, in a given year, at different stages of their life cycles.
- (172) Table 9 intends to measure, for each country, the evolution of the average price of [...] mixtures over their life time. For the purpose of this exercise, products are not grouped according to categories defined on their composition but on the basis of their age, that is the number of years since they first appear in the transaction data in a given country. The average price is computed by averaging the various products of the same age, using their sales value in the given year of age as weights for the average.¹³²
- (173) The underlying motivation is that the life cycle dynamics could be at least as influential as market events which occurred in a given year. For that purpose, the year of introduction of each product is referred to as “Year 0” or “Y0” (if the product was already sold in 2001, “Year 0” is taken as 2001), and subsequent years are referred to as “Year 1” or “Y1”, “Year 2” or “Y2”, etc. Changes in price between “Year x” and “Year 0” are reported in the column “Yx”.¹³³ Therefore, [...] mixtures sold in [...] have experienced, on average, a decrease of price of [...] after their introduction (“Y[...]”). Moreover, [...] mixtures still sold [...] after their introduction have been prices [...] % higher than their price in their year of introduction.
- (174) On the one hand, [...], the [...] most important markets for [...], show a [...] decrease in prices over the life cycle of [...] mixtures. On the other hand, other important countries such as [...], had a [...] increase in prices. Finally, many markets, including important ones such as [...] and [...], show effects in both directions but, overall, little effect.

Table 9 – Evolution of the average price of [...] mixtures of the same age

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Prices are not inflation-adjusted

- (175) The data therefore show that prices have been maintained constant, or even increasing, over the life cycle of the [...] products in numerous countries, suggesting that [...] could, after patent expiry and after generic entry related to the main active ingredient, maintain prices of similar magnitude than during patent protection in these countries at least.

¹³² The prices are not inflation-adjusted.

¹³³ Most products were not sold in [...] but have been introduced later. Moreover, products disappear when they stopped being sold. Due to these effects, the price is computed over different baskets of products in different years.

- (176) The same analysis can be replicated for the Lerner index, that is the margin measured as a ratio of the price, which is commonly interpreted as a proxy for the level of market power exerted by a supplier. Table 8 shows that changes around generic entry in Lerner index for mixtures of each [...] and [...], at country level, do vary significantly across countries and between the two active ingredients. Most of these changes are positive or close to zero for [...] mixtures, suggesting that [...]’s market power with respect to the pricing of [...] mixtures seems to have increased in most countries. As regards [...] mixtures, the most important markets experienced an increase in Lerner index while other important markets had a decrease. Overall, the changes are limited and positive for both [...] mixtures and for [...] mixtures.
- (177) Table 10 reports the variation of [...]’s average Lerner index for [...] products over their life time.¹³⁴ [...]’s Lerner index evolved differently in each country over time. Globally, in most countries and, more importantly, in most important countries for [...], [...]’s Lerner index did not decrease [...] or even increased on, for example, a [...] years basis (...). Over the [...] countries which have mixtures of [...] years, [...] countries have Lerner index which increased [...] (more than [...] percentage points), [...] between [...] and [...] percentage points and [...] with a decrease in Lerner index.

Table 10 – Evolution of [...]’s average Lerner index for [...] mixtures of the same age

[...]

Source: Commission’s analysis of the Submissions on generics

Note: Prices and margins are not inflation-adjusted

- (178) The data therefore show that [...] was able to maintain its market power in most of the EEA, irrespective of the fact that one of their active ingredients, the straight [...] or the straight [...], lost its patent protection or experienced generic entry.
- (179) Overall, on the basis of the data submitted by the Parties in support of their Submissions on generics, the Commission concludes that (i) [...] was able to maintain prices and market power in most of the EEA, irrespective of the fact that one of their active ingredients, the straight [...] or the straight [...], lost its patent protection or experienced generic entry, and that (ii) this suggests that the level of appropriability is strong and extends far after patent expiry of the straight products or related generic entry.

5. CONCLUSION

- (180) Taking all these elements in consideration, the Commission concludes that the data provided by the Parties in support of their Submissions on generics do not allow to validate the Parties’ claims that (i) branded manufacturers are significantly constrained by patent expiry or generic entry, that (ii) generic products are close competitors to products of branded manufacturers, and that (iii) the combined market shares of the Parties are likely to overstate the impact of the proposed Transaction as the ability of generic manufacturers to constrain the Parties is greater than that implied by their market shares.
- (181) First, the Submissions on generics suffer from important limitations. For example, entry by generics is mischaracterized and the analysis amounts solely to the graphical

¹³⁴ Computations are similar to those made in relation to the change in price over products life cycle. The prices and margins are not inflation-adjusted.

identification of downwards changes in price or margin occurring in similar periods than patent expiry or generic entry.

- (182) Second, [details on Parties' sales]. Any conclusion reached on this sample is thus of limited probative value. [...].
- (183) Third, [details on Parties' sales]. Any conclusion reached on this sample is thus, also, of limited probative value. Moreover, among other things, changes in price, that could be timely related to patent expiry or generic entry, do not seem to be consistently oriented downwards.
- (184) Fourth, the general assessment of the evolution of sales of mixtures shows that changes in Lerner index for mixtures vary significantly across countries and between the two active ingredients. In particular, [details on Parties' margin development].
- (185) Fifth, the Commission also considers that [...], and notes that the Parties' Submissions do not take into account the effective market segmentation strategy with mixtures used by branded manufacturers to differentiate from generic manufacturers.
- (186) The Commission also concludes that, at least for [...] and [...] products, the level of appropriability is strong and extends far after patent expiry of the straight products or related generic entry.

CASE M.7932 – DOW/DUPONT

ANNEX 3 TO THE COMMISSION DECISION

DESCRIPTION OF THE COMPUTATION OF MARKET SHARES AND MARKET POWER PROXIES FOR CROP PROTECTION MARKETS

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1. INTRODUCTION

- (1) Paragraphs 14 and 27 of the Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings¹ (hereafter the “Horizontal Merger Guidelines”) state that “[m]arket shares and concentration levels provide useful first indications of the market structure and of the competitive importance of both the Parties and their competitors. [...] Although market shares and additions of market shares only provide first indications of market power and increases in market power, they are normally important factors in the assessment.”
- (2) The Decision explains, in Section V.4, the main principles followed by the Commission for the purpose of defining markets in the context of the assessment of the Transaction.
- (3) This annex follows Section V.4 of the Decision. Section 2 is dedicated to the data and methodology used by the Parties to calculate market shares in the Form CO. It includes a review of the exchanges between the Commission and the Parties on that issue as well as the presentation of the data, the data selection and the methodology used by the Parties, and concludes by explaining why the Commission decided to perform an independent exercise on market shares. Section 3 then presents the data and methodology used by the Commission for the purpose of calculating market shares for the assessment of (downstream) markets for formulated products. Section 3.2.4 presents the various market power proxies produced by the Commission for that purpose: “downstream shares” and “R&D players shares”, along with several concentration measures. Section 4.2 presents the data and market power proxies calculated by the Commission for the assessment of the (upstream) innovation competition: “patent-strength shares” and “active ingredients development shares”. Note that a separate annex to Decision describes the assessment of patent strength² and another separate annex to the Decision describes specific concentration measures dedicated to account for the effect of common shareholding in the agrochemical industry.³

2. DATA AND METHODOLOGY USED BY THE PARTIES IN THE FORM CO

2.1. The communication between the Commission and the Parties as regards the Parties’ data and methodology used for the computation of markets shares provided in the Form CO

- (4) As from the pre-notification stage and during part of the Phase I investigation, the Commission and the Parties had numerous and extensive discussions regarding the data and the methodology used by the Parties for the computation of the market shares in the Form CO, as well as regarding the various results obtained through this process.

¹ OJ C031, 5.2.2004, pages 5-18.

² Annex 1 to the Decision.

³ Annex 5 to the Decision.

- (5) In that context, the Commission issued several requests for information partly or entirely devoted to issues related to market shares, among which:⁴
- (a) Commission’s (pre-notification) request for information RFI 2, [date], question 40;
 - (b) Commission’s (pre-notification) request for information RFI 4, [date], question 12;
 - (c) Commission’s (pre-notification) request for information RFI 6, [date] questions 11, 17, 39, 45-50;
 - (d) Commission’s (pre-notification) request for information RFI 7, [date], questions 38-40, 56-58;
 - (e) Commission’s (pre-notification) request for information RFI 8, [date], question 22;
 - (f) Commission’s request for information RFI 13, [date], questions 27-28;
 - (g) Commission’s request for information RFI 16, [date], questions 1-3 (all);
 - (h) Commission’s request for information [date], questions 1-5 (all),⁵ which led to a meeting with DuPont’s expert [date];⁶
 - (i) Commission’s request for information RFI 21, [date], questions 1-7 (all);
 - (j) Commission’s request for information RFI 34, [date], question 1.
- (6) The methodology note attached to the Form CO provided limited information on the Parties’ data and methodology used for the computation of markets shares provided in the Form CO (see section 2.4), in particular in light of the importance of market shares in a case with, potentially, hundreds of affected relevant (downstream) markets for formulated products.
- (7) In response to the requests for information sent by the Commission, the Parties provided, [dates of submission], details on the data sources used for each market as well as an updated methodology note reflecting the different calculations and assumptions made when data was available and when data was not available to them.⁷
- (8) In responding to the Commission’s request to “*provide an updated methodology note [...] explaining in detail the preparation of all global data and indicating sources for*

⁴ The list of the Commission’s requests for information, ordered chronologically, is not intended to reflect fully the exchanges between the Commission and the Parties on the issue of the data and methodology used by the Parties for the purpose of calculating market shares in the Form CO. Other exchanges took place, in particular by emails and in conference calls.

⁵ Commission’s request for information [date] (ID4866).

⁶ Following the State of Play meeting [date], a second meeting took place, at the request of the Parties, [date] to guide the Parties through the methodology followed by the Commission in the computation of market shares for formulated products for the purpose of the assessment of the Transaction.

⁷ Parties’ response to Commission’s request for information [date; dates of Parties’ submission] (ID5025 and ID5026).

their respective data point, year, unit”,⁸ the Parties indicated, [dates of submission], that [details on communication regarding market share methodology].⁹

- (9) [Dates of submission], the Parties provided details on the methodology used for the allocation of products across the various segments, for, respectively, herbicides and insecticides,¹⁰ and fungicides.¹¹
- (10) [Dates of submission], the Parties completed their response to question 1 of the Commission’s request for information RFI 16,¹² [dates of submission], by submitting a spreadsheet entitled [name of the Parties’ submissions] that, according to the Parties’ additional methodology explanations submitted [dates of submission], was necessary to compute market shares for fungicides formulated products.
- (11) [Details on communication regarding market share methodology].
- (12) The Commission attached to its Statement of Objections a dedicated annex which provided details on the data and methodology used for the purpose of computing market shares and other market power proxies relevant for the assessment of competition in downstream markets for formulated products as well as for (upstream) innovation competition.¹³
- (13) In their response to the Statement of Objections, the Parties have submitted an annex addressing some of these issues (hereafter referred to as the “Submission”).¹⁴
- (14) In their Submission, the Parties indicate that [details on market share methodology].¹⁵
- (15) [Details on communication regarding market share methodology].

2.2. Description of the data used by the Parties in the Form CO

- (16) According to the methodology note attached to the Form CO,¹⁶ the market shares provided by the Parties in the Form CO are based on third-parties data on crop protection sales originating from three primary sources:¹⁷
 - (a) *Panel surveys of growers/farmers*: these surveys, conducted at “grower level”, are carried out by a number of different independent third parties, with the identity of these firms differing between countries. They contain information regarding the specific crop for which a particular product has been used. The survey firms extrapolate from the survey results to produce figures for total national spend at a country-crop-product level.
 - (b) *Market estimates from providers* [information on a company’s sources for market shares calculations]: These estimates are created by third parties that

⁸ Commission’s request for information [date], question 2, reiterating question 2 of the Commission’s request for information RFI 16.

⁹ Parties’ response to Commission’s request for information [date], question 2 (reiterating question 2 of the Commission’s request for information RFI 16), [date of submission] (ID5025).

¹⁰ Parties’ response to Commission’s request for information [date], question 5, for herbicides (ID4897) and insecticides (ID4896).

¹¹ Parties’ response to Commission’s request for information [date], question 5, for fungicides (ID5114).

¹² Parties’ response to Commission’s request for information [date], question 1 (ID5157).

¹³ Statement of Objections, annex 3.

¹⁴ Parties’ response to the Statement of Objections, annex 3, entitled [name and date of submission] (ID10024).

¹⁵ Response to the Statement of Objections, section X.C.2, paragraphs 1227-1228.

¹⁶ Form CO, annex B.I.6.6, [name of Parties’ submission] (ID1325-147).

¹⁷ Form CO, annex B.I.6.6, section 2.

use market intelligence, secondary sources (including, in some instances, panel surveys), and their own research to estimate figures of the total market size for crop protection products in a country and how these total figures should be broken down by crop and product to produce disaggregated figures on a country-crop-product level. [Information on a company's internal process for market shares calculations].

(c) [Details on market share methodology].

- (17) The data contain predominantly the following relevant variables: the crop group (the type of crop, for example cereals), the crop (which the product is used to treat, for example barley), the type of product (for example herbicide, insecticide or fungicide), the product brand name and the active ingredient(s) included in the product,¹⁸ the product original manufacturer and the product distributor, and the value of sales at the grower level and distributor level.

2.3. Description of the data selection made by the Parties in the Form CO

- (18) According to the methodology note attached to the Form CO,¹⁹ for each country/year/crop for which the Parties had data, “*the data sources they consider to be the most accurate and reliable*” were first selected, [details on market share methodology].

(19) [...].

(20) Finally, the Parties indicate that they [details on market share methodology]²⁰.

(21) No other details on the data selection are provided in the methodology note attached to the Form CO for the purpose of calculating market shares.²¹

2.4. Description of the computational methodology used by the Parties in the Form CO

(22) As regards the computation, according to the methodology note attached to the Form CO,²² the Parties report that the market shares calculations are based on the value of sales at the distributor level (the price paid by the distributor) [details on market share methodology].²³

(23) For market shares at the level of country/year/crop/pest combinations, the Parties indicate in their methodology note that they have [details on market share methodology].²⁴

(24) For market shares at a higher level of aggregation than that level ([...]), the market size and sales values were calculated by aggregating all crop-level markets for which data are available.²⁵

(25) No other details on the computational methodology are provided in the methodology note attached to the Form CO for the purpose of calculating market shares.

¹⁸ [Details on market share methodology].

¹⁹ Form CO, annex B.I.6.6 (ID1325-147).

²⁰ See [internal database reference].

²¹ [Information on Parties' submissions and their submission dates] (ID5025 and ID5026).

²² Form CO, annex B.I.6.6 (ID1325-147).

²³ The Parties indicate that [details on market share methodology] (see Form CO, annex B.I.6.6, section 2).

²⁴ Form CO, annex B.I.6.6, section 3.

²⁵ Form CO, annex B.I.6.6, section 3.

- (26) [Details on communication regarding market share methodology] the methodology followed for the allocation of products across the various segments. Such methodology and its underlying assumptions are key to the computation of market share for each of these segments and, thus, to the Commission’s ability to assess the methodology followed by the Parties for the computation of market shares.
- (27) As detailed in Section 2.1, the clarifications on such methodology issues have been provided by the Parties [date of the Parties’ submissions], as a result of several Commission’s request for information.
- (28) The Commission understands that, [details on market share methodology].^{26,27,28,29,30}

2.5. The Commission’s decision to compute its own estimation of (downstream) market positions

2.5.1. The Parties provided limited information at the time of notification on the data and methodology used for the purpose of calculating markets shares in the Form CO

- (29) As explained in Section 2.4, the methodology note attached to the Form CO provided limited information, in particular in light of the importance of market shares in a case with, potentially, hundreds of affected relevant (downstream) markets for formulated products. The Commission was not provided with all the data and information necessary for the understanding and assessment of the Parties’ methodology before [dates of submission],³¹ [dates of submission].

2.5.2. [Details on communication regarding market share methodology]

- (30) [Details on market share methodology].
- (31) [Details on communication regarding market share methodology].³²
- (32) The Commission also requested in pre-notification global market size, global sales, and global shares for the Parties and their main competitors for a number of affected market.³³ [Details on communication regarding market share methodology].
- (33) First, the Parties stated [dates of submission] that, while the “Parties will be able to provide global sales (and estimates of market size and shares) for each of all crop protection, total herbicides, total insecticides, and total fungicides [...],” [details on market share methodology].³⁴

²⁶ See, for example [internal document] (ID1329-469).

²⁷ Parties’ response to Commission’s request for information [dates of submission], question 5 for insecticides (ID4896).

²⁸ Parties’ response to Commission’s request for information [dates of submission], question 5 for fungicides (ID5114).

²⁹ Parties’ response to Commission’s request for information RFI 21, question 2 (ID5272-29).

³⁰ Parties’ response to Commission’s request for information RFI 21, question 2 (ID5272-29).

³¹ See Section 2.4.

³² Parties’ response to Commission’s request for information RFI 13, question 28 (ID3653); Parties’ response to Commission’s request for information RFI 16, question 2, [dates of submission] (ID4010); Parties’ response to Commission’s request for information [dates of submission] (ID5025).

³³ See, in particular, Commission’s request for information RFI 8, questions 22, [dates of submission] and Commission’s request for information RFI 16, question 2, [dates of submission], reiterated in question 2 of Commission’s request [dates of submission].

³⁴ Parties’ email, [dates of submission], related to the Commission’s request for information RFI 8, question 22 (ID1145).

- (34) [Content from internal document],³⁵ [details on communication regarding market share methodology.]³⁶
- (35) [Details on communication regarding market share methodology].³⁷
- 2.5.3. *Faced with significant uncertainties on the market shares provided by the Parties in the Form CO, the Commission considered necessary to compute such market shares*
- (36) In light of the limited time available in a Phase I investigation and of the elements described above, in particular given the difficulties faced by the Commission, despite its efforts, to be provided with sufficient level of information on the data selection and on the methodology used by the Parties, the Commission considered necessary to compute market shares for (downstream) formulated products.
- (37) This decision was communicated to the Parties and, following the State of Play meeting [...], a meeting took place, at the request of the Parties, [...] to guide the Parties through the methodology followed by the Commission in the computation of market shares for formulated products for the purpose of the assessment of the Transaction.
- (38) The Commission notes that, [...], at a time at which the Parties were aware of the Commission's data and methodology used for computing market shares, [content from internal document].^{38,39}

3. DATA AND METHODOLOGY USED BY THE COMMISSION FOR THE PURPOSE OF THE ASSESSMENT OF THE TRANSACTION REGARDING THE (DOWNSTREAM) RELEVANT MARKETS FOR FORMULATED PRODUCTS

3.1. Data used by the Commission

3.1.1. Description of the data used by the Commission

- (39) For the purpose of the calculation of market shares and related figures, the Commission relied on databases provided by a third party, Agrobase-Logigram,⁴⁰ through its product called Agrowin.⁴¹
- (40) Agrowin defines itself as the “*crop protection and seeds use database*”, which compiles information on the use of pesticides and seeds from multiple sources: “*Agrowin is better labelled as ‘use data’ rather than ‘sales data’.* Indeed, Agrowin tracks quantities and prices of products used by farmers, which only partly correspond to the products sold by suppliers.”⁴² In a nutshell, the added value of Agrowin is to standardize the primary data obtained from panel companies and to provide its users with a standardized set of variables valid across the various primary data.

³⁵ [Internal document] (ID1329-469).

³⁶ Parties' email, [dates of submission], related to the Commission's request for information RFI 16, question 2 (ID4010). [content from submission].

³⁷ Parties' email, [dates of submission], related to the Commission's request for information [dates], question 2 (reiterating question 2 of RFI 16) (ID5025).

³⁸ [Internal document] (ID7081-2531).

³⁹ [Internal database reference].

⁴⁰ See <http://www.agrobase-logigram.com/index.html>.

⁴¹ See <http://www.agrobase-logigram.com/pages/agrowin.html>.

⁴² Agreed non confidential minutes of a call with Agrobase-Logigram, 12 August 2016 (ID7747).

- (41) The Commission understands that Agrowin is widely used and recognised in the agrochemical industry. [...].⁴³
- (42) Agrowin data are organized on a product level. For each product, many variables and sub-categories of crops/pests/applications are available. The variables used for the purpose of computing market shares are the following:
- (a) *Year*: the year of interest, from 2013 to 2015;⁴⁴
 - (b) *Country*: the country of interest;
 - (c) *Type of Product*: fungicides, insecticides or herbicides;
 - (d) *Crop*: the plant on which the product has been applied, with four levels of aggregation;
 - (e) *Target*: the pest which is targeted by the product – note that, as for the crop, an additional aggregation of pests was created by the Commission [...];
 - (f) *Application (Stage)* : the stage of growth of the plant for which the product can be applied (for herbicides) or the part of the plant on which the product should be applied (for insecticides) – note that this variable is not relevant for fungicides;
 - (g) *Company*: the manufacturer of the product – note that the data also provide the product distributor, which differs from the manufacturer in some cases because of distribution agreements across competitors in some countries;
 - (h) *Sales*: the amount of sales estimated for each product, in USD – sales values are available in the data at the grower level (the price paid for the product by the grower) and the distributor level (the price paid by the distributor), and the latter is used for market share calculations.
- (43) [Details on market share methodology].⁴⁵
- (44) Whenever no primary source data are available from Agrowin, the Commission’s assessment relies on figures provided by the Parties.

3.1.2. *Benefits and limitations of the data used by the Commission*

- (45) The entire database managed by Agrobases is constructed using surveys conducted at the farmer level by market research agencies around the world or available from governmental and other official departments and services. Figures of the market values of a given product in a given country are typically created by combining several survey data and, thus, can differ from sales figures produced by suppliers.
- (46) In particular, some companies active in the agrochemical industry are not included in the database. To address this issue, Agrowin reports a company called “Others” in which sales belonging to distributors which are not identified are aggregated.

⁴³ See, [internal document] (ID7079-363) [internal document] (ID6826-796). [Internal database reference].

⁴⁴ The data extraction included the option “last year last crop” meaning that, for each primary data source, the data extracted for a given year, for example 2013, was either the data reported by the primary data source for the year 2013 or, if not available (either because there was no data collection on this year by this primary data source [details on market share methodology]), the last available year from this primary data source.

⁴⁵ [Names and dates of submission] (ID6002), [names and dates of submission] (ID6003), [names and dates of submission] (ID6004), [names and dates of submission] (ID6042), [names and dates of submission] (ID6043), [names and dates of submission] (ID6044) (see also ID5960).

- (47) In some specific markets, “Others” amount to a significant level. In 2015, for examples, 30% of the markets have all their suppliers identified (and no mention of “Others”), while in roughly 55% of them, “Others” are present and accounts for less than 50% and around 5% of the markets are entirely reported as supplied by “Others”.
- (48) Despite these limitations, Agrowin is a reliable source, recognized and used in the industry, which provide the Commission with a standardized and consistent set of variables necessary for the computation of market shares.

3.2. Methodology used by the Commission

3.2.1. Definition of “market groupings” of interest

- (49) As explained in Section V.4.2.1 detailing market definition principles for relevant crop protection formulated product markets, the Commission concludes that, in general, the relevant product markets for formulated products correspond to segmentation by application/crop/pest combinations in a given country. Typical relevant markets are therefore for example “foliar – apples – codling moth – Italy” for insecticides or “post emergence – broadleaf herbicide – barley – France” for herbicides.
- (50) However, from a practical point of view, it is impossible to, in all instances, break down the crop protection industry into all relevant antitrust markets which would number just in Europe tens of thousands. Therefore, the Commission decided, in order to be in a position to conduct a meaningful assessment of the Transaction, to in where appropriate and necessary also group crop/pest combinations into market groupings.
- (51) The market shares computed by the Commission therefore reflect where possible both true market shares at crop/pest level and more often however for reasons of practicality such market groupings. For each country, market groupings are defined in terms of combinations of:
- (a) *Type of Product*: the broader aggregation of pests targeted by the product (insecticides, fungicides or herbicides);
 - (b) *Crop*: the plants or plant groupings on which the product can be applied (cereals, cotton, etc.);
 - (c) *Target*: the lower level aggregation of pests which are targeted by the product (broadleaf, capnodiales, lepidoptera, etc.);
 - (d) *Application*: the method of application of the product, whenever relevant.
- (52) Despite the necessity to often compute market shares at the level of “market groupings” of relevant markets, the Commission recalls that market shares reflecting such market groupings are only a (weighted average) approximation of the underlying reality experienced by each individual relevant market.

3.2.2. Aggregation of relevant markets into market groupings

- (53) [...], the Commission created specific aggregation of crops and pests for herbicides⁴⁶, for insecticides⁴⁷ and for fungicides.⁴⁸ [Details on market share methodology].

⁴⁶ [Internal document] (ID1329-962), slides 6-16-18-19-22-23-61-65-66.

- (54) As regards herbicides, cereals, fruits and vegetables are separated into several groupings. Targeted infesting herbs are classified as broadleaf and grass (“graminicides”), while the term “cross spectrum” stands for products that are effective against both. The mode of application is divided into “pre-plant”, “pre-emergence” and “post-emergence”, on the basis of the growth cycle of the crop.
- (55) As regards insecticides, fruits and vegetables are separated into several groupings which are considered relevant for the EEA. Pests are grouped by families of insects (for example coleopteran or lepidopteran). The mode of application is divided into “foliar” (applied on the plant) and “soil” (applied on the soil around the plant).
- (56) As regards fungicides, broad groupings of crops are considered. Fruits and vegetables are grouped together, while cereals are separated into several groupings. Pests are collected in groupings with a global market greater than [...] USD. The mode of application is considered not to be a relevant factor of product concepts for fungicides.

3.2.3. Allocation of sales values across different market groupings

- (57) The database used by the Commission, Agrowin, is product-centric, in the sense that it reports sales of a given product used on a given crop, reportedly against a given pest.
- (58) In order to allocate sales between different targeted pests, the Commission used two different methodologies, one for herbicides and one for fungicides and insecticides. [Details on market share methodology].
- (59) As regards herbicides, [details on market share methodology].
- (60) The Commission’s requested from the Parties the allocation of each product into various segments, [details on market share methodology].^{49,50,51}
- (61) [Details on market share methodology]⁵². Products are first classified as “selective herbicides”, that is products that target a specific set of weeds, and “non-selective herbicides”, that is products that are not targeted toward any specific weed. Among selective herbicides, a distinction is made between products targeted towards broadleaf, grass (“graminicides”) or both (“cross spectrum”).
- (62) As regards fungicides and insecticides, the classification provided by the Parties⁵³ is too broad and does not reflect market structure. The Commission considers the internal classification of Agrobases to be more informative, and thus uses the *Target* variable already present in the file provided by Agrobases.

⁴⁷ [Internal document] (ID1329-961), [internal document].

⁴⁸ [Internal document] (ID1329-960), slide 17.

⁴⁹ Parties’ response to Commission’s request for information [date], question 5.

⁵⁰ Parties’ response to Commission’s request for information RFI 21, question 6.

⁵¹ [Submission document] submitted along the Parties’ response to Commission’s request for information RFI 16, question 1 (ID4003).

⁵² [Submission document] submitted along the Parties’ response to Commission’s request for information RFI 16, question 1 (ID4897).

⁵³ [Submission document] (ID4896) and [submission document] (ID5114) submitted along the Parties’ responses to Commission’s request for information RFI 16, question 1.

3.2.4. *Assumptions for the computations of concentration measures such as the HHI*

- (63) As explained in Section 3.1.2, the data provided by Agrowin contain a supplier “Others” in which sales belonging to distributors which are not identified to a known supplier are aggregated.
- (64) The computation of HHI requires markets shares for all suppliers as an input. When the share associated to “Others” is limited, assuming that “Others” is one single entity, and therefore using “Others” market share as another competitors’ market share, does not alter significantly the result. Nevertheless, in some instances, the market share associated to “Others” is large and, in such circumstances, the same assumption will bias upwards the results.
- (65) In order to address that difficulty, the Commission makes the following assumptions:
- (a) Whenever the market share associated to “Others” is *higher* than the lowest market share associated to a known supplier, then “Others” is split in several firms with, each, the same market share as the lowest market share associated to a known supplier, and, if necessary, an additional firm with residual market shares;
 - (b) Whenever the market share associated to “Others” is *lower* than the lowest market share associated to a known supplier, then “Others” is assumed to be one single entity.
- (66) For example, let assume that “Others” is reported with a market share of 8%. If the lowest market share associated to a known supplier is 10%, then the computation of HHI assumes that “Others” is one competitor with market share of 8%. If, on the contrary, the lowest market share associated to a known supplier is 3%, then the computation of HHI assumes that “Others” is in fact three different firms, two with market shares of 3% (as the lowest market share associated to a known supplier) and one with market shares of 2% (residual).

4. MARKET SHARES AND CONCENTRATION MEASURES PRODUCED BY THE COMMISSION FOR THE PURPOSE OF THE ASSESSMENT OF THE TRANSACTION

- (67) Market shares typically provide first indication of market power and increases of market power. Such interpretation relies on several assumptions, in particular the fact that firms are independent one from the other and each maximize their own firm’s profits.
- (68) The Commission uses market shares in this Decision for the purpose of assessing the likely effects of the Transaction on downstream formulated products (at the level of market groupings), which also led to the identification of the relative strength of R&D players in the supply of each formulated products (at the level of market groupings). The Commission also calculated several concentration measures, including HHI. Finally, the Commission used market shares for the purpose of assessing the likely effects of the Transaction on innovation competition by calculating “active ingredients development shares” and “patent-strength shares”.

4.1. Market shares and concentration measures produced for the purpose of the assessment of (downstream) relevant markets for formulated products

4.1.1. Downstream market groupings shares

- (69) Downstream shares represent the shares of all companies present in the data. For each year and for each market group within each country, as well as at EEA-level and worldwide, the Commission calculates market shares for each company and for the Parties combined using the sales value attributed to each manufacturer.
- (70) Market value, expressed in thousands of USD, was constructed as the summation of the sales of each manufacturer present in the market group.
- (71) The sum of the market shares of all companies amount to 100 in each market group. In some market groupings, a relevant portion of the market shares is captured by the residual company “Others” created by Agrowin,⁵⁴ and thus that portion of the market remains unintelligible.

4.1.2. R&D players shares

- (72) As shown in Section V.1.5 of the Decision, suppliers present in a given relevant market can be divided in different categories, among which suppliers with research and development capabilities (“R&D players”), which have innovated and continue to innovate by identifying new active ingredients, and suppliers which copy inventions brought by R&D players when their related patent protections expire (“generic suppliers”).
- (73) In some relevant (downstream) markets, generic suppliers can supply a significant share of the volumes sold and therefore achieve significant market shares levels. The market shares achieved by generic suppliers in such markets are therefore informative of, for example, the level of commoditization of such markets. Nevertheless, as explained in Section V.1.5.4, generic suppliers do not introduce new actives ingredients in the market but they mainly provide farmers with combination of already invented active ingredients. The number of R&D players present in a given market, as well as their relative size, provides insightful elements on the competition that took place before and resulted in the invention of the products sold currently on this market, as well as on the possible strength of each R&D player currently.
- (74) As a consequence, the presence and relative strength of R&D players provide contextual elements to be factored in the Commission’s assessment of a specific relevant (downstream) market. R&D players shares aim at providing such a view, by indicating the relative importance of manufacturers which are considered to have R&D capabilities, along with other structural elements.
- (75) Three sets of players with R&D capabilities are considered:⁵⁵
- (a) “Big 5”: BASF, Bayer, Dow, DuPont and Syngenta, which all have global research and development capabilities;
 - (b) Big 5 along with Sumitomo, as Sumitomo has research and development capabilities potentially relevant for the EEA;⁵⁶

⁵⁴ See Section 3.1.2.

⁵⁵ See Section V.1.5 of the Decision.

⁵⁶ See Section V.8.6.3 of the Decision.

- (c) Big 5 along with Sumitomo as well as FMC and Monsanto, as both FMC and Monsanto have global development capabilities.
- (76) The Commission considers that R&D players shares on the basis of the Big 5 is the most relevant to capture R&D players relevant for the purpose of the EEA. Other set of manufacturers are considered for robustness checks.
- (77) For each year and for each market group within each country, as well as at EEA-level and worldwide, the Commission calculates the share of each R&D firm within the set of R&D firms considered (for example the Big 5).
- (78) In order to provide extensive contextual elements related to each market group, the Commission also computes, along R&D players shares:
 - (a) the number of manufacturers with a share above a certain threshold (threshold were chosen to be 0%, 1%, 2.5%, 5% and 10%);
 - (b) whether both Parties are above a certain threshold (threshold were chosen to be 0%, 1%, 2.5%, 5% and 10%);
 - (c) if a R&D manufacturer has a market share greater than 40%, and also if at least two R&D manufacturers have each a market share above 30%;
 - (d) post-merger HHI and delta HHI;
 - (e) the total market value, expressed in thousands of USD, which was calculated taking into account all manufacturers active in the market group.

4.1.3. *R&D-focused concentration measures*

- (79) Concentration measures provide interesting features of an industry that are less easily identified at the level of each relevant market (or market groupings). Given the potentially limited number of R&D players active in this industry and the significant number of relevant markets (and market groupings), the Commission has calculated some concentration measures to capture whether this industry was concentrated. These measures serve as contextual elements in the assessment of the Transaction.
- (80) Using the same sets of R&D players as in Section 4.1.2, and defining presence of a given firm in a market group as having a market share above a given threshold (taken alternatively at 0%, 1%, 2% and 5%), the Commission computes several concentration measures based on the number of R&D players present in each market group in the EEA:
 - (a) *Market presence*: for each market group and each country, this measure reports the market value and the percentage of the crop protection market value, both expressed in thousands USD, as well as the expected number of R&D players before and after the Transaction;
 - (b) *Country coverage*: for each country, this measure reports the percentage of the total crop protection market which is covered by a certain number of R&D players;
 - (c) *Country concentration*: for each country, this measure reports the share of the total crop protection market which is impacted by the Transaction;
 - (d) *Product coverage*: for each market group, this measure reports the share of the EEA market which is covered by a certain number of R&D players.

4.2. Market shares and concentration measures produced for the purpose of the assessment of (upstream) innovation competition in individual innovation spaces and in the overall crop protection industry

4.2.1. Patent-strength shares

(81) The Commission conducted a patent analysis, in particular by assessing the strength of patents for herbicides, insecticides and fungicides. In that context, the Commission computed several patent-strength shares, that is shares of the quality of the patent portfolios of R&D players. Annex 1 to the Decision describes the data and methodology used by the Commission, as well as the Commission's assessment of the patent strength of the Parties and their competitors, and the comments made by the Parties in section 2 and Annex B of their Submission attached to their response to the Statement of Objections.⁵⁷

4.2.2. New active ingredients shares

4.2.2.1. The data on turnovers generated by active ingredients

(82) In order to measure the success of the innovation efforts by R&D players, the Commission requested information from the Parties related to active ingredients introduced since 1995.⁵⁸

(83) The data contain in particular details on the active ingredient (name, chemical class, mode of action, target crops and pests, category of products), on its development (developing companies), on its launch (launching company, year of launch, year of EEA launch), on its registration (first country of registration, other countries where registered, if registered in the EEA) and turnover figures (worldwide, in the EEA and in Japan, for each of 2013, 2014, 2015, all expressed in USD).

4.2.2.2. Commission's cleaning and corrections

(84) The Commission checked and cleaned several elements of the data, in particular some EEA launch dates as well as companies' names.

(85) **Companies' names** have been harmonized in order to account, as much as possible, for the numerous mergers and acquisitions that took place in the agrochemical industry since 1995. The principle is to provide the latest legal entity resulting from the original firm of interest. Firms have then been grouped in several categories: "Big 5", "JP" and "Other".

(86) "Big 5" stands for BASF, Bayer, Dow, DuPont, Syngenta and their predecessors and acquisitions, namely (in the context of the list provided by the Parties) Agraquest, Aventis, Ciba Geigy, Cyanamid, Hoechst, Merck, Nisso BASF Agro, Novartis, Rhône-Poulenc, Rohm & Haas, RohMid, Sandoz, Shell and Zeneca.

(87) "JP" groups firms which have been identified as belonging to or being *today* Japanese firms, namely (in the context of the list provided by the Parties) Abbott, Agro-Kanesho, Certis, Chugai, Eiko Kasei, Hokko, Idemitsu Kosan, Ihara Chemical Industry, Ihara Chemical Industry / Kumiai, ISK, ISK / Sumitomo, Japan Carlit, Kaken, Kumiai, Kumiai / Mitsui & Co, Kumiai / Sumitomo, Kureha, Kyoyu Agri, Marubeni, Meiji, Meiji / Nippon Kayuku, Mitsubishi Chemical, Mitsui & Co, Mitsui & Co / Nihon Nohyaku, Mitsui & Co / Sipcam, Mitsui & Co / UPL, Mitsui

⁵⁷ See Annex 1 to the Decision for more details.

⁵⁸ Parties' response to Commissions' request for information RFI 38, question 5, [dates of submission] (ID6854 and ID6855).

Chemicals, Mitsui Chemicals / Nihon Nohyaku, Mitsui Chemicals / Nihon Nohyaku, Mitsui Chemicals / Nippon Kayaku, Mitsui Chemicals / Ube Industries, Nihon Nohyaku, Nihon Nohyaku / Otsuka Chemical, Nihon Nohyaku / SDS Biotech, Nippon Kayaku, Nippon Kayaku / Sankyo Agro, Nippon Soda, Nissan Chemical Industries, Otsuka Chemical, Otsuka Chemical / Ube Industries, Philagro, ProAgro, Sankyo Agro, Sankyo Agro / Ube Industries, SDS Biotech, Showa Denko, Sumitomo, Sumitomo / Takeda Chemical Industries, Sumitomo Chemical Takeda Agro, Summit Agro, Takeda Chemical Industries, Tokuyama, Ube Industries, Valent, Yashima Chemical Industries, and Zen-noh.

- (88) “Other” stands for firms that are not reported in neither “Big 5” nor “JP”, namely (in the context of the list provided by the Parties) Adama, Agrium, Albaugh, AMVAC, Arysta LifeScience, Avgust, Belchim, Belchim / FMC, Belchim / Isagro, Cheminova, Chemtura AgroSolutions, Chemtura AgroSolutions / FMC, Crompton, Dongbu Farm Hannong, Dongbu Farm Hannong / FMC, East China University, FMC, FMC / LG Chem, FMC / Platform Specialty Products, Gowan, ICI, Isagro, Isagro / RiceCo, Isagro / UPL, LG Chem, Makhteshim Agan Industries, Monsanto, Nufarm, Plant Health Care, Platform Specialty Products, Shanghai Zhongxi Pharmaceutical, Sinochem, Sipcam, Staehler, Swat Agri Chemicals, and UPL.
- (89) While there has been *no systematic review* on years of launch (first year and in the EEA), **EEA launch dates** have been complemented, when not provided, or have been corrected, when potential inconsistent with other information provided by the Parties, typically when indicated to be before the first launch date. The changes operated relate to the following active ingredients, ordered by decreasing EEA turnover in 2015.
- (a) Nicosulfuron: Nicosulfuron is an important active ingredient, ranking 8 in terms of turnovers generated in the EEA in 2015, amongst all active ingredients introduced in the EEA over 1995-2015 (see Table 1). The Parties indicate that it has been first launched, overall, in [...]. They also indicate that it has been first launched specifically in the EEA in [...]. To solve this inconsistency, the Commission relies on Phillips McDougall Product directory⁵⁹ which indicates that Nicosulfuron [...]. The year [launch date] was thus retained as year of entry in the EEA.⁶⁰
- (b) Pinoxaden: Pinoxaden is also an important active ingredient in the EEA, ranking 10 over active ingredients introduced during 1995-2015 (see Table 1). The Parties indicate that it has been first launched, overall, in [...]. They also indicate that it has been first launched specifically in the EEA in [...]. To solve this inconsistency, the Commission relies on Phillips McDougall Product directory⁶¹ which indicates that Pinoxaden [...]. The year [launch date] was thus confirmed as year of entry in the EEA.
- (c) Dimethenamid: Dimethenamid ranks 17 over active ingredients introduced during 1995-2015 (see Table 1). The Parties indicate that it has been first launched, overall, in [...], and that the first launch specifically in the EEA was

⁵⁹ Phillips McDougall Product Directory 2013 Market, filename "DOC-000000454.pdf", slide 472 (ID1328-454).

⁶⁰ This change was indicated in the Statement of Objections and the Parties' response to the Statement of Objections did not respond on that.

⁶¹ Phillips McDougall Product Directory 2013 Market, filename "DOC-000000454.pdf", slide 520 (ID1328-454).

not available. The Commission relies on Phillips McDougall Product directory⁶² which indicates that Dimethenamid was [...]. The year [launch date] was thus retained as year of entry in the EEA.

- (d) Topramezone: “N/A” was changed to [launch date] on the basis of information in Phillips McDougall Product directory.⁶³
- (e) Oxadiazargyl: “N/A” was changed to [launch date] on the basis of information in Phillips McDougall Product directory.⁶⁴
- (f) Orthosulfamuron: “N/A” was changed to [launch date] on the basis of information in Phillips McDougall Product directory.⁶⁵
- (g) Novaluron: “N/A” was changed to [launch date] on the basis of information in Phillips McDougall Product directory.⁶⁶

4.2.2.3. Few active ingredients generate a significant share of turnovers

- (90) Overall, [10-20]% of the active ingredients introduced in the EEA since 1995 ([...]) generated [50-60]% of the EEA turnover in 2015 of these active ingredients (USD [...] out of USD [...]), and [20-30]% of them generated [70-80]% of their 2015 EEA turnover. Thus, a small number of the active ingredients introduced in the EEA since 1995 generate a significant share of their EEA turnover in 2015.
- (91) In particular, three active ingredients with significant 2015 turnovers have been introduced in the EEA in [launch date], namely Bayer’s insecticide Thiachlopid (ranked [...] – see Table 1), DuPont / ISK’s herbicide Nicosulfuron (ranked [...]) and Syngenta’s herbicide Pinoxaden (ranked [...]), which together generate [10-20]% of the 2015 EEA turnover generated by active ingredients introduced in the EEA since 1995.
- (92) Any analysis based on the EEA turnover of active ingredients introduced in the EEA will be sensitive to periods of reference being defined in 2005 or 2006, as it will either include or exclude active ingredients with significant turnovers.
- (93) Nevertheless, the Commission notes that this sensitivity is not related to the Parties’ products only but to active ingredients introduced by three different competitors (Bayer, DuPont and Syngenta).

⁶² Phillips McDougall Product Directory 2013 Market, filename "DOC-000000454.pdf", slide 244 (ID1328-454).

⁶³ Phillips McDougall Product Directory 2013 Market, filename "DOC-000000454.pdf", slide 650 (ID1328-454).

⁶⁴ Phillips McDougall Product Directory 2013 Market, filename "DOC-000000454.pdf", slide 483 (ID1328-454).

⁶⁵ Phillips McDougall Product Directory 2013 Market, filename "DOC-000000454.pdf", slide 480 (ID1328-454).

⁶⁶ Phillips McDougall Product Directory 2013 Market, filename "DOC-000000454.pdf", slide 475 (ID1328-454).

Table 1 – Top 24 active ingredients introduced in the EEA during 1995-2015

#	Developer	Active ingredient	Application	EEA launch	2015 EEA turnover	
					USD million	% all AIs
1	Bayer	Prothioconazole	Fungicide	[...]	[...]	[10-20]%
2	Bayer	Thiacloprid	Insecticide	[...]	[...]	[0-5]%
3	BASF	Fluxapyroxad	Fungicide	[...]	[...]	[0-5]%
4	Bayer	Flufenacet	Herbicide	[...]	[...]	[0-5]%
5	Aventis	Mesosulfuron	Herbicide	[...]	[...]	[0-5]%
6	BASF	Boscalid	Fungicide	[...]	[...]	[0-5]%
7	ICI	Azoxystrobin	Fungicide	[...]	[...]	[0-5]%
8	<i>DuPont / ISK</i>	<i>Nicosulfuron</i>	<i>Herbicide</i>	<i>[...]⁶⁷</i>	<i>[...]</i>	<i>[0-5]%</i>
9	Bayer	Bixafen	Fungicide	[...]	[...]	[0-5]%
10	Syngenta	Pinoxaden	Herbicide	[...]	[...]	[0-5]%
11	Syngenta	Mesotrione	Herbicide	[...]	[...]	[0-5]%
12	<i>Dow</i>	<i>Pyroxsulam</i>	<i>Herbicide</i>	<i>[...]</i>	<i>[...]</i>	<i>[0-5]%</i>
Top 12 active ingredients (out of 104) introduced in the EEA since 1995					[...]	[50-60]%
13	BASF	Pyraclostrobin	Fungicide	[...]	[...]	[0-5]%
14	Aventis	Iodosulfuron	Herbicide	[...]	[...]	[0-5]%
15	<i>Dow</i>	<i>Florasulam</i>	<i>Herbicide</i>	<i>[...]</i>	<i>[...]</i>	<i>[0-5]%</i>
16	Syngenta	Thiamethoxam	Insecticide	[...]	[...]	[0-5]%
17	Sandoz	Dimethenamid	Herbicide	[...] ⁶⁸	[...]	[0-5]%
18	Bayer / Takeda	Clothianidin	Insecticide	[...]	[...]	[0-5]%
19	<i>DuPont</i>	<i>Chlorantraniliprole</i>	<i>Insecticide</i>	<i>[...]</i>	<i>[...]</i>	<i>[0-5]%</i>
20	Aventis	Isoxaflutole	Herbicide	[...]	[...]	[0-5]%
21	Novartis	Trifloxystrobin	Fungicide	[...]	[...]	[0-5]%
22	ISK	Cyazofamid	Fungicide	[...]	[...]	[0-5]%
23	BASF	Metrafenone	Fungicide	[...]	[...]	[0-5]%
24	Bayer	Tembotrione	Herbicide	[...]	[...]	[0-5]%
Top 24 active ingredients (out of 104) introduced in the EEA since 1995					[...]	[70-80]%

Note: “AIs” stands for Actives Ingredients
Active ingredients in italics are (co)developed by the Parties
EEA launch years in bold indicate active ingredients launched in the EEA in 2005

4.2.2.4. Commission’s analysis based on turnovers generated by active ingredients

(94) On the basis of these cleaned data, the Commission provides, in Section V.8.7.2.2 of the Decision, an assessment of the innovation output by weighing the importance of

⁶⁷ In their response to Commissions' request for information RFI 38, question 5, [dates of submission], the Parties have indicated that Nicosulfuron was first launched, overall, in [launch date] and in [launch date] in the EEA, which is inconsistent. Phillips McDougall Product directory indicates: [...] (slide 472). Year [...] was retained as year of entry in the EEA.

⁶⁸ In their response to Commissions' request for information RFI 38, question 5, [dates of submission], the Parties have indicated that Dimethenamid has been first launched, overall, in [launch date] but indicated that the first launch specifically in the EEA was not available. The Commission relies on Phillips McDougall Product directory which indicates that Dimethenamid was [...] (slide 244). The year [...] was thus retained as year of entry in the EEA.

the new active ingredients introduced by R&D players according to the turnover generated, typically in 2015, by each active ingredient in the global market as well as in Europe.

- (95) In section 3 of the Submission attached to their response to the Statement of Objections, the Parties provide comments on this analysis, which are addressed in Section V.8.7.2.2 of the Decision.

CASE M.7932 – DOW/DUPONT

ANNEX 4 TO THE COMMISSION DECISION

IMPLICATIONS OF THE ECONOMIC THEORY ON MERGERS, COMPETITION AND INNOVATION IN LIGHT OF THE FEATURES OF THE TRANSACTION

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1. INTRODUCTION AND SUMMARY

1.1. Structure

- (1) This Annex sets out the Commission's economic considerations related to the theory of harm on the likely effects of the current Transaction on innovation incentives, taking into account the salient features of the Transaction. This Annex also reviews the theoretical economic arguments raised by the Parties during the Phase II investigation, in light of the insights from the relevant economic literature. The factual elements underpinning the Commission's conclusions that the Transaction is likely to lead to a significant reduction in innovation competition are included in the main body of the Decision, and are only briefly highlighted in this Annex.
- (2) The Annex is structured as follows:
 - (a) Section 2 sets out the Commission's economic considerations used in this case to assess the effects of a merger on innovation;
 - (b) Section 3 sets out the theoretical arguments made by the Parties in the economic submissions provided to the Commission;
 - (c) Section 4 looks at the separate roles of *innovation competition* and *product market competition* in determining the level of innovation;
 - (d) Section 5 considers the relevance of conditions of *appropriability* on the likely effects of a merger on innovation;
 - (e) Section 6 briefly considers additional efficiency-related arguments made by the Parties (beyond those relating to appropriability);
 - (f) Section 7 specifically rebuts the arguments made in the economic submissions made by the Parties in response to the Commission's Statement of Objections.
- (3) Appendix A includes a specific example on the relationship between the value of innovation and its appropriability, which is relevant to the Commission's rebuttal contained in Section 7.
- (4) Appendix B collects the list of academic articles referred to in the Annex.

1.2. Summary of conclusions

- (5) The Commission considers that the economic literature on competition and innovation supports the innovation theory of harm set out in the main body of the Decision, in light of the most salient features of the Transaction. In particular, the economic principles laid out in the economic literature indicate that a merger between two out of a limited number of significant innovators is likely to reduce product innovation when appropriability is high (that is, when Intellectual Property Rights (IPR) are effective) and where there are no merger-specific efficiencies.
- (6) A merger can reduce innovation incentives primarily by suppressing innovation competition between the merging parties. Whilst prior to the merger the parties would have an incentive to capture current and future sales from each other when introducing new and improved products, post-merger they would face a reduced incentive to do so. An innovation by a merging party now cannibalizes profits of the merging partner firm and that effect is internalized with the merger, adding to the opportunity cost of innovation and thus depressing the innovation incentive. This is a standard unilateral effect from a merger, in line with the treatment of innovation competition under the Horizontal Merger Guidelines. This effect is stronger if the

merger brings together two out of a few significant innovators in a concentrated market, which absent the merger would have been likely to divert sales from each other by investing in innovation.

- (7) The incentives of the merging parties to innovate may also be affected by the change in current and future product market competition brought about by the merger. This second effect is based on the fact that following a merger, the merging firms coordinate the pricing of their products and thus increase profits. Less intense competition in the product market can increase the net revenues earned by a product line both when the firms innovate to improve the products in that line and when they do not. As such, the effect of a less intense product market competition on innovation is potentially ambiguous.
- (8) While the product market channel in principle generates an ambiguous effect of the merger on innovation incentive, the existing literature suggests that potential countervailing effects of a reduction in product market competition on innovation are unlikely to outweigh the direct adverse effect due to the loss of innovation competition between rivals in a concentrated market.
- (9) Other potential merger-related countervailing effects which may increase innovation by the merging parties relate to the possible lower risk of imitation by competitors and/or to the ability to apply process innovations over a larger scale post-merger. These potential countervailing effects are unlikely to play a significant role if innovation mostly takes the form of product innovation that is protected by effective IPR, which is the case for the present Transaction. The economic literature provides support for the proposition that competition stimulates innovation in the presence of exclusive rights protecting inventors. Moreover, possible pro-innovation effects due to greater appropriability and/or economies of scale should be treated as merger-related efficiencies for which the Parties bear the burden of proof.
- (10) During the Phase II investigation the Parties have provided a number of economic submissions on the relationship between competition and innovation. Prior to the issuing of the Statement of Objections, the Parties submitted [submission document]¹ ([name of submission document])². These submissions contend that competition analysis of innovation is different than the analysis applicable to price competition, and that there can be no presumption that a merger between competing firms would result in a reduction in innovation. In the response to the Commission's Statement of Objections, the Parties have submitted [submission document]³ and [name of submission document]⁴ which criticise the conceptual framework on mergers and innovation used for the assessment of this Transaction, as set out in the Statement of Objections.
- (11) On the basis of its own analysis and its review of the economic literature set out in this Annex, the Commission considers that the theoretical arguments raised by the Parties for why innovation competition should be assessed differently than price competition are largely not applicable to this Transaction, in the absence of substantiated efficiency claims. Moreover, the economic arguments submitted by the

¹ Parties' submission entitled [submission document] (ID7448).

² Parties' submission entitled [submission document] (ID7358).

³ Parties' submission entitled [submission document].

⁴ Parties' submission entitled [submission document].

Parties in the response to the Statement of Objections do not invalidate the conceptual framework and the conclusions set out in this Annex.

1.3. Features of the Transaction that are relevant to the innovation theory of harm

- (12) The Commission considers that the key factual features of the Transaction set out in the main body of the Decision, when assessed in conjunction with the economic principles laid out in the economic literature and explained in this Annex, support the finding that the Transaction is likely to lead to a significant reduction of innovation. In particular in the present case:
- (a) Innovation is an important feature of the crop protection industry, as it allows firms to introduce new and improved products and to address the potential challenges faced by their existing products (for example due to stricter regulatory requirements and/or resistance). By innovating, firms in the crop protection industry are also able to compete away current and future sales from their competitors.
 - (b) The markets affected by the Transaction are highly concentrated (especially if one looks at specific innovation areas), and with high barriers to entry.
 - (c) The Transaction brings together two out of a limited number of significant innovators (both at the industry level and in specific areas in which their innovation activities overlap).
 - (d) There is evidence that absent the merger, the Parties would have been likely to capture sales from each other, as illustrated by the past and current innovation competition between them, resulting in overlaps in/across discovery targets, product pipelines and final products.
 - (e) Innovation in the crop protection industry largely takes place through product innovation that is protected by effective IPRs and other means to sustain high profit margins. This implies that appropriability is already high in the absence of the merger, and is unlikely to be significantly increased by the Transaction.
 - (f) [R&D information].
 - (g) [R&D information].
- (13) The specific evidence supporting each of the factual elements listed in the paragraph above is included in the main body of the Decision.⁵

⁵ The main body of the Decision contains the Commission's assessment of the factual evidence on the following relevant factors for the innovation theory of harm: (a) high industry concentration with high barriers to entry (Section 8.6); (b) innovation by each competitor leads to expected cannibalisation of existing sales of rival firms (Section 8.4.2) and of future sales of rival firms (section 8.8 and 8.9); (c) the relevant product markets are characterised by limited switching costs and high contestability (Section 8.4.2); (d) innovation in the crop protection industry largely concerns product innovation with effective IPRs and other means to sustain high profit margins (high appropriability) (Section 8.4.2); (e) possible product cannibalisation effects are considered by firms when evaluating the profitability of investments in R&D (Section 8.4.3); (f) the merging parties are important innovators with significant patents shares in crop protection for innovations related to new active ingredients (Section 8.7.2); (g) the merging parties are close competitors with overlapping lines of research (Sections 8.8 and 8.9), and (h) [R&D information].

2. GENERAL CONSIDERATIONS ON THE IMPACT OF A MERGER ON INNOVATION

- (14) The economic literature identifies a number of aspects to examine when analysing the effects of a merger on innovation, and identifies a number of conditions which make it more likely that a reduction of competition due to a horizontal merger will reduce innovation. This section briefly sets out these aspects, laying the ground for the assessment of the Parties' economic submissions.
- (15) As noted in the [Parties' submissions], the incentives to innovate are driven by the difference in the expected innovator's profits earned if innovation takes place and the profits earned if innovation does not occur. A merger can affect this difference for each of the firms in the industry (including both the merging and non-merging parties), and with that the overall rate of innovation.
- (16) In line with the economic literature on the relationship between competition and innovation, it is helpful to distinguish between three possible mechanisms through which a merger may affect the difference in firms' profits with and without innovation.
- (17) ***Innovation competition.*** A merger affects innovation incentives—negatively for the merging parties—through the partial internalization of the negative effect that innovation has on sales of rival products. When competing against other firms for the introduction of new products, each firm imposes a “negative externality” on its competitors. A successful innovator will capture—divert—profitable sales from its rivals. The diversion of sales may affect both existing rival products (if rivals are making current sales in the market in the absence of any innovation, based on existing products) and future rival products (if rivals are also innovating and therefore may be introducing new and improved products in the future). A merger between two potential innovators partially internalises the negative externality from innovation. This means that the combined entity will now take into account the fact that innovation by each of the merging firms would result in a loss of expected profits by the other merging party. The diversion of sales between the merging parties becomes an additional opportunity cost of innovation for the merged entity. Following the merger, this new opportunity cost leads to lower incentives to innovate (absent merger-specific efficiencies). This is a standard “unilateral effect” from a merger, similar to the effect of the suppression of price competition between merging parties. This mechanism is further developed in Section 4.1 of the Annex.
- (18) ***Product market competition.*** Another—less straightforward—way in which a merger could affect innovation incentives is by reducing the intensity of product market competition between the merging parties (that is to say by allowing the merging firms to optimally coordinate the prices of their products). If a less intense product market competition increases profits on individual products in the no-innovation state by more (less) than it increases them in the innovation state, the merger is likely to mute (increase) innovation incentives via its effect on product market competition. This mechanism is further developed in Section 4.2 of the Annex.
- (19) ***Appropriability.*** Yet another way in which a merger between competitors could increase the difference between profits when innovating and when not—thus increasing the innovation incentive—is by improving their ability to appropriate the value of their innovation. For the purposes of this Annex, appropriability is defined as the ability by an innovator to prevent rivals (including generic suppliers) from imitating successful innovation and/or the ability to monetize inventions through

licensing.⁶ Because the appropriability channel, when relevant, does not affect the profits in states in which the firm is not successful in innovation but it positively affects profits when innovation takes place, it tends to favour innovation. The merger could increase appropriability because it removes a potential imitator (namely the merging partner) or because it facilitates the achieving of economies of scale in innovation (if licensing opportunities are limited absent the merger). This mechanism is further developed in Section 5 of the Annex.

- (20) In this Annex, the Commission assesses the likely effects of the Transaction and the arguments of the Parties against the three possible mechanisms, taking account of the salient features of the Transaction (as set out in the main body of the Decision) and considering some of the insights of the existing economic literature.
- (21) There are factors other than a merger that affect firms' profits with and without innovation. In the crop protection industry, these other factors include for example resistance and regulation. These factors however are unlikely to be significantly affected by the Transaction. They are discussed in the main body of the Decision and are therefore not considered in detail in this Annex. Specific arguments raised by the Parties in connection to the role played by resistance and regulation in the context of the assessment of the Transaction are addressed in Section 7 of this Annex.

3. THEORETICAL ECONOMIC ARGUMENTS ON INNOVATION PRESENTED BY THE PARTIES

- (22) The Parties made, before the Commission issued the Statement of Objections, a number of arguments relating to the theoretical relationship between mergers and innovation (notably [Parties' submissions]). This section of the Annex (Section 3) addresses the arguments spelled out in those reports.
- (23) The Parties have also submitted two economic reports in response to the Statement of Objections. Those reports argue that the Commission has not correctly identified or assessed all the mechanisms that contribute to the potential positive effects of a merger on innovation incentive. The reports allege that as a result of such errors, the Commission's conceptual assessment of innovation incentives is incomplete and its theory of harm must be dismissed. Section 7 reviews the economic arguments submitted by the Parties in the response to the Statement of Objections, and explains why they are not correct.

3.1. Overview of the theoretical arguments presented by the Parties

- (24) [Parties' submissions] both contend that the relationship between competition and innovation is complex and that a merger such as the current Transaction may lead to higher incentives to innovate even in the absence of efficiencies.

⁶ Appropriability is therefore not about the ability to monetize innovation through the acquisition of market power in the product market. This effect is captured through the first two mechanisms set out in the main text.

- (25) These two economic submissions identify six separate channels through which the Transaction could lead to higher incentives to innovate:⁷
- (1) **Higher returns to R&D investment when firms compete in R&D.** A reduction in the number of independent competitors in R&D may increase the return to R&D efforts and therefore increase innovation ([Parties' submissions]);
 - (2) **Reduced uncertainty in R&D competition.** The possible reduction of uncertainty in R&D competition due to the merger can also stimulate innovation, [Parties' submission];
 - (3) **Reduction of imitation.** A merger may increase the reward to innovation by reducing information spillovers to competing firms and hence imitation ([Parties' submissions]);
 - (4) **Higher scale.** A merger may increase the return to innovation by allowing the merged entity to capture greater sales and hence appropriate more of the value of innovation if this is proportional to sales ([Parties' submission]);
 - (5) **Product complementarities.** A merger may allow a firm to capture a greater value of its innovation by combining it with complementary products offered by the other merging party (and vice versa), in ways which were not feasible pre-merger ([Parties' submissions]); and
 - (6) **Cost synergies.** A merger may reduce the cost of R&D via merger-specific synergies, and therefore stimulate innovation ([Parties' submission]).
- (26) [Parties' submissions] argue that only the last of the six channels listed above should be assessed as a merger-specific efficiency. The other alleged pro-innovation effects should be considered within the overall competitive assessment of the Transaction.
- (27) [Parties' submissions] make a number of arguments in connection to the relationship between product market competition and innovation. In particular, both reports argue that the well-known prediction due to Arrow according to which firms in a competitive market structure are likely to face stronger incentives to innovate than firms in a more concentrated market, is not always valid. For example, Arrow's result may not hold if firms compete in R&D, since in this case an incumbent firm may face stronger incentives to invest than a new entrant. This is because the incumbent may be investing to protect its existing monopoly profits, while the latter would be able to only realize—lower—competitive profits after a successful innovation and entry ([Parties' submission]).⁸ An incumbent firm may also face stronger incentives to innovate than a competitive firm if it can capture greater market value by combining the new product with its existing product ([Parties' submission]).⁹

⁷ [Parties' submissions] develop some of the arguments on why a merger could positively affect innovation incentives in general, without specific reference to the Transaction, we assume for the purposes of this Annex that all of theoretical arguments raised are in principle applicable to the Transaction according to the two economic submissions.

⁸ This result relies on the work of Richard Gilbert and David Newbery (1982), "Preemptive patenting and the persistence of monopoly, *American Economic Review*, 72(3), 514-526 (hereafter "Gilbert and Newbery (1982)").

⁹ This result relies on the work of Yongmin Chen and Marius Schwartz (2013), "Product innovation incentives: monopoly vs. competition", *Journal of Economics and Management Strategy*, 22(3), 513-528 (hereafter "Chen and Schwartz (2013)").

- (28) The [Parties' submission] also refers to a number of academic articles in support of the notion that a reduction in product market competition may stimulate innovation. These include work by Vives (2008)¹⁰, and by Aghion, Harris and Vickers ([Parties' submission]).

3.2. General considerations on the theoretical arguments of the Parties: distinguishing competitive effects from efficiencies

- (29) At the outset, the Commission notes that according to its assessment all but the first two of the six pro-competitive channels set out by the Parties ([Parties' submissions]) rely on *merger efficiencies*. This is because each of the channels enumerated three to six above is based on a mechanism conceptually distinct from the loss of competition between the merging parties brought about by the merger itself. In other words, the four channels are not necessarily specific to a merger or linked to the elimination of competition between the merging parties. While a reduction in imitation (or free-riding) by rival firms may, for example, generate an offsetting pro-innovation effect (by allowing the merging parties to internalise a positive externality that was not being internalised absent the merger), it can be logically distinguished from the effect of the loss of competition between merging parties. This is because a reduction in imitation risk does not automatically follow from a loss of competition between the merging parties. The reduction in this risk can—at least in principle—be achieved by strong (enforcement of) IPR, high degree of secrecy or other business strategies by the industry participants.¹¹
- (30) By contrast, the first channel identified by the Parties (the mechanism whereby the loss of innovation competition between the Parties may lead them to innovate more) is intrinsically linked to the loss of innovation competition between the Parties and should therefore be evaluated within the competitive assessment of the Transaction. The second channel is also closely linked to the elimination of innovation competition between merging parties, and therefore the Commission considers it to be a part of the theory of harm. Both channels are connected to the notion of innovation competition introduced in Section 2 of this Annex, and are addressed in detail in Section 4.1.
- (31) The Commission also notes that the third and fourth pro-competitive mechanisms identified by the Parties (namely greater innovation incentives due to less imitation and due to higher scale) are both linked to the notion that the merger may increase the appropriability of a given innovation. [...], the Commission reviews in Section 5 the theoretical arguments on appropriability raised by the Parties in light of the findings of the economic literature on innovation. As set out in Section 2, the issue of appropriability is an important determinant of the incentives to innovate considered in the economic literature. It is thus appropriate to examine the relevance of appropriability in the assessment of the effects of competition on innovation, particularly in a market with strong patent protection such as the crop protection industry.

¹⁰ Xavier Vives (2008), "Innovation and competitive pressure", *Journal of Industrial Economics*, 56(3), 419-469 (hereafter Vives (2008)).

¹¹ By analogy, the U.S. Horizontal Merger Guidelines explicitly discuss the ability by a merged entity to appropriate a greater share of the benefits resulting from innovation as a possible efficiency, noting that licensing and intellectual property conditions may be important factors to consider (see page 31).

(32) The fifth and sixth pro-innovation channels identified by the Parties are more traditional efficiency arguments which are addressed in Section 6 of this Annex.

4. THE ECONOMIC LITERATURE INDICATES THAT A MERGER CAN CHANGE INNOVATION INCENTIVES BY AFFECTING BOTH INNOVATION AND PRODUCT MARKET COMPETITION

(33) A merger affects investment incentives through different channels. Some of the economic literature and—to facilitate the exposition and analysis—this Annex, distinguish between the *innovation competition* and the *product market competition* channel.

(34) To see the distinction, consider a merger between owners of two separate product lines (Product line A and Product line B), and assume that the quality of the product in each product line can be improved through innovation. One way in which the merger affects innovation incentives is by internalising the (negative) effects of innovation in Product line A on the expected profits of Product line B (and vice versa). This is the standard unilateral effect from the suppression of *innovation competition* which is discussed in Section 4.1 of this Annex.

(35) The other way in which a merger affects the incentives to innovate in relation to each of Product lines A and B is by relaxing the *product market competition* between the two lines of products. The coordination of the pricing of Product A and Product B due to the merger increases the revenues earned by each product line both in the scenarios where innovation does and where it does not take place (by one or both of the two products). The product market competition effects studied in the economic literature—and referred to by the Parties in their submissions—are primarily related to this second effect of a merger, and do not account for the first effect (or do so only indirectly). The possible effects of changes in product market competition on innovation incentives are discussed in Section 4.2 of this Annex.

4.1. The effects of a merger on competition in innovation

4.1.1. A merger in innovative industries generates standard unilateral effects in innovation

(36) In the crop protection industry firms compete against each other in the process of introducing innovative products, rather than just competing in the market for *current* products. Rivalry between competing firms is an important driver of the incentives to innovate, as reviewed in the main body of the Decision.

(37) In circumstances where by innovating a firm captures significant sales from rivals while a firm that does not innovate risks losing its current sales to rivals that do (thus increasing the profit gain from innovating), competition in innovation will be an important parameter of competition between firms, just like price and quality are.¹² This concept is explicitly noted in the European Commission's Horizontal Merger Guidelines (paragraph 8).

(38) The importance of rivalry in the process of introducing innovative products is emphasised in the economic literature on innovation. For example, Baker (2007) notes: "[f]irst, competition in innovation itself—that is, competition among firms

¹² This mechanism finds support in the [Parties' submission], which notes that market share changes in the crop protection industry appear to be driven by innovation, "*providing strong incentives for firms to innovate since if they do not they will lose share to firms that do*" (page 39).

seeking to develop the same new product or process—encourages innovation. When firms see themselves in a tough race to innovate first, they try harder to win. This dynamic is particularly evident in the economic literature on R&D competition in “patent races”” (page 579).¹³ Similarly, Shapiro (2012) stresses the importance of the “contestability” principle in driving innovation incentives (defining the contestability principle as “[t]he prospect of gaining or protecting profitable sales by providing greater value to customers spurs innovation” (page 364)).

- (39) Some of the economic literature also notes that rivalry in innovation may enhance innovation by promoting R&D diversity. Parallel research paths can accelerate innovation if there is uncertainty about the correct solution to a specific technological program. A merger can reduce R&D diversity and therefore harm innovation if parallel research tracks are discontinued and duplicative R&D is eliminated in order to cut costs.¹⁴
- (40) A merger between two out of a limited number of innovators is likely to reduce competition in innovation, and thus limit the overall rate of innovation. This conclusion is supported by a number of articles - see for example Gilbert (2006b)¹⁵, Gilbert and Greene (2015)¹⁶, Shapiro (2010)¹⁷, Shapiro (2012) and Whinston (2012)¹⁸.

¹³ Jonathan Baker (2007), "Beyond Schumpeter vs. Arrow: How antitrust fosters innovation", *Antitrust Law Journal*, 74 (hereafter "Baker (2007)").

¹⁴ See Comanor William and F.M. Scherer (2013), "Mergers and innovation in the pharmaceutical industry", *Journal of Health Economics*, pages 106-113 (hereafter "Comanor and Scherer (2013)"). This paper notes that: "*The portfolio-pruning and cost-cutting practices that often follow a merger could be one reason why parallelism in pharmaceutical companies' clinical testing programs is so low. When a merger occurs, it is common for managers to analyse the R&D portfolios of the combined companies and eliminate those they see as "duplicative"*" (page 110). Carl Shapiro (2012), "Competition and innovation. Did Arrow hit the bull's eye?", chapter 7 of Josh Lerner and Stern Scott (eds.) *The Rate and Direction of Inventive Activity Revisited*, pages 361-404 (hereafter "Shapiro (2012)") also notes the advantages of having multiple firms seeking to innovate in a given area, due to the fact that decentralisation supports innovation diversity (page 382). The advantages of competition for research diversity are also noted by Richard Gilbert (2006), "Competition and innovation", Chapter 26 in Wayne Dale Collins (eds.), *Issues in Competition Law and Policy*, ABA Antitrust Section (hereafter "Gilbert (2006b)").

¹⁵ Gilbert (2006b) for example notes that: "*Competition in research and development [...] has effects on the amount and timing of R&D that differ from competition in the product markets before and after innovation occurs. If the outcome of R&D is highly uncertain, then increasing the number of firms engaged in a race to patent a new innovation generally reduces the expected arrival time of the innovation*" (page 9).

¹⁶ Richard Gilbert and Hillary Greene (2015), "Merging Innovation into Antitrust Agency Enforcement of the Clayton Act", *The George Washington Law Review*, Volume 83(6) (hereafter "Gilbert and Greene (2015)") state as follows: "*An increase in market power from a merger can dull the incentive to invent in at least two ways. By increasing the flow of profits from existing products and services, the merger can reduce the merged firm's incentive to create new products and services. Alternatively, the merger can combine two firms, each of which would have taken significant sales from the other if they had been successful innovators. The merger internalizes this externality, thereby reducing incentives for invention*" (page 1938).

¹⁷ Carl Shapiro (2010), "Merger guidelines: hedgehog to fox", *Antitrust Law Journal*, 77, 701-759 (hereafter "Shapiro (2010)").

¹⁸ Michael Whinston (2012), "Comment" on Chapter 7 of Josh Lerner and Scott Stern (eds.), *The Rate and Direction of Inventive Activity Revisited*, pages 404-410 (hereafter "Whinston (2012)").

- (41) The intuition for this proposition relies on the standard logic of unilateral effects.¹⁹ As already summarised in Section 2, when competing against other firms for the introduction of new products, each firm imposes a “negative externality” on its competitors. If it is successful in introducing a new product, the innovator will capture profitable sales from its rivals. A merger between two potential innovators internalises the negative innovation externality. In other words, from the perspective of each innovator, the lost expected profits on the products of the other merging firm become an opportunity cost of innovating.²⁰ Following a merger the opportunity cost—that was not present before—leads to lower incentives to innovate for each of the two firms (absent merger-specific efficiencies).²¹
- (42) As with the standard unilateral effects in price competition, unilateral effects in innovation competition are more pronounced if the merger brings together two out of a limited number of effective innovators, in a concentrated market with high barriers to entry. The effects are also stronger if the merging parties are close competitors in terms of their likely innovation trajectories and/or in the product markets targeted with their innovation. In this case, the merging parties would have been likely to capture significant sales from each other (including from both current and future products). As indicated by Farrell and Shapiro (2010), adverse effects on innovation increase when the “innovation diversion ratio” between the merging parties increases (that is, the higher is the fraction of additional profits earned by one of the merging parties when it invests more in innovation which come at the expense of the other merging party).²² In a way that is analogous to non-coordinated effects in price competition, the existence of significant adverse unilateral effects in competition is not predicated on the merger strengthening or leading to a dominant position, and it can also hold in a concentrated oligopolistic market (in accordance with paragraph 25 of the Horizontal Merger Guidelines).²³
- (43) The adverse effect on innovation due to a merger between rival innovators is not predicated on a loss (or change) of current product market competition between the

¹⁹ For a discussion along these lines see Shapiro (2012).

²⁰ The [Parties' submission] mentions a number of specific examples of competition in innovation affecting the expected profits of the merging parties, noting that [quote from internal document].

²¹ Diversion of future sales between the merging parties is central to the mechanism whereby a horizontal merger can lead to less innovation, as is noted for example in the U.S. Horizontal Merger Guidelines (see also discussion in Shapiro (2010), pages 735-737). In section 6.4 (“Innovation and Product Variety”), the U.S. Horizontal Merger Guidelines state as follows: “*Competition often spurs firms to innovate. The Agencies may consider whether a merger is likely to diminish innovation competition by encouraging the merged firm to curtail its innovative efforts below the level that would prevail in the absence of the merger. That curtailment of innovation could take the form of reduced incentive to continue with an existing product-development effort or reduced incentive to initiate development of new products.*”

The first of these effects is most likely to occur if at least one of the merging firms is engaging in efforts to introduce new products that would capture substantial revenues from the other merging firm. The second, longer-run effect is most likely to occur if at least one of the merging firms has capabilities that are likely to lead it to develop new products in the future that would capture substantial revenues from the other merging firm. The Agencies therefore also consider whether a merger will diminish innovation competition by combining two of a very small number of firms with the strongest capabilities to successfully innovate in a specific direction.)”

²² See section 8 of Joseph Farrell and Carl Shapiro (2010), “Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition”, *The B.E. Journal of Theoretical Economics*, 10(1) (hereafter “Farrell and Shapiro (2010)”).

²³ [R&D information].

merging parties. Even if the current product portfolios of the two merging parties do not overlap, each of the parties may still be an important innovator in a market where the other is an existing or a potential supplier and with that there is a negative externality from innovation between the merging parties. The merger would, if it leaves only a few viable independent innovators in the market, then lead to lower innovation incentives given that the merged entity now internalises this effect. As already noted, this effect can be expected to be significant if the merger involves two out of a limited number of effective innovators, which absent the merger would have captured significant sales from each other.

- (44) Less innovation by the merging parties can take the form of both lower *development* efforts for product innovation that have already been discovered (for example discontinuation and/or delay of early pipeline products) and lower discovery (*research*) efforts for new products. Discontinuation of the development of a product in the pipeline is more likely to occur the higher the level of development and commercialisation costs that have not yet been incurred (relative to market sales) and the higher the expected sales which the pipeline product would capture (if launched) from the existing/future products of the merged entity. The merger-induced incentive to discontinue pipeline products applies to projects of each merging party that was likely to cannibalise sales from the other merging party.
- (45) In some economic models of oligopoly, less innovation by the merged entity may lead to a reaction by non-merging parties in the form of higher innovation effort (in the absence of capacity constraints).²⁴ Even if this potential offsetting effect is present, it is however typically of lower magnitude than the first-round reduction of innovation effort by the merging parties in a concentrated market, thus leading to lower overall innovation (see the discussion in Whinston (2012), and the specific illustration in Motta and Tarantino (2016)²⁵).

4.1.2. *Unilateral effects in innovation competition are supported by the literature on R&D races*

- (46) The literature on patent races in the presence of uncertainty supports the view that a reduction in rivalry in the process of introducing innovation can be expected to lead to less innovation, and thereby to consumer harm, via unilateral effects.
- (47) This literature is not directly applicable to merger control because it does not model mergers between rival innovators (that is to say a reduction in the number of independent innovators that is the result of the combination of the capabilities of two rival innovators due to a merger). It is however instructive to examine the findings of this literature as it sheds some light on the role of rivalry in driving innovation. This literature is also directly relevant to some of the claims made by the Parties on why a merger may lead to an increase in innovation.
- (48) In the crop protection industry, it is evident that innovation is stochastic or uncertain – that is, the firms are not certain of the commercial impact of their discovery efforts when they initiate such efforts. The economic literature on patent and R&D races

²⁴ Note that this effect is not always present in the economic literature. For example, in some models of R&D races, less innovation by challengers also induces the incumbent to innovate less (see section 4.1.2 immediately below). In this case, the reaction by non-merging parties may actually strengthen the initial reduction in innovation due to the merger.

²⁵ Massimo Motta and Emanuele Tarantino (2016) "The effect of a merger on investments", CEPR Discussion Paper DP11550 (hereafter "Motta and Tarantino (2016)").

under conditions of uncertainty is therefore relevant to the understanding of the impact of a change in market structure on innovation.

- (49) Economic models of uncertain patent races indicate that a reduction in the number of firms racing to be the first to patent a new product leads to a delay in the expected arrival date of a new invention.²⁶ Depending on the assumptions made on the innovation cost function, a reduction in the number of potential innovators may increase or decrease the investment level *per firm*. However, even in the case where a reduction in the number of independent firms means that each firm invests more (for example Loury (1979)), overall innovation is slowed down due to the loss of an independent innovator (that is to say the higher innovation efforts by the remaining firms do not compensate for the loss of an independent innovator²⁷).
- (50) The findings from the patent races literature contradict the proposition advanced by the Parties that a merger may stimulate the overall innovation rate as it could lead to a greater return from R&D if firms are racing to be the first to innovate (for example as suggested both [Parties' submissions]). Whilst this effect may, or may not, hold for an individual firm (depending on how the R&D race is modelled), it is unlikely to hold for the market as a whole, given the loss of an independent innovator due to the merger. When the merger is modelled simply as a reduction in the number of potential innovators, the results of the patent race literature indicate that it is likely to reduce overall innovation, contrary to the claim made by the Parties.²⁸

4.1.3. *The literature on competition and innovation suggests that competition is a positive driver of innovation in concentrated markets*

- (51) Some papers have put forward models that account for changes in both process (that is to say cost-reducing) innovation and product market competition. These papers analyse how the changes in market structure affect competition in innovation and competition in the final product market. Some of this work considers explicitly a merger between competing firms in oligopolistic markets (for example Motta and Tarantino (2016) consider both a general oligopoly case, and a specific 3-to-2 merger), and is therefore directly relevant to merger assessment.

²⁶ See Glenn C. Loury (1979), "Market Structure and Innovation", *Quarterly Journal of Economics*, 93(3), 395-410 (hereafter "Loury (1979)"); Tom Lee and Louis L. Wilde (1980), "Market Structure and Innovation: A Reformulation", *Quarterly Journal of Economics*, 94(2), 429-436 (hereafter "Lee and Wilde (1980)"); Jennifer F. Reinganum (1983), "Uncertain Innovation and the Persistence of Monopoly", *American Economic Review*, 73(4), 741-748 (hereafter "Reinganum (1983)"); Jennifer F. Reinganum (1985), "Innovation and Industry Evolution", *Quarterly Journal of Economics*, 100(1), 81-99 (hereafter "Reinganum (1985)"); and Jennifer F. Reinganum (1989), "The Timing of Innovation: Research, Development, and Diffusion", Chapter 14 in Richard Schmalensee and Robert D. Willig (eds.), *Handbook of Industrial Organization*, Volume 1, 849-908 (hereafter "Reinganum (1989)").

²⁷ The result that overall innovation is reduced even if innovation per firm increases follows from the fact that any increase in innovation per firm is due to higher incremental returns for innovation, which in turn must be associated with an overall reduction in the rate of innovation.

²⁸ Models of patent races under uncertainty extend to asymmetric situations where an incumbent monopolist races to introduce an innovation in competition with one or more challengers. As shown by Reinganum (1983) the presence of an additional challenger induces an incumbent to increase its innovation effort. Competition in innovation leads to more (faster) innovation also in this case. More generally, Reinganum (1985) shows that an increase in competitive intensity (proxied by the number of independent challengers) leads to greater innovation efforts and faster innovation by both the incumbent and the challengers. Moreover, for sufficiently drastic innovations, the challengers are likely to innovate more than the incumbent.

- (52) These papers find that less competition (for example a merger or partial collusion between competing firms) typically reduces market-wide innovation, in particular in concentrated markets. Whilst this body of work looks at deterministic process innovation (rather than uncertain product innovation), some of the insights are likely to carry through to product innovation (in the absence of efficiencies).
- (53) Lopez and Vives (2016)²⁹ look at the impact of changes in competitive pressure, that is changes in the degree of effective coordination between firms (for example due to higher level of common ownership and cross shareholding), on process innovation. The paper shows that under a variety of assumptions, less intense competition (that is to say more coordination between firms) is associated with lower levels of cost-reducing innovation in the absence of spillovers, to the detriment of consumers. The paper assumes that coordination affects both innovation competition and product market competition. Therefore, when coordinating, rival firms partially internalise the effects of their innovation on rival firms by reducing innovation effort; this effect outweighs any possible countervailing effect from the reduction in product market competition (absent spillovers).
- (54) In a different setting Aghion *et al.* (2005)³⁰ find that more coordination in the product market stimulates innovation by laggards, leading to the prediction of an inverted-U relationship between competition and innovation (the result of Aghion *et al.* (2005) is further reviewed in Section 4.2 below, in connection with product market competition). One reason for the difference in the results between Aghion *et al.* (2005) and Lopez and Vives (2016) is that the latter looks at how different competitive conditions affect *both* innovation competition and product market competition at the same time (which is a realistic assumption), while the former only looks at product market competition in isolation (which is *not* a realistic assumption). Under the more reasonable assumption that coordination between rival firms happens both in innovation and in product prices, then Lopez and Vives (2016) show that the results of Aghion *et al.* (2005) no longer apply (absent spillovers).
- (55) Motta and Tarantino (2016) look at the impact of a horizontal merger in a situation where firms offer differentiated products and can engage in cost-reducing effort (process innovation). The paper shows that, absent efficiencies, a merger typically reduces total innovation and consumer welfare (whilst increasing the profits of the merging parties). In this set-up, innovation effort by the merging parties follows their output post-merger (that is to say both innovation and output fall post-merger).³¹ Whilst its results apply to process innovation, the paper discusses a number of applications where the same results would apply to product innovation.
- (56) [Parties' submission] relies on Vives (2008), claiming that the paper shows that "*too much competition harms consumers by reducing the incentives for firms to engage in cost-reducing innovation*" ([Parties' submission]). Vives looks at process innovation

²⁹ Angel Lopez and Xavier Vives (2016), "Cross-ownership, R&D spillovers and Antitrust Policy", CESifo Working Paper No. 5935 (hereafter "Lopez and Vives (2016)").

³⁰ Aghion, Philippe, Nick Bloom, Richard Blundell, Rachel Griffith and Peter Howitt (2005), "Competition and innovation: an inverted-U relationship", *Quarterly Journal of Economics*, 120(2), 701-728 (hereafter "Aghion et al. (2005)").

³¹ The paper also shows that the negative effect of the merger on investment by the merging parties may outweigh the positive effect on investment by the non-merging parties, in line with standard economic principles (as noted by Whinston (2012)). This is the case in a general model with simultaneous choices, and in the specific 3-to-2 example considered in the paper.

under a number of assumptions on competition. He models a change in competition as a change in the number of firms (which is not directly applicable to merger assessment). Whilst Vives finds that process innovation effort *per firm* tends to decrease with the number of competing firms, he also finds that total R&D intensity (for example the amount of cost reduction expenditure over total sales) typically increases with an increase in the number of firms.³² The reason for this finding is similar to the one from the patent race literature: whilst the presence of fewer innovators may make innovation effort more attractive for each firm, the loss of an independent innovator typically reduces overall innovation. Vives (2008) therefore does not support the statement advanced in the [Parties' submission] that an increase in competition can reduce innovation and harm consumers.

- (57) In response to the Statement of Objections, the [Parties' submission] argues that the Statement of Objections wrongly dismissed Vives (2008) as supporting the idea that a merger can increase innovation. The report first explains that the paper shows that "*with more rivalry, each firm sells less and invests less in R&D. As a consequence, rivalry has an adverse effect on the extent to which each firm lowers its costs. The fact that R&D intensity may increase with the number of competing firms is irrelevant to innovation in this context.*"³³ The report then claims to illustrate, with a simple numerical example, that a reduction in the number of firms active in the market—a merger—could lead to higher industry innovation in the framework of Vives (2008).
- (58) The [Parties' submission] therefore claims that in Vives's framework an increase in the effort of each individual firm could increase innovation even when the number of firms that innovate and overall R&D intensity is reduced. This is not, however, what Vives (2008) finds – the paper is silent on this point. The Commission also notes that the simple numerical illustration in the [Parties' submission] does not establish that total innovation output is likely to increase in Vives's framework. This is because the illustration assumes—and the result depends on that assumption—that the equilibrium output would have remained unchanged as the number of firms is reduced. [Parties' submission] assumption is not consistent with Vives (2008) framework where the total output falls with a reduction in the number of firms. If the output in the report's illustration was assumed also to fall after the merger, the result could easily be turned around.
- (59) In conclusion, the Commission considers that whilst the results of the papers summarised in the preceding paragraphs do not apply directly to uncertain product innovation, overall these papers indicate that the intensity of competition between rival innovators is positively associated with market-wide innovation, absent specific forms of efficiencies. A merger between two significant and close competitors is therefore likely to reduce the level of innovation by each of the merging parties.

³² Vives (2008) states that, in the model with restricted entry (which is more suitable for merger assessment): "*[...] it is still possible, and indeed likely, that increasing the number of firms increases R&D intensity (i.e. cost reduction expenditure over sales)*" (page 423). The paper also notes, in relation to models of differentiated pricing, that "*a usual measure of the firm's R&D intensity as well as the total R&D intensity is in fact increasing in [the number of firms] n in the examples*" (page 430).

³³ [Parties' submission], paragraph 40.

4.1.4. *Overall impact on consumers of a loss of innovation competition between merging parties*

- (60) It is well established in the economic literature that a reduction of innovation can generate significant harm to consumers.³⁴ On the basis of the unilateral effects from the elimination of innovation competition summarised in the Annex so far, innovation-related harm to consumers can come through three possible channels:
- (a) **Discontinuation of *existing* pipeline products.** In the short to medium term, a merger bringing two competing pipeline products under a common ownership may lead to the discontinuation (or delay) of one of them. The same can happen if the merger brings under a common ownership a pipeline product that would have competed with an existing product or another pipeline of the merging partner firm. The risk of a discontinuation of a pipeline product increases with the likelihood with which it was to capture significant revenues from a competing—be it another pipeline or a current—product, particularly in the presence of significant development and commercialisation costs. If existing pipeline products are discontinued, consumers are harmed by a loss of product variety, and by a reduced intensity of future product market competition in the market(s) where the discontinued product would have been introduced in the absence of the merger. The discontinuation of a product leads to a higher consumer harm relative to the case where competing products are still introduced following a merger but then do not compete in price.
 - (b) **Reduction in *future Research & Development* efforts.** By internalising the impact of innovation competition between the merging parties, a merger between significant innovators can also lead to lower innovation efforts. This can negatively affect both the research (discovery) efforts for new products and development of future pipeline products. A merger makes it more likely that future pipeline products will be discontinued by bringing together the existing products portfolios and pipelines of the two merging parties (to the extent that discovery cannot be perfectly targeted to avoid overlaps with competing products owned by the merged entity).³⁵ Also in this case, consumers are harmed by a loss of product variety, and by less intense future product market competition in the market(s) where the parties would have innovated but for the merger. As for the case of discontinuation of existing pipeline products, the consumer harm associated with a merger that results in a reduction in R&D efforts is additional to the harm resulting from the elimination of future price competition between the merging parties.
 - (c) **Reduction in *future product market competition*.** Finally, a merger between important innovators is also likely to remove price competition between the merging parties in markets where they would have competed in the future but

³⁴ For example, Shapiro (2010) notes that "*The [U.S. competition] Agencies are well aware of the importance of non-price competition, and especially the enormous importance over the long run of innovation competition in generating consumer benefits*" (page 736).

³⁵ For reasons that are explained in the main text, the merger effectively increases cannibalisation effects. This implies that a newly discovered product that would have been profitable to develop pre-merger may no longer be profitable post-merger, increasing the likelihood of discontinuation. [R&D information] as further developed in the main body of the Decision, the Commission considers it likely that the Transaction would lead to the discontinuation/delay of overlapping lines of research and early development products.

for the merger. Product market competition for products other than the existing overlaps is affected by the merger in circumstances where, notwithstanding the reduction in innovation efforts that follows a merger, competing products are still discovered and commercialised (for example this can be the case if discovery cannot be perfectly targeted, and after the merger firms discover new products that are sufficiently valuable relative to their development costs and cannibalisation effects, and therefore still bring them to market). The suppression of future price competition affects markets where the merging parties would have competed against each other absent the merger. This can include markets where one or both of the parties are not currently present with existing products. If innovation is an important determinant of market dynamics, and the parties are important innovators, the parties can be expected to meet in future product markets which do not necessarily correspond to their current product overlaps. Consumers would likely be harmed in this case by the standard unilateral effects due to the elimination of future price competition between the merging parties.³⁶

4.2. The Transaction is unlikely to lead to greater overall innovation on the basis of its effects on product market competition

- (61) As noted in Section 2, the incentives to innovate are driven by the difference in the profits earned if innovation takes place and the profits earned if innovation does not occur. The degree of product market competition affects expected profits under the respective scenarios, and can therefore affect innovation incentives. The intensity of product market competition may vary as a result of a number of conditions, including the degree of product differentiation, the extent of barriers to entry, the propensity for (tacit) collusion, and market structure.
- (62) The Parties allege that an ambiguous relationship between product market competition and innovation incentives implies that the Transaction may lead to greater innovation. These arguments, however, largely abstract from the loss of innovation competition directly caused by the Transaction ([R&D information]). Because the arguments made by the Parties relate almost exclusively to the possible effects of the merger via the product market competition channel, ignoring the concurrent impact of the merger on innovation rivalry, they are incomplete.³⁷
- (63) For reasons that are set out in this section of the Annex, the Commission does not consider that the economic literature supports a prediction that the loss of product market competition implied by the Transaction would be likely to offset the negative effect on innovation brought about by the loss of innovation competition between the merging parties.

³⁶ The adverse effects of a merger on *future* price competition are likely to be greater than those resulting from the suppression of *current* price competition if absent the merger the parties would have improved their existing products thanks to their innovation, delivering greater future benefits to consumers. These higher benefits would be lost as a result of the suppression of future price competition between the merging parties.

³⁷ As explained before, much of the economic literature takes a similar focus when studying the relationship between market structure and innovation output. This is the reason why much of this literature is not directly applicable to the assessment of the likely effect of a merger on innovation. This has to be kept in mind when applying the results of the economic literature to merger assessment.

4.2.1. *The alleged inverted-U relationship between competition and innovation referred to by the Parties is not directly applicable to the assessment of merger effects*

- (64) The [Parties' submission] refers to an alleged inverted-U relationship between competition and innovation, suggesting that in some cases a merger that reduces the intensity of product market competition may actually encourage innovation by the merged entity. The Commission has reviewed the literature on the effects of changes in product market competition on innovation, and (absent efficiencies) does not find that this literature supports the view put forward in the [Parties' submission].
- (65) As noted by Baker (2007), an increase in the intensity of product market competition should be expected to increase innovation incentives if it (negatively) affects hypothetical profits in the state in which the firm does not innovate by more than it affects the profits in the state where it innovates.
- (66) When appropriability is high—as is the case for the current Transaction and for crop protection industry in general (see discussion in Section 5 below)—the innovator can reap most of the benefits of a new and better—differentiated—product.³⁸ By innovating, a firm “escapes” the pre-innovation competitive pressure and gets a degree of post-innovation market power and associated profits.
- (67) In other words, if product market competition is intense, firms, individually, likely realize low sales volumes or profits. They thus face weaker *cannibalisation* (or replacement) effects when introducing new products. Therefore, a merger that reduces product market competition may, in some circumstances, be expected to also reduce incentives to innovate.³⁹ In such circumstances, the product market channel and innovation rivalry channel would both be generating a negative pressure on innovation following a merger.
- (68) The “escape competition” effect is clearest in the case of drastic or winner-takes-all innovation, since post-innovation rivals to the innovator do not exercise significant competitive pressure (if appropriability is high), and therefore post-innovation profits are less affected by product market competition than pre-innovation profits (as noted by Baker (2007)).
- (69) Theoretical work in the economic literature also suggests that greater product market competition may stimulate innovation also for the case of non-drastic innovation. In particular, the “step-by-step” innovation model considered by Aghion *et al.* (2001)⁴⁰ formally studies the nature of the “escape competition” effect. In the model, two firms compete both in a product market and to introduce innovations. Both the

³⁸ The Parties' economic reports in response to the Statement of Objections contest the Commission's definition of appropriability as being too narrow. This issue is dealt with in Sections 7.2.1 and 7.2.2 of the Annex.

³⁹ Therefore, under high appropriability, the “Arrovian” principle whereby higher competition ex-ante stimulates innovation can be compatible with the “Schumpeterian” principle that innovation should be rewarded ex-post with a degree of market power (see Shapiro (2012) and Whinston (2012)). Daniel Spulber (2013), “How do competitive pressures affect incentives to innovate where there is a market for inventions”, *Journal of Political Economy*, 121(6) (hereafter “Spulber (2013)”) has noted that competition policy and IP policy can be complementary and mutually reinforcing (with the former acting on ex-ante competition, and the latter ensuring adequate incentives to invest by acting on ex-post competition).

⁴⁰ Aghion, Philippe, Christopher Harris, Peter Howitt and John Vickers (2001), “Competition, imitation and growth with step-by-step innovation”, *Review of Economic Studies*, 68, (hereafter “Aghion *et al.* (2001)”).

market leader (the firm at the technology frontier) and the laggard (with inferior technology) can engage in uncertain innovation effort, and innovation takes place step-by-step (meaning that the laggard cannot leapfrog the leader, but can only catch-up with it).

- (70) This model is not applicable to the study of the effects of changes of the intensity of competition in the innovation stage, since it only considers a case with a fixed number of possible innovators (two, in the case illustrated in the paper). It is therefore ill-suited for the study of the impact of a merger or change in market structure on innovation competition. Despite this limitation, some insights can be obtained on by analysing how the changes in the degree of substitutability affect innovation effort. The results of the model support the proposition that more product market competition (modelled as less product differentiation) leads to more innovation, by enhancing the “escape competition” effect.⁴¹ This model therefore suggests that the elimination of competition between two rival innovators may lead to a reduction of innovation not just by directly suppressing innovation competition between the merging parties, but also by weakening product market competition between them.
- (71) The finding of Aghion *et al.* (2001) contrasts with the result of the significantly simpler theoretical model by Aghion *et al.* (2005), which presents the inverted-U relationship that the [Parties' submission] relied on to argue that a merger may lead to greater innovation.
- (72) The Aghion *et al.* (2005) model is based on a simpler version of the more general model put forward in Aghion *et al.* (2001). In the simpler model, only the laggard can innovate (and not the leader), and innovation is constrained to a one step. Once the laggard innovates, it competes neck-and-neck with the former leader, now both offering a homogenous product. Firms earn positive profits in the neck-and-neck state only if they are able to collude in the product market (either fully or partially) and the differing intensities of product market competition are thus modelled as differing degrees of collusion in the neck-and-neck state. This simpler alternative model of innovation generates an inverted-U relationship between the intensity of competition (that is to say the degree of collusion in the product market) and innovation by each firm, as noted in the [Parties' submission] (paragraph 23).

⁴¹ Aghion *et al.* (2001) find as follows: “With respect to PMC [Product Market Competition], we find that at least a little competition is always growth-enhancing. That is, starting from the minimal degree of PMC and holding constant the ease of imitation, a marginal increase in PMC always raises the growth rate. For most parameter values this positive *ceteris paribus* effect of competition on growth continues to hold as the degree of PMC rises to its maximal level (at which there is perfect competition). When we allow both PMC and imitation to be varied together we find that the maximal growth rate is always achieved by allowing the maximal degree of competition. Thus it seems that the usual Schumpeterian effect of more intense competition is almost always outweighed by the increased incentive for firms to innovate in order to escape competition” (page 470); and “These numerical results argue strongly against the Schumpeterian proposition that competition reduces growth. For the only cases in which we have observed such an overall effect occur when “gamma” [the parameter determining the size of innovation] is far too large to fit the facts concerning growth and R&D expenditures” (page 486). As noted by Baker (2007), one of the authors of the paper has interpreted this line of research as suggesting that stronger competition policy has a positive overall effect on innovation (“Competition policy should not be relaxed in the hopes of boosting innovation, because more competition actually strengthens the incentives to innovate” – footnote 25 in Baker (2007)).

- (73) The Commission notes that the inverted-U relationship between product market competition and innovation is based on a particular innovation model, which involves a number of specific and not very realistic assumptions on the nature of innovation (this has been noted by for example Gilbert (2006a)⁴², Gilbert (2006b), and Shapiro (2012)). Because the assumptions appear to be critical for the specific result, they are problematic. For example: (a) it is not clear why only the laggard can innovate, and why the laggard cannot leapfrog the leader by offering a better technology; (b) innovation in this model actually leads the laggard to offer the *same product* as the leader, bringing it into head-to-head competition with the other firm (that is to say there is no genuine product innovation in the model); and (c) the model cannot be used for the analysis of the effects of a merger between innovators, as it only allows for a consideration of the changes in the degree of collusion between firms in the product market (but not in innovation). These specific features alone make the model inappropriate for an assessment of the impact of a merger on innovation incentives (as discussed by Shapiro (2012))⁴³. The Commission also notes that in the more general step-by-step innovation model developed by Aghion *et al.* (2001), the inverse U-shaped result does not apply. As explained above, increasing competition enhances innovation and growth in this more general and more realistic setting.⁴⁴ In any event, even in the inverted-U shape model that the Parties rely upon, a reduction in competition is likely to reduce innovation if the industry is sufficiently concentrated.
- (74) On the basis of the above, the Commission considers that the alleged inverted-U relationship between product market competition and innovation that has been mentioned by the Parties is not suitable to the assessment of this Transaction.
- 4.2.2. *A comparison of innovation incentives under different product market structures is not directly informative about the loss of innovation competition due to a merger*
- (75) The [Parties' submissions] contain a number of observations suggesting that a less competitive product market structure may give greater incentives to innovate than a more competitive one. In particular, the [Parties' submission] and the [Parties'

⁴² Richard Gilbert (2006), "Looking for Mr. Schumpeter: Where are we in the competition-innovation debate?", Chapter 6 in Adam Jaffe, Josh Lerner and Scott Stern (eds.), *Innovation Policy and the Economy*, Volume 6, pages 159-215 (hereafter "Gilbert (2006a)").

⁴³ Shapiro (2012) notes that a merger would have a significant adverse impact in the Aghion *et al.* (2005) model, given that this paper considers a duopoly (which would become a monopoly post-merger). The post-merger monopoly would have no incentive to innovate. Whilst this effect is the result of the specific modelling choice of the paper, it illustrates the fact the model is not informative about the effects of mergers on innovation. Segal, Ilya and Michael Whinston (2007) "Antitrust in Innovative Industries", *American Economic Review*, 97(5), 1703-1730 (hereafter "Segal and Whinston (2007)") raise a similar critique of models of product market competition in connection to antitrust policy. They note that a change in product market competition due to changes in specific parameters such as product differentiation is not the same as a change in specific antitrust policies (such as policies on the use of exclusive contracts in the case of their paper). It is therefore not possible to infer the impact of a merger on innovation from models which study changes in product market competition by varying parameters that are not directly affected by competition policy. As Baker (2007) also notes, "*antitrust is not a general-purpose competition intensifier. Rather, antitrust intervention can be focused on industry settings and categories of behaviour where enforcement can promote innovation*" (page 589).

⁴⁴ The empirical findings of an inverted-U reported by Aghion *et al.* (2005) have also been criticised by a number of commentators, due to the difficulties in addressing concerns about reverse causality between innovation and competition and the fact that it is difficult to control for sectoral differences in technological opportunities in aggregate cross-industries studies (see for example the critique in Gilbert (2006a) and Baker (2007)).

submission] argued that Arrow's result that a more competitive product market structure gives greater innovation incentives than a monopolistic one is not a general result. Both economic submissions noted that the result does not apply to non-dramatic product innovations that allow a (secure) incumbent to horizontally differentiate its offers to customers (as shown by Chen and Schwartz (2013)). In this case, the incumbent is able to extract more value from a new product than a new entrant that faces (perfect) competition from the old product.⁴⁵ The economic submissions also noted that the Arrow result can also be reversed in the case of an unsecure monopolist, threatened by competition. In this case (if innovation is deterministic), the monopolist may face incentives to pre-empt entry in order to protect its existing market power (as shown by Gilbert and Newbery (1982)).

- (76) The Commission notes that neither the Chen and Schwartz paper nor the Gilbert and Newbery article study the effect of a merger between rival innovators. And neither the [Parties' submission] nor the [Parties' submission] have fully drawn out the implications of these observations for the Commission's assessment of the Transaction. By relying on the findings of the two articles, it appears that the [Parties' submission] and the [Parties' submission] intended to argue that a merger that reduces product market competition may stimulate innovation by either increasing the scope for price differentiation by incumbent firms (on the basis of the mechanism highlighted by Chen and Schwartz), and/or by strengthening the pre-emption incentives faced by incumbent firms (relying on results of Gilbert and Newbery). However, the economic reports do not explain how exactly these results should be interpreted and applied to the Commission's assessment and it is therefore difficult for the Commission to properly assess the reports' arguments.
- (77) The Commission notes that the work by Chen and Schwartz (2013) and Gilbert and Newbery (1982) do not imply that a merger between competing innovators would likely increase innovation. The Chen and Schwartz's mechanism considers only a secure monopolist that is not threatened by competition. The assumption that only one firm can innovate is also applied to the product market duopoly and perfect competition cases considered in the article (the paper assumes that there is a monopoly in innovation also in these cases). The paper is therefore not informative about the impact on innovation of changes in the structure of innovation competition. In fact, as observed by Chen and Schwartz themselves, the innovation incentives of a threatened incumbent are likely to be greater than those of a secure incumbent. A merger that reduces the threat of competing innovation faced by an incumbent is therefore likely to reduce innovation incentives.⁴⁶ Similarly, the Chen and Schwartz's paper does not look at mergers between two out of a limited number of rival innovators and is therefore not informative about whether there are product market competition effects that are capable of offsetting the loss of innovation competition due to the merger.
- (78) The pre-emption result due to Gilbert and Newbery (1982) also relies on a number of assumptions that are not applicable to the case at hand.⁴⁷ The paper, for example,

⁴⁵ This result depends on the nature of product differentiation, and does not apply in the case of vertical product differentiation. The authors also show that a monopolist would have stronger incentives to introduce a high quality product in comparison to a duopolist.

⁴⁶ This is formally shown in the literature on R&D races already reviewed in section 4.1.2.

⁴⁷ Gilbert (2006a) notes that models of pre-emption “*require particular assumptions about market structure or the dynamics of innovation competition and do not apply to many other reasonable market*

considers deterministic product innovation, in a setting where only one firm (the highest bidder) obtains a given patent. With uncertain innovation, the result that a threatened incumbent will innovate more than a potential entrant can, however, be reversed because the incumbent faces stronger incentives to preserve the status-quo.⁴⁸ For crop protection industry, it is evident that innovation is stochastic or uncertain – that is, firms are not certain of the commercial impact of their discovery efforts when they initiate such efforts. The economic literature on patent and R&D races under conditions of uncertainty reviewed in Section 4.1.2 is therefore more relevant to the understanding of the impact of a change in market structure than the literature based on deterministic innovation.

- (79) The pre-emption result can also be reversed in the presence of multiple incumbents, who do not fully internalise the benefits of keeping out an entrant.⁴⁹ The Commission also notes that pre-emption is more likely to occur if only one firm can innovate, and firms are therefore racing to acquire the right to be the *only* innovator. If innovation by one firm does not prevent others from also innovating, as it is more likely the case in the crop protection industry (for example as firms can innovate along different research paths), then pre-emption effects are likely to be significantly muted.
- (80) Therefore, in many realistic settings which are relevant to the Transaction (for example multiple incumbents; uncertain innovation; multiple innovation paths; possibility of disruptive innovation), challengers may face stronger innovation incentives than incumbents, due to weaker replacement effects. This conclusion abstracts from other possible sources of persistence in innovation.⁵⁰
- (81) Based on the above, the Commission therefore does not consider it likely that the Transaction would lead to greater innovation by strengthening the incentives to engage in pre-emptive innovation by the Parties.

4.2.3. *Summary of the implications of the literature on the relationship between product market competition and innovation*

- (82) A change in product market competition is one of the channels through which a merger may affect innovation incentives. The Parties have argued that under some conditions a less competitive product market structure may increase innovation, generating an inverted-U relationship between product market competition and innovation by each firm, as shown in some of the economic literature.
- (83) Based on its review of the relevant economic literature, the Commission considers that the alleged inverted-U relationship depends on a specific theoretical model of innovation that cannot be readily applied to merger analysis to conclude that a

settings. Empirical tests of pre-emption do not generally sustain the view that incumbent firms invest in ways that effectively pre-empt competitors” (with the possible exception of the acquisition of licences) (see pages 192-193).

⁴⁸ This is the case for sufficiently drastic innovation.

⁴⁹ This is illustrated by Gilbert, Richard (2006c), "Competition and innovation," *Journal of Industrial Organization Education*, 1(1), 1-23 (hereafter "Gilbert (2006c)"), who notes that "in general [the pre-emption this result holds only for a firm that has a monopoly in the old technology]" (page 9).

⁵⁰ For example, the existence of firm-specific assets (including discovery, development and distribution assets), first-mover advantages, potential for complementarities between existing and new products, learning effects in innovation, and strategic incentives to patent around existing products. Iain Cockburn and Rebecca Henderson, "Scale and scope in drug development: unpacking the advantages of size in pharmaceutical research", *Journal of Health Economics*, 20, 1033-1057, 2001 (hereafter Cockburn and Henderson (2001)) report the existence of firm-specific fixed effects in pharmaceutical development.

merger between rival innovators is generally likely to have an ambiguous effect on innovation. The alleged inverted-U relationship is therefore not suitable to the analysis of the current Transaction.

- (84) The related claim by the Parties that monopolistic structures can generate stronger innovation incentives than competitive markets also rests on some specific assumptions (for example most notably, the *absence* of competition in innovation) that are not realistic and that, if relaxed, often reverse the result.
- (85) Overall, the Commission considers that the arguments raised by the Parties on the alleged ambiguous relationship between product market competition and innovation do not to invalidate the application of the innovation theory of harm to the present Transaction, as set out in the main body of the Decision.
- (86) This conclusion is in line with the overall findings of the economic literature on the relationship between competition (including product market competition) and innovation.
- (87) For example Baker (2007) finds that, based on a survey of industry-specific studies, "*[the] empirical evidence highlights the importance of the second principle [that product market competition stimulates innovation]. As a general rule, competition does not just lead firms to produce more and charge less; it encourages them to innovate. Competition supplies a powerful motive for innovation*" (page 587).
- (88) Similarly, on the basis of a review of a number of empirical studies, Shapiro (2012) concludes as follows: "*[t]here is a very substantial body of empirical evidence supporting the general proposition that "more competition", meaning greater contestability of sales, spurs firms to be more efficient and to invest more in R&D*" (page 376) and "*the empirical evidence overall gives powerful support for the proposition that heightened competitive pressure caused firms to invest more to improve their efficiency*" (page 382).
- (89) Along the same lines, Gilbert and Sunshine (1995)⁵¹ state that: "*[i]ndividual circumstances weigh heavily on the likely relation between industry structure and R&D. There is nonetheless broad support for the Areeda and Turner admonishment that "[N]either theory nor evidence suggests that substantial market power is so generally conducive to technological progress that toleration or encouragement would be desirable", and there is additional evidence to support the stronger conclusion that protection from competition is inimical to technological progress*" (page 581).
- (90) Finally, the Commission notes if the product market competition effects of a merger are so strong so as to neutralise the negative effects on innovation from a loss of innovation competition, consumers would still be harmed by a significant loss of future competition due to the merger. Under these circumstances, the primary or only mechanism for harm to consumers would be through higher future prices (resulting from the suppression of product market competition), rather than through a combination of lower innovation and higher future prices (which is the more likely outcome predicted by the economic literature).

⁵¹ Gilbert, Richard and Steven Sunshine (1995), "Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets", *Antitrust Law Journal*, 63, 569-601 (hereafter "Gilbert and Sunshine (1995)").

5. THE TRANSACTION IS UNLIKELY TO SIGNIFICANTLY INCREASE APPROPRIABILITY ON THE BASIS OF THE MECHANISMS IDENTIFIED IN THE ECONOMIC LITERATURE

- (91) As already set out in Section 2, a merger between actual or potential competitors may increase innovation by leading to greater appropriability. Increased appropriability is a possible merger efficiency which may at least partially offset the reduction in innovation incentives due to the elimination of innovation competition between the merging parties.
- (92) The economic literature on the relationship between competition and innovation identifies two market features that are likely to be associated with high appropriability, independently of the degree of competition between rival firms:
- (a) *Limited spillovers or imitation from innovation*, meaning that firms that introduce a new product to the market are able to capture a significant part of its social value, without significant external effects on their competitors; and
 - (b) *Innovation takes place largely in the form of product rather than process innovation*, implying that the economies of scale/scope that may be associated with process innovation are unlikely to be significant.
- (93) Both conditions are satisfied in the crop protection industry. The Commission therefore considers it unlikely that the Transaction would lead to greater innovation incentives by increasing appropriability, as suggested by the Parties. We examine each of two conditions in turn below.

5.1. High appropriability due to limited spillovers or imitation

- (94) High appropriability supports innovation incentive by ensuring that the successful innovator can capture a large share of the innovation's value. Some of the economic literature has noted that more concentration may enhance innovation if a lower number of independent competitors also implies a lower risk of imitation and thus higher appropriability (as noted by for example Gilbert (2006b)). However, if imitation concerns are properly dealt with effective IPRs, then this channel is largely irrelevant.⁵²
- (95) A market is more likely to be characterised by high appropriability if the benefits from introduction of new products are protected by patents and strong IPRs. This means that the original innovator can be expected to reap the benefits from its innovation, with no significant spillovers to its competitors. Formal patent rights may be complemented by strategies to lengthen the effective economic life of a patent used in defense against generic entry for off-patent products to further raise the degree of appropriability.
- (96) As set out in the main body of the Decision (in particular Section V.8.4.2) and in Annex 1 and Annex 2 to the Decision, the crop protection industry indeed appears to be characterised by a high degree of appropriability. A formal patenting system is in place for the introduction of new products (for example new active ingredients, and new mixtures or formulations). Moreover, originators of new active ingredients have access to a number of strategies to defend themselves against generic entry (such as for example the use of supplementary data protection certificate, the introduction of

⁵² The role of appropriability and possible imitation concerns in the assessment of the relationship between competition and innovation is stressed by several papers in the economic literature, for example Gilbert (2006a); Gilbert (2006b); and Shapiro (2012).

mixture of on-patent and/or off-patent active ingredients close to the expiry of the patent life of a given active ingredients). A high degree of appropriability in the crop protection industry is also confirmed by the high profit margins earned on crop protection products both during the period of patent protection, and during the subsequent off-patent periods.

- (97) High appropriability implies that one of the possible efficiencies (in the form of reduced scope for free-riding) that may apply to this Transaction is unlikely relevant. Even though it is for the Parties to bring forward and substantiate an efficiency claim based on less imitation and therefore more appropriability, the Commission considers that in the case at hand the scope for this type of efficiency claim is limited.

5.2. Innovation takes place largely in the form of *product* rather than *process* innovation

- (98) In the case of *process innovation*, the literature has posited that a reduction in product market competition may result in greater sales by an innovator and may therefore enhance the incentives to engage in process innovation. Gilbert (2006b) for example identifies this mechanism as a plausible efficiency defence for a merger, which could be relied upon to rebut the presumption that competition promotes innovation.
- (99) As noted by Gilbert and Greene (2015) in the case of process innovation, a reduction of competition (for example due to a merger) could address possible appropriability issues connected with imperfect licensing, by allowing a firm with superior technology to apply it to the product of the other merging party. The argument rests on the assumption that pre-merger the innovator was not able to capture the full benefits of its innovation by virtue of being unable to licence it to other firms. A merger may enhance appropriability if the process innovation can be applied also to the sales of the other merging party (assuming that this is technically possible and profitable). This possible efficiency may increase incentives to innovate, given that the output of the merged entity is typically greater than the output of each of the merging parties absent the merger.⁵³
- (100) A salient feature of innovation in the crop protection industry is that it mostly relates to *product innovation*. This means that innovative effort typically manifest itself in the introduction of new and improved products (for example new active ingredients). Innovation in the form of improvements in the production process for existing products instead appears to be less relevant than product innovation (particularly for high quality patents). Process patents are also largely product-specific (for example linked to the production process of a specific active ingredient), and therefore could not be easily transferred to other products following a merger.
- (101) For product innovation, the potential positive effect on innovation incentives described above for the case of process innovation does not apply. Indeed, the economic literature has not identified a possible efficiency effect connected with greater scale in relation to product innovation. Gilbert (2006a) and Gilbert (2006b) explicitly note that product and process innovation are different in this regard, given

⁵³ Note that following a merger typically the output of each merging party decreases, due to the reduction of product market competition and the increase in market prices. Any economies of scale or scope due to the merger therefore would need to come from the fact that innovation on a specific process can be applied to the product of the other merging party.

that intellectual property protection is weaker for process innovations compared to product innovations.

- (102) The Commission also notes that several recent papers that have focused on process innovation still find that a decrease in competition can reduce market-wide innovation (in the absence of efficiencies). These papers are reviewed in Section 4.1.3, in connection with the relationship between a merger and innovation competition.

5.3. Implication of high appropriability absent the Transaction

- (103) In summary, the evidence suggests that the merger between Dow and DuPont is not likely to significantly increase appropriability. Moreover, the Commission considers that in the case of product innovation, the economies of scale alluded to by the Parties as a possible reason for why the Transaction may increase appropriability are unlikely to be practically relevant. This is because in crop protection industry innovation takes place predominantly in the form of product, rather than process, innovation.
- (104) On the basis of the economic principles reviewed so far in this Annex, the strong patent protection for product innovation that characterises the crop protection industry and the associated high level of appropriability imply that it is likely that the Transaction, by lessening innovation competition, will lead to a reduction in innovation. The economic literature supports the conclusion that in general a reduction of competition is more likely to reduce product innovation under conditions of high appropriability.⁵⁴

6. ADDITIONAL EFFICIENCY ARGUMENTS

- (105) As noted in Section 2, several of the pro-innovation channels mentioned by the Parties in their economic submissions (for example channels three to six in the list given at paragraph 21 above) are based on efficiency arguments. Two of these (namely the potential benefits from less imitation and possible scale economies in process innovation) are related to appropriability, and are discussed in Section 5 of this Annex.
- (106) The fifth and sixth potential pro-innovation merger effects put forward by the Parties (the potential for product complementarities and for cost synergies) are based on more traditional efficiency arguments that are not necessarily related to competition in innovation.
- (107) For example, the scope for a merger to bring together complementary products and lead to pro-competitive outcomes is discussed in the Commission's Non-Horizontal

⁵⁴ For example: Gilbert (2006a) states that “*The economic theory of the incentive effects of different market structures for innovation clearly demonstrates the importance of exclusive rights for innovation incentives. With exclusive rights, the theory suggests that competition promotes innovation*”; (page 192); Gilbert (2006b) notes that: “*Although empirical evidence on the relationship of competition and innovation is mixed, several careful studies suggest that competition promotes innovation if inventors gain exclusive rights to their inventions. A number of studies that focus on product innovations show that R&D and competition are positively related*”; and Gilbert and Greene (2015) state that “*Weak appropriation supports the Schumpeterian view that size, and, indirectly, market share, promotes incentives to innovate. In contrast, if firms can appropriate the benefits from their innovations, Arrow’s conclusion applies, as profits from existing operations reduce the net returns to innovation and the incentive to invest in R&D.*” (page 9).

Merger Guidelines as potential merger efficiency (paragraph 115-117). In the context of innovation, more efficient coordination of pricing of complementary products post-merger may lead to stronger innovation incentives by increasing the profits that can be captured by innovators. This effect would need to rest for example on the elimination of double marginalisation in the product market – a potential efficiency brought about by the merger. The Parties would need to demonstrate *inter alia* why this effect would be specific to the merger, that is, it could not be achieved organically by each of the merging parties (by exploiting complementarities within their existing product portfolios), or via cooperation with third parties.

- (108) Similarly, a merger between innovators could in principle lead to economies of scale and/or scope which could reduce the cost of carrying out R&D and thus at least partially offset the loss of innovation competition between the merging parties.⁵⁵ This effect may be present if possible economies of scale/scope in R&D were not fully captured by each of the merging parties in the absence of the merger. However it is also possible that savings in R&D expenditures following a merger may be the result of anticompetitive output reductions, and as such may not qualify as efficiencies.⁵⁶
- (109) The Commission notes that the Parties have not provided substantiated arguments on merger efficiencies, showing that in the specific case of this Transaction the alleged efficiencies would be verifiable, merger-specific and beneficial to consumers (in accordance with the Commission's Horizontal Merger Guidelines). The Parties bear the burden of proof in relation to this analysis (see paragraph 87 of the Horizontal Merger Guidelines). In the absence of a substantiated efficiency claim, the Commission does not need to consider further the general arguments raised by the Parties on why the Transaction may increase innovation incentives.

7. THE PARTIES' RESPONSE TO THE STATEMENT OF OBJECTIONS DOES NOT INVALIDATE THE COMMISSION'S THEORY OF HARM AND THE COMMISSION'S CONCLUSIONS

- (110) In response to the Statement of Objections, the Parties submitted economic reports [Parties' submission] and [Parties' submission]. These two reports address the Commission's innovation theory of harm as developed in Annex 4 of the Statement of Objections.
- (111) The reports argue that the Commission's conceptual analysis of the likely effects of the merger on innovation incentives is not well-developed as it disregards certain important factors and is internally inconsistent. Specifically, the reports argue that the Statement of Objections: (1) took a too narrow view of the notion of appropriability, (2) wrongly separated cannibalization and appropriability concerns,

⁵⁵ For example, Rebecca Henderson and Iain Cockburn (1996), "Scale, scope and spillovers: the determinants of research productivity in drug discovery", *RAND Journal of Economics*, 27(1), find the existence of economies of scope in pharmaceutical research by looking at a sample of 10 pharmaceutical companies representing 25% of research conducted worldwide. A companion paper studying economies of scale and scope in development (Cockburn and Henderson (2001) however cannot disentangle the presence of possible economies of scope from specific firm effects due to persistent differences in organizational structure, incentives and decision-making procedures across firms.

⁵⁶ See paragraph 80 of the Horizontal Merger Guidelines, and by analogy page 31 of the US Horizontal Merger Guidelines.

and (3) ignored the role of biological resistance and regulatory pressure in its assessment. The economic reports also argued that the Commission wrongly dismissed several arguments put forward by the Parties during the course of the procedure. In particular the [Parties' submission] argues that the Commission wrongly dismissed as irrelevant the numerical illustration included in the [Parties' submission] which according to the Parties suggests that the merger could enhance product innovation by increasing appropriability.

(112) This section addresses the arguments put forward by the two economic reports submitted by the Parties in response to the Statement of Objections.

7.1. The Commission has identified the same key economic mechanisms as the Parties' economic reports and has correctly interpreted the results of the relevant economic literature

(113) The Commission based some of conceptual underpinning of the innovation theory of harm on a comprehensive review of the relevant economic literature. The Commission considers that this analysis includes all the relevant key economic mechanisms as identified in the Parties' economic reports. This analysis and the related literature are set out in Section 4.1 and Section 4.2 of this Annex.

(114) Nevertheless, in their response to the Statement of Objections, the Parties have criticized the conceptual analysis of the Transaction set out in the Statement of Objections. For reasons that are set out below, the Commission does not consider that the validity of its analysis is undermined by the critique of the Parties.

7.1.1. The Commission's economic analysis includes all the key mechanisms as identified by the economic reports of the Parties

(115) The [Parties' submission] puts forward the following framework for the assessment of merger effects on innovation incentive: (1) the incentive to invest in R&D is driven by the difference between the expected profit if a firm invests and the profit that it can earn if it does not invest; (2) competition reduces the profit that a firm can earn if it does not invest – in that sense a merger, by reducing competition, is decreasing incentive to invest in R&D; but (3) competition also reduces the profit a firm can earn after it innovates – in that sense a merger increases incentives to innovate.⁵⁷

(116) The [Parties' submission] further explains that because channels (2) and (3) generate opposing effects, depending on assumptions, a merger could ultimately either positively or negatively impact the innovation incentives.⁵⁸ The [Parties' submission] identified an additional effect: the merged firm would internalize the "business-stealing effect" from potentially overlapping research and in that sense the merger reduces the incentives for innovation.⁵⁹

(117) Consistently with the framework set out by the Parties, the Statement of Objections identified the opposing channels (2) and (3) and the internalization of the business stealing effect as key factors in its assessment.⁶⁰ The [Parties' submission] therefore

⁵⁷ [Parties' submission].

⁵⁸ [Parties' submission].

⁵⁹ [Parties' submission].

⁶⁰ The Commission's theory of harm posits a significant likelihood of prospective competition for sales (and a significant degree diversion of sales) between chemicals independently developed by the merging parties in a number of crop protection markets. The factual evidence contained in the main

does not put forward a framework for assessment that is substantively different than the analysis proposed by the Commission.

7.1.2. *The Commission's interpretation of the results of economic literature for the purpose of the merger assessment is correct*

- (118) The [Parties' submission] only briefly engages with the Statement of Objections' review and interpretation of the economic literature.⁶¹ One element of the literature which the [Parties' submission] addresses is the work on uncertain patent races, which Annex 4 of the Statement of Objections cited in support of its assessment of the likely effect of the merger on innovation. The [Parties' submission] states that the economic models of uncertain patent races are not well suited to the analysis of innovation in crop protection. The reason, according to the report, is that they typically assume that the winner of the patent race is a monopolist and this feature excludes the effects of the merger on innovation via the appropriability channel.
- (119) The economic models of uncertain patent races indeed do not explicitly include some of the potential effects of a merger on innovation, in particular those effects that arise from the following channels: (1) merger-enabled reduction in imitation, (2) merger-specific realization of economies of scale or scope and (3) the effects that are generated by a merger via a relaxation of competition in the current and future product markets.
- (120) The first two groups of effects, if present, would constitute efficiencies that are for the Parties to substantiate (as explained in Section 5 and 6 of this Annex). With respect to the third channel, both the Statement of Objections and the [Parties' submission] noted that a merger may affect product market competition and, via this channel, innovation incentives. This effect on innovation is in principle ambiguous. The economic literature indicates, however, that even when the product market channel positively contributes to innovation incentives, the positive effect is unlikely to be sufficiently strong to overturn the negative one that follows with the loss of innovation competition.
- (121) In the models put forward by Motta and Tarantino (2016), a merger reduces innovation while relaxing product market competition – and the latter effect does not prevail over the effect of the internalization of the business stealing effect. This result applies to both product and process innovation and is robust across several standard demand and cost specifications.
- (122) Similarly, in Lopez and Vives (2016) a higher degree of effective coordination between firms results in lower cost-reducing innovation effort (absent spillovers) despite the fact that collusion relaxes innovation competition and product market competition at the same time. The two papers indicate that the adverse effects of a

body of the Decision (see sections V.8.4.2, V.8.4.3, V.8.7, and V.8.8 in particular) justifies this assumption. The Commission considers that competition for sales between crop protection chemicals happens in circumstances (scenarios) in which innovation expands demand (or addresses needs that have not been addressed previously) as well as in those in which the demand is fixed by the acreage under cultivation.

⁶¹ Neither the [Parties' submissions] discuss most of the literature reviewed and assessed in Annex 4 of the Statement of Objections, including articles that the Parties cited in support of their argument that the relationship between a merger and innovation is inherently ambiguous (for example the work of Aghion *et al.* (2005), Chen and Schwartz (2013)).

reduction in innovation competition outweigh any potentially offsetting effect from the reduction in product market competition.

- (123) The [Parties' submission] itself notes that in the models of Motta and Tarantino (2016) a merger decreases innovation incentives unless it brings about a realization of sufficient economies of scope in innovation. This is consistent with the Statement of Objections' reasoning that the likely negative effects of the merger on innovation can, in principle, be overturned – provided that the parties substantiate the presence of sufficient merger-specific efficiencies.
- (124) It is notable that the [Parties' submission] does not challenge the logic or the results of Motta and Tarantino's paper or the analysis of Lopez and Vives (2016).

7.2. The arguments by the Parties that the Commission improperly assessed effects are either irrelevant or not supported by the economic theory

- (125) The [Parties' submission] argues that the Statement of Objections' theory of harm suffers from several conceptual errors; in particular, the Statement of Objections allegedly⁶²:
1. took too narrow a definition of "appropriability" thus ignoring that a merger that reduces innovation competition may increase the incentives to innovate;
 2. wrongly separated cannibalization from appropriability concerns.
- (126) Similarly, the [Parties' submission] argues that the Commission has not properly identified or quantified all the opposing effects of the merger on innovation incentives and, in particular, has not identified a theoretical model of innovation incentives that incorporates "appropriation" effects and supports the Commission's analysis in the current case.⁶³
- (127) The [Parties' submission] also claims that the Statement of Objections wrongly ignored the role of biological resistance and regulatory pressure in its assessment.
- (128) The Commission addresses the three sets of claims in turn below.

7.2.1. A narrow definition of appropriability has not prevented the Statement of Objections from identifying and assessing all the relevant mechanisms; moreover, such a definition is justified by methodological considerations

- (129) The [Parties' submission] notes that the Statement of Objections treated appropriability as “the ability by an innovator to prevent rivals (including generic suppliers) from imitating successful innovation and/or the ability to monetize inventions through licensing”. The report then explains that such a notion of appropriability is too narrow: a merger decreases the number of independent innovators and may relax prospective product market competition. Firms can therefore be expected to be able to appropriate more of the value of their innovation after the merger via an increase in price and/or in volumes in relation to their innovative products. The report alleges that as a result of that the firms would have stronger innovation incentives.
- (130) The [Parties' submission] further explains that because of its narrow notion of appropriability, the Statement of Objections left out of its analysis several positive

⁶² [Parties' submission].

⁶³ [Parties' submission].

appropriability effects of the merger on innovation incentive. The [Parties' submission] makes similar claims.

- (131) Contrary to the claims of the Parties' economic reports and irrespectively of its definition of appropriability, the Statement of Objections considered all the key relevant mechanisms related to merger-induced changes in product market competition and innovation rivalry. In particular, in Annex 4 of the Statement of Objections the Commission considered at length the impact on innovation incentives of a reduction in the number of independent innovators and less intense product market competition.
- (132) This Annex follows the analysis of the Annex 4 of the Statement of Objections and reproduces all the mechanisms that the Commission analysed in the Statement of Objections. Section 4.1 thus explains in detail why a merger-induced reduction in innovation rivalry generally acts in a direction of reducing innovation incentives, in a concentrated market. Section 4.2 notes that the merger may lead to less intense competition in product markets. The product market channel effect may act in a direction of further reinforcing or it may act contrary to the—negative—rivalry channel merger effect on innovation incentives. The existing economic literature reviewed in Section 4.2, however, indicates that the product market channel effect on innovation incentives, even when positive, is not likely to overcome the negative impact of the innovation rivalry channel. The [Parties' submission]'s general claim that the Statement of Objections failed to consider an important channel of innovation effects, or that the Commission reached a wrong conclusion, because of a “too narrow” definition of appropriability is therefore wrong.
- (133) Similarly as the [Parties' submissions] also contests the Statement of Objections' notion of appropriability as too narrow, suggesting that this resulted in errors in the Statement of Objections' assessment. The report states that the “ability of a seller to appropriate value from a new crop protection chemical—whether it is one that is new to the market or has a proven track record—depends on its ability to successfully market the product to potential customers, the other chemicals that are sold in competition with the new chemical, and on other approaches to crop management that limit the ability of the seller to profit from the new chemical.”⁶⁴
- (134) The report does not explain how the merger between Dow and DuPont would improve the ability of the merged firm to market the innovative product to potential customers. Nor does it explain how the appropriability effect related to the *"approaches to crop management that limit the ability of the seller to profit from the new chemical"* should have been taken into account in the assessment. It is therefore impossible for the Commission to precisely address these two alleged omissions from the Statement of Objections. Presumably, the report is implicitly alleging that the Commission failed to assess potential merger-specific efficiencies. Yet, the Statement of Objections discussed several potential merger efficiencies, in particular a reduction of imitation by rivals and the presence of economies of scale or scope (in innovation, production or in sales). These factors are again addressed in Section 5 and Section 6 of this Annex and would have been relevant to the assessment, provided the Parties had made substantiated efficiency claims, which they have not.

⁶⁴ [Parties' submission].

- (135) With regards to the [Parties' submission]'s claim that appropriability depends on "*other chemicals that are sold in competition with the new chemical*", the Commission considers that this aspect of competition affects the value of the innovative chemical itself rather than—or at least in addition to—the ability of the innovator to appropriate it. Appendix A further analyses this issue by means of a simple illustration.
- (136) The Commission also notes that its use of the appropriability notion is consistent with the economic literature. Shapiro (2012), for example, distinguishes between “appropriability” and “contestability” as two key drivers of innovation incentives. Appropriability thus “depends on the extent to which a firm can protect the competitive advantage associated with its innovation. If imitation is rapid, so a firm that successfully innovates is unable to differentiate its products or achieve a significant cost advantage over its rivals, ex post profits margins will be low and innovation incentives will be muted.”⁶⁵ In turn, contestability relates to “the extent to which a firm can gain profitable sales from its rivals by offering greater value to customers. Sales are contestable in the relevant sense if profitable sales shift toward the successful innovator.”⁶⁶ A merger between two of a limited number of firms that compete to introduce rival innovative products would lower contestability, rather than increasing appropriability, as the rivalry between the two innovators is lost, thereby harming innovation incentive.
- (137) While the Commission considers that the broad appropriability notion employed in the economic submissions of the Parties is inappropriate, it also notes that in any case the question of whether its own definition is too narrow or not is ultimately a semantic one, rather than one of substance. Irrespectively of how the question is answered, it remains the case that the Statement of Objections did not leave out of its analysis any of the key channels of merger-induced effects on innovation incentives that the Parties had put forward. The Commission therefore considers that the arguments of the Parties that are based on the appropriate use of the notion of appropriability are not relevant to the assessment of the effect of the present Transaction on innovation.

7.2.2. *Cannibalization and appropriability are not driven by the same fundamental mechanism*

- (138) The [Parties' submission] argues that another key conceptual error of the Statement of Objections is that it "*[f]ails to recognize that the cannibalization and appropriability effects are driven by the same fundamental mechanism*".⁶⁷
- (139) The argument is built on a simple example where before the merger independent firms A and B respectively sell existing products A1 and B1 and can invest to introduce a corresponding second generation of products, A2 and B2. Referring to this example, the report states that "*if the protections of IPRs prevent an adverse appropriability effect on Firm A's incentives, i.e. implying that B2 will not divert sales from A2, they [the protections of IPRs] will also reduce or eliminate pre-merger innovation incentives provided to Firm B by the prospect of such sales*

⁶⁵ Shapiro (2012), page 364.

⁶⁶ Shapiro (2012), page 387.

⁶⁷ [Parties' submission].

diversion. As such, the cannibalisation effect associated with the merger must also be reduced or eliminated."⁶⁸

- (140) In other words, the report argues that if appropriability were high and unaffected by the merger as the Statement of Objections claimed, it could not have been that the innovative products of the merging parties pre-merger competed for sales – and a key premise of the Statement of Objections' theory of harm would thus have to be rejected. The report concludes that this highlights an inconsistency in the Statement of Objections' analysis.
- (141) The above argument assumes that the Statement of Objections' notion of high appropriability implies the absence of (or it implies a weak) competitive interaction in (future) product markets. This assumption is wrong: strong IPRs (and high premerger appropriability more generally) do not imply that innovative products of one of the firms will not divert sales from a related innovative product of another firm.⁶⁹ This is only implied in the overly broad concept of high appropriability of the [Parties' submission]. Intense competition does, however, imply that, in order to generate any profits at all, a firm has to innovate so as to make its product better (or different) from those of its rivals. And when it innovates successfully, it will enjoy the extra profits – but only until a rival's innovation eradicates its advantage. To make the point even more clear, the example of Appendix A shows how an intense competition and high appropriability go together hand-in-hand. Because it is based on a false premise, the Commission considers that the [Parties' submission]'s argument is not correct and that there is no inconsistency in the Commission's own analysis.⁷⁰

7.2.3. *A merger between two close competitors is not likely to enhance innovation in the absence of efficiencies*

- (142) On the basis of the flawed premise that high appropriability implies weak competition, the [Parties' submission] further asserts that "*[t]he closer a rival's competing product, the greater the adverse impact of appropriability considerations on innovation, and the greater the adverse effect on innovation effort. If this risk is reduced as a result of the merger, appropriability will be increased, and so will the positive effect on innovation incentives, to a greater extent than with a merger between two distant competitors.*"⁷¹ Along the same lines, the [Parties' submission] states also that "*[p]rospective competition can disincentivise innovation by reducing the expected profitability of innovations*", again suggesting that a merger could increase innovation incentives because it relaxes prospective competition. The report makes an even stronger statement: that a merger may increase the innovation incentive "*through mechanisms that do not involve any increase in market power.*"⁷²

⁶⁸ [Parties' submission].

⁶⁹ The Commission considers that the merger could in principle generate certain efficiencies which could contribute to higher post-merger appropriability in addition to its potentially limiting imitation when IP rights aren't strong. Section 5 discusses these efficiencies in more detail.

⁷⁰ In any case, as explained before, the Commission considers that its assessment in no way depends on the definition of appropriability: independently of taxonomy the Commission identified and analysed all the relevant mechanisms that the Parties' economic reports put forward as relevant.

⁷¹ [Parties' submission].

⁷² [Parties' submission].

- (143) According to the [Parties' submission], the logic of paragraph 28 of the Horizontal Merger Guidelines (which relates to closeness of competition between rival products) does not carry over to innovation.
- (144) The report's arguments are partial and therefore incorrect. Section 4.1 of this Annex explains that independent investments by two firms—call them, as in the [Parties' submission]'s example, A and B—in two R&D projects aimed at producing rival products, accordingly called A2 and B2, impact each other's expected net revenues negatively.⁷³ Investments into A2 and B2 also negatively affect (upon commercialization of the two products) the expected stream of future net revenues from the sales of existing products A1 and B1 to the extent the products are substitutes.
- (145) The merger between A and B will result in internalization by each merging party of the adverse effect of the R&D projects on the net revenues of the product lines of the other merging party; hence, in what this Annex called a merger-induced reduction in innovation competition, it will reduce investment in the competing R&D projects. The innovation competition effect follows the basic logic of unilateral effects, which is equally applicable to product market competition and to innovation competition. This effect is stronger if Firm A and B are close competitors (implying that innovation effort by each firm diverts significant expected sales from other firm). Moreover, any potential positive effects on profitability of R&D projects that could follow a less intense product market competition between Firm A and Firm B would unlikely be sufficient to offset the innovation competition channel.
- (146) To see the mechanism in its most basic form (and to evaluate the specific claim in the [Parties' submission] that a merger may increase innovation even without increasing market power), assume that the merged firm would not have changed the prices for any of its products (and in particular for A2 and B2) relative to the level that would have been set in the absence of the merger. That is, assume for simplicity that the merger does not increase market power in the product market.⁷⁴ It is clear that the internalization of pre-merger externalities between the two competing firm must take place entirely via an adjustment in the rate of investment in the two rival R&D projects. Given that the rival projects adversely affect each other's expected net revenues as well as net revenues of existing substitute products, innovation has to decrease after the merger. This is the standard "first-order" effect from a horizontal merger, which is the foundation of any unilateral (or non-coordinated) effect.
- (147) [Parties' submission]'s claim that a merger may increase innovation even without an increase in market power is therefore not generally correct, and is based on an incorrect and partial application of the basic logic of unilateral effects. The claim is based on possible indirect effects of a merger on innovation, but omits the most direct effect.⁷⁵ Indeed, the numerical example that the [Parties' submission] puts

⁷³ As explained before, the negative effect on profitability that rival R&D projects exert on one-another does not have to involve any reduction in appropriability. Rather, the value of a particular innovation decreases as alternatives are introduced.

⁷⁴ This assumption is equivalent to the assumption of perfect coordination in the product market employed in the numerical example set out in [Parties' submission] (see Section 7.2.4 below for a detailed review of this numerical example).

⁷⁵ Effectively the [Parties' submission] is noting that a merger may lead to second-order (or feedback effects), which mean that less innovation by Firm B may lead to greater incentives to innovate by Firm A. However the existence of these feedback effects is premised on a reduction of innovation by Firm B

forward to argue the opposite, rests on assumptions that are not realistic. When its assumptions are replaced with more realistic (and standard) ones, the example confirms that a merger between rival innovators reduces the rate of innovation (see Section 7.2.4 below).

- (148) Consider now an alternative case where, as before, the merged firm can adjust the investment rate but it can now also sets prices in the product market differently from those that arise in the equilibrium without the merger. In this case, the merged firm would increase the price for its existing overlapping products A1 and B1 immediately. It would also expect to set prices for the new products A2 and B2 higher than in the scenario without the merger (if and once the two products are successfully commercialized in the future). These price increases are based on the well-known unilateral horizontal price effects of the merger. The merger therefore relaxes product market competition, and hence may have an indirect impact on innovation incentives (as recognised in Section 4.2 of this Annex).
- (149) The merger-induced relaxation of product market competition will increase A2's expected net revenues for positive levels of investment in A2. But the merger will also increase the profitability of not investing in A2. That is, the merger will also increase the opportunity cost of investing in A2. The higher opportunity cost result from two channels: (a) the greater loss of profits implied from diverted sales of A1 to A2 (given that the merger makes sales of A1 more profitable); and (b) the fact that the opportunity cost of investing in A2 now also involves the diversion of sales of B1 and the negative impact of A2 on profitability of B2. In other words, whereas before the merger, firm A only considered the effect of introduction of A2 on sales of A1, it now considers also its negative effect on revenues from B1 and B2. Analogous logic applies to firm B with regards to project B2's effect on Firm A's product line.
- (150) The cross-firm externality that innovation (the introduction of A2) in product line A exerts on sales of the product line B and vice-versa therefore is not eliminated—it may rather be enhanced—as the merger relaxes product market competition. Even in circumstances in which the product market competition effect—which is generally ambiguous—promotes innovation, the internalisation of competition innovation—that mutes innovation incentives—is likely to be stronger so that a merger would likely result in a net reduction in innovation effort. As set out in Section 4.1, this is the case in a broad range of standard model specifications as considered by Motta and Tarantino (2016) and Lopez and Vives (2016). In other words, the existing economic literature suggests that even if a decrease in the intensity of product market competition were to have a positive impact on innovation incentives, this effect would likely have been offset by the merger-induced incentive to internalise the negative effects that innovation by each merging firm has on the profits of the competing existing products and the competing research projects of the other merging party. This is especially the case if the market is concentrated.
- (151) The [Parties' submission] also argues that evidence supports its argument that a reduction in uncertainty regarding the threat of competition in the same product

in the first place (this is the first-order effect of a merger, from firm's B perspective). This first-order effect applies to both Firm B (which post-merger internalises the negative externality of its innovation on Firm A), and to Firm A (which post-merger internalises the negative externality of its innovation on Firm B). It is well-established in standard economic models of oligopoly that first-order effects dominate second-order and feedback effects, implying that the innovation of both Firm A and Firm B would fall as a result of a merger.

space could increase appropriability and thus innovation incentive.⁷⁶ The report puts forward [internal document] (which was already included in [Parties' submission]), [R&D information].

(152) As already noted in Section 4.1, the documentary evidence put forward by the [Parties' submission] is consistent with the Commission's theory of harm. As just explained, investment in two R&D projects by rival firms which (are expected to) result in closely competing new products will exert a negative externality on each other in terms of the expected profitability of each of the research projects. The evidence put forward by [R&D information]. As such, it is consistent with the Commission's theory of harm.

(153) Overall, the Commission considers that the [Parties' submission] has not shown that the analysis set out in the Statement of Objections is not correct and that the merger between two close competitors in a concentrated market may enhance innovation incentives. In particular, following the logic of unilateral effects it is clear that, absent efficiencies, the incentives to innovate cannot be enhanced when the merger does not relax product market competition, contrary to the claims in the [Parties' submission].

7.2.4. *Resolution of uncertainty about the level of post-innovation competition is not likely to spur innovation*

(154) In support of its claim that a merger between competing innovators (such as the current Transaction) could increase innovation rate, the [Parties' submission] put forward a simple numerical example ([Parties' submission]). This example is again relied upon in the [Parties' submission] to criticise the economic analysis and conclusions contained in the Statement of Objections.

(155) The logic of the [Parties' submission] numerical example can be summarized as follows.

(156) Before the merger, there are two firms that must decide whether to engage in uncertain innovation. The example assumes that the cost of innovation effort is fixed and it results in a successful innovation with some probability. Innovation success gives a firm the right to claim a share of a fixed "innovation reward" (the report assumes that its total value is 40). When only one firm gets lucky and successfully innovates, it claims the full reward; when both firms successfully innovate they share the reward equally (which is the equivalent of an assumption of perfect collusion in the product market). The sharing of the prize represents the fact that a successful innovation by one firm may have a negative externality on the sales of a successful rival innovator. To claim its share of the reward after a successful innovation, each firm must pay an additional (small) fixed "collection fee" (assumed to be 4 in the numerical example). The collection fee represents the fact that a successful innovator may cannibalize the sales of its existing products when selling the innovative product.

(157) The example further assumes that there are two states of the world – the firms are faced with each of these with equal probability and the total prize is the same across the two states; however, whereas Firm 1 has the same chance of successfully innovating across the two states of the world (0.5), Firm 2 has a higher chance (0.9)

⁷⁶ [Parties' submission].

in one state and a lower chance of innovating in the other (0.1). Firm 2 knows which state of the world it is facing and Firm 1 does not. The asymmetry in information supposedly captures the fact that firms do not know how likely their rivals are to successfully innovate in areas (markets) that they can also innovate in.

- (158) The merger allows the firms to coordinate their innovation effort and to share the prize irrespectively of which firm wins it – as long as one firm is successful they share the reward after the merger. The firms can now choose whether only one or both of them will incur the fixed effort cost, knowing what their respective chances of innovating successfully are. When collecting the innovation reward, after the merger, the firms pay twice the single-firm pre-merger collection fee. That is, the merged firm can coordinate the activities of its two research labs, choosing whether to innovate with a single lab—the more efficient one—or with both. The higher post-merger reward collection fee represents the fact that a merger firm would take into account any cannibalization of sales of existing products of the two firms by an innovative product when deciding on whether (and how much) to invest in innovation.
- (159) The [Parties' submission] then effectively examines whether there are fixed costs of innovation effort, such that:
- (a) Before the merger Firm 2 incurs the effort when it has a high chance of being successful but not when it has a low chance, whereas Firm 1 never incurs the innovation effort cost; and
 - (b) After the merger the firm with the higher likelihood of successfully innovating (for example 0.5 or 0.9 probability) always incurs the innovation effort cost.
- (160) [Parties' submission] shows that such fixed costs indeed exist (for example fixed cost of 15 satisfy conditions (a) and (b) above), concluding that a merger may increase the industry innovation rate.
- (161) The Commission considers that the [Parties' submission]'s model is not one of innovation as it does not capture some of its most basic features. Moreover, the model relies on a set of specific assumptions to arrive at a result of very limited relevance.
- (162) It can be checked that by changing the assumption on the level of fixed cost of innovation, leaving all other assumptions as in [Parties' submission]'s example unchanged, the result can be turned around. For example, before the merger, for fixed costs just slightly below 12, Firm 1 always incurs the fixed costs of innovation, whereas Firm 2 incurs the fixed costs when it is a strong innovator – two firms thus incur "investment effort" pre-merger. In contrast to [Parties' submission]'s example, however, now the merger reduces overall "innovation" effort. In particular, in states where Firm 2 faces the higher probability of winning the reward, and thus two firms would have incurred the cost of innovation effort before the merger, after the merger only one firm does. That is, while before the merger two labs incurred the fixed innovation costs, only the more efficient one does so after the merger. Accordingly, the probability of a successful innovation decreases with the merger relative to the same pre-merger probability. This shows that [Parties' submission]'s results are very sensitive to assumptions – a minor change turns the results upside-down.
- (163) More generally, under the assumptions for which the [Parties' submission] obtains its result, before the merger one of the firms (Firm 1) does not innovate at all. The example thus hardly captures innovation in competition between the two firms before

the merger. Also because of this reason, the example cannot be relied upon to infer on the likely merger effects. The [Parties' submission] dismisses this critique; it argues that in the pre-merger equilibrium one of the firms chooses not to go ahead with investment pre-merger precisely because of the uncertainty in innovation success of the other firm so that, in fact, the model captures innovation competition pre-merger. The Commission, however, does not consider the [Parties' submission]'s argument to be valid. In the model, one of the firms (Firm 1) has a negative value of "innovating" because the value of its innovation, in expected terms, is lower than the costs of innovating. The likelihood that its innovation will have a low value is too high (indeed if Firm 2 successfully innovates, Firm 1's innovation has a value of zero). If such a firm had faced even tiny costs of preserving its ability to innovate, it would have exited the market altogether. If uncertainty indeed plays a role, [Parties' submission]'s is hardly an example that captures its role in innovation competition between Dow and DuPont sufficiently well to be relied upon in the Commission's assessment.

- (164) The numerical example included in the [Parties' submission] cannot be relied upon in light of another (even more problematic) feature: the assumption that the chances of winning are fixed and independent of the level of effort. A more realistic approach would make the probability of successfully innovation dependent on firms' investment. In other words, the probability of a successful innovation should depend on the firms' level of investment in research. As was already noted in the Statement of Objections (and not contested by the Parties), if [Parties' submission]'s model is modified so that the innovation cost is convex in probability of a successful innovation (which is a reasonable assumption that is typically used in the R&D race literature reviewed in Section 4.1), it robustly predicts a decrease in overall investment rate after the merger.⁷⁷

⁷⁷ To illustrate this point numerically, assume for example that Firm 1's lab in every state of the world successfully innovates with probability $P_1[\text{success}|w_1] = 1 - e^{-\sqrt{2}w_1}$ that depends on its effort w_1 (this corresponds to the standard assumption used in the R&D race literature). Further, assume that Firm 2's lab, in the state of the world in which it is less efficient than Firm 1's lab successfully innovates with probability $P_2^L[\text{success}|w_2^L] = 1 - e^{-\sqrt{w_2^L}}$ (that depends on its effort in that state of the world w_2^L), and in the state of the world in which Firm 2 is more efficient than Firm 1, its lab successfully innovates with probability $P_2^H[\text{success}|w_2^H] = 1 - e^{-\sqrt{3}w_2^H}$ (that again depends on its effort w_2^H in the relevant state of the world). As in the [Parties' submission], assume that before the merger Firm 1 does not know in which state of the world it is (each of the two states is equally likely) whereas Firm 2 knows the state. Also, as in the [Parties' submission], before the merger, each firm independently sets the effort level for its lab to maximize its profit, while after the merger they set the effort levels so as to maximize joint profits. Computing the effort levels in the pre-merger equilibrium and comparing these to the post-merger profit-maximizing solution, shows that the effort decreases significantly; accordingly the probability of a successful discovery is lower [...] the merger. For example, using the same assumption on payoffs as in the [Parties' submission], it can be shown that the total probability of a successful innovation in the state of the world in which Firm 2's lab is less (more) efficient is approximately 0.94 (0.96), whereas after the merger the total probability of a successful innovation when Firm 2's lab is less (more) efficient is approximately 0.98 (0.99). The Statement of Objections also contained a very simple illustration of why a symmetric version of [Parties' submission]'s numerical example with convex cost of innovation also predicts a reduction in innovation effort due to the merger. The Parties have also not contested this element of the Commission's assessment.

* Should read: before.

- (165) Overall the Commission concludes that the [Parties' submission]'s numerical example cannot be taken to be informative. In fact, under more realistic assumptions it shows that a merger between competing innovators would likely negatively affect innovation effort, in line with the results of the literature on R&D races reviewed in the Section 4.1 of this Annex.
- 7.2.5. *Biological resistance of pest to crop protection chemicals, regulatory pressure and the presence of generics do not significantly affect the assessment*
- (166) The [Parties' submission] argues that the Statement of Objections' theory of harm wrongly ignores biological resistance and regulatory pressure in its assessment. The two factors, according to the report, reduce the impact of cannibalization on innovation incentives as the profits earned on the existing products will eventually decline as a result of a build-up of biological resistance and due to regulatory pressure. The report states that cannibalization plays a key role in the theory of harm put forward in the Statement of Objections and therefore the Commission's failure to account for the influence of these means that its conclusions are unsound.
- (167) At the outset, the Commission notes that its theory of harm rests on the broader notion of innovation competition rather than on the notion of cannibalization. Cannibalization is often meant to refer to a diversion of sales from one or several *existing* products to an innovative product sold by the same producer. Innovation competition, instead, more broadly refers to the extent to which innovative products of one of the parties may divert demand from both *existing* and other *innovative future* products of the other merging party before as well as after the merger. Accordingly, the Commission notes that even if innovation involves no cannibalization of the sales of existing products, a merger between two out of a limited number of innovators in a market may reduce innovation incentives. This would likely be the case if, absent the merger, firms would compete with innovative products in some markets with a sufficient likelihood (as the merger internalizes the negative externality of each firm's investment in research on the other firm's profitability of research, as explained in 7.2.3).
- (168) Nevertheless, the degree of cannibalization could in principle affect the likelihood with which a merger harms innovation incentives. Cannibalization tends to depress innovation incentives because the cannibalized sales represent an opportunity cost of innovation, making it less profitable. A merger may reinforce this effect. This is because, compared to the situation before the merger, the merged firm has a larger portfolio of existing products whose sales an innovation can cannibalize.
- (169) The [Parties' submission] argues that this merger effect is very limited: regulation, the presence of generics and resistance reduce the extent to which a new chemical in the initial stages of development would eventually cannibalize the sales of those chemicals that are currently being sold (as the sales of the latter would in any case be very small by the time the innovative chemical is ready for sales). In that sense, a weaker cannibalization effect could, at least in principle, make a merger less likely harmful to innovation incentives.

- (170) However, in the present case, the evidence discussed in the Decision shows that these factors (regulatory pressure, biological resistance, generics) are unlikely to be sufficiently strong to make the cannibalization of an existing product irrelevant.⁷⁸
- (171) Moreover, the argument loses much of its relevance when one considers that innovation competition (and cannibalization) takes place in a dynamic setting. Indeed, in crop protection industry firms continuously innovate and keep introducing new chemicals in development pipelines. In such a setting, an innovative chemical that is in the initial stages of its development now will in the future be diverting sales from related chemicals that may be further advanced in the development pipeline but have not yet been commercialized. In other words, in a dynamic setting competing firms would be selling chemicals targeting same pests that have not had been rendered obsolete by biological resistance or regulation by the time any innovative chemical is ready for commercialization. The sales of such chemicals will have been cannibalized by the newly introduced chemical and the extent of such cannibalization is larger for the merged firm.⁷⁹ The Commission therefore considers that the fact that the crop protection industry is characterized by factors such as biological resistance, the presence of generics and regulatory pressure does not invalidate its theory of harm.

⁷⁸ First, generic players are only a partial and often not significant constraint for integrated R&D players, even for active ingredients which are off-patent for a considerable period of time (See section 6.2.1 of the Decision). Second, regulatory pressure and biological resistance are unlikely to play a role for the most recent products commercialized by the merging parties, for example DuPont's Cyzypr and Dow's Isoclast in insecticides which are in the process of being launched. Third, even for products launched many years ago, like Dow's insecticide Spinosad (launched in 1984), DuPont's herbicides SUs, DuPont's Rynaxypyr (launched in 2008), [R&D information]. For example, while the Spinosad insecticide was discovered in 1984 and launched in 1985, it has [sales estimates].

⁷⁹ The same reasoning applies to some other arguments put forward by the [Parties' submission] to justify its position that cannibalisation concerns do not play an important role in innovation decisions. The report, for example, refers to the [R&D information]. More generally, the claim of the [Parties' submission], that because of regulation and resistance, the right counterfactual for the analysis is one where all the demand for a new chemical should be considered incremental (that is to say market expanding) is incorrect ([Parties' submission]).

APPENDIX A: EXAMPLE ON APPROPRIABILITY

- (172) The distinction between value and appropriability can best be illustrated by an example. Assume that yet-to-be independently discovered chemicals A and B could both address a newly emerged pest. If both chemicals are discovered, the inventors engage in Bertrand competition (competition in prices). Assume also—without loss of generality to the argument—that it costs nothing to produce the chemicals after they have been discovered. The demand for the chemicals is fixed at X in each period and they are never used together. A farmer would be willing to pay up to 5 Euro for a unit of A and 6 for a unit of B, the latter being more effective in pest control. If chemical A is discovered first, it generates a social value of 5 X per period (and this is how much it can earn in every period) but only until chemical B is discovered. From then onwards, A no longer generates any social value (and also does not generate any sales as B replaces it entirely). The subsequent discovery of B generates a total additional value of $(6-5) X = X$ per period. The Commission notes that innovation B is only socially valuable to the extent it allows for a differentiation of the product in which it is incorporated (a more effective crop protection chemical in this case) from A. The additional value is also what the innovator B can extract per period (in the Nash equilibrium of the price setting game A, is priced at 0 and B sets the price of 1).
- (173) If, in an alternative scenario, B is discovered first, it generates the value of 6X per period. In this case, however, if A was later discovered, it would not have generated any additional social value; accordingly, it also would not have generated any sales. Because of that, the innovator would not have invested in the discovery of A in the first place and his rival would have enjoyed a monopoly position forever.
- (174) In the example, the ability to appropriate value of innovation is the same across the two scenarios—an innovator can appropriate all of it—yet the reward for innovation differs. This is because the value of the innovation itself differs across the scenarios. In other words, in the first scenario A and B compete intensely when both chemicals are discovered, whereas in the second scenario B enjoys a monopoly because it innovates before firm A – yet, each of the innovators appropriates the whole value of its respective innovation in each scenario (a discovery is incrementally valuable only to the extent it differentiates the product). This simple example is not intended to implicitly define "appropriability". Indeed, as explained before, the scope of the notion has no effect on the Commission's analysis or its conclusions. The example is merely intended as an illustration of the conceptual error in the overly broad definition of appropriability proposed by the Parties.
- (175) It is clear that the [Parties' submission] does not recognize the distinction between the value of innovation and the ability to appropriate it when it, for example, states that "*[t]he relevance of the appropriability threat in practice is highlighted by the negative impact that potentially competing projects by crop protection rivals have on the Parties' decisions to advance their own innovation projects.*"⁸⁰ Clearly an innovation with many competing alternatives is less profitable than one which has none, all else given. But this is not because the innovator could not appropriate its value. It is rather because the value of that innovation is lower when many rival firms can come up with a good alternative. An innovation is valuable to the extent it differentiates the innovative product from rival products that do not embedded it. No

⁸⁰

[Parties' submission].

firm, whether it is in competition with other firms or it is a monopolist—that is to say irrespectively of the product market structure—would invest in an innovation which does not provide a better value than an existing innovation to at least some customers. This follows from the fact that the firm could make no additional profits with such an innovation.

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CASE M.7932 – DOW/DUPONT

ANNEX 5 TO THE COMMISSION DECISION

ASSESSMENT OF THE EFFECTS OF COMMON SHAREHOLDING ON MARKET SHARES AND CONCENTRATION MEASURES

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1. INTRODUCTION

- (1) The Commission requested information from the Parties on common shareholders amongst BASF, Bayer, Dow, DuPont, Monsanto and Syngenta in the pre-notification request for information RFI 2, [date],¹ in particular in questions 4 and 5 which requested to list and provide details on such common shareholders. In a subsequent post-notification request for information RFI 14,² [date], the Commission requested the Parties to harmonize their responses to questions 4 and 5. The Parties' responses to questions 4 and 5 of RFI 2 form the basis of the analysis in this section, and are referred to as "RFI 2 data".³ The Commission further requested information on common shareholders in the request for information RFI 38, [date].⁴ Finally, in response to the Statement of Objections, and in particular to Annex 5 thereto dedicated to the assessment of the effects of common shareholding on market shares and concentration measures, the Parties provided arguments supporting their conclusion that "*the Commission's assertion that industry shares tend to underestimate the expected non-coordinated effects of the Transaction given the "significant cross shareholding between the main players" [...] is without basis*"⁵ (hereafter referred to as "Submission on common shareholding" or "Submissions").^{6,7}
- (2) In the context of the discussion of concentration levels and the likelihood of non-coordinated effects, paragraph 20(c) of the Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings⁸ (hereafter the "Horizontal Merger Guidelines") states that "*[t]he Commission is [...] unlikely to identify horizontal competition concerns in a merger with a post-merger HHI between 1000 and 2000 and a delta below 250, or a merger with a post-merger HHI above 2000 and a delta below 150, except where special circumstances such as, for instance, one or more of the following factors are present: [...] (c) there are significant cross-shareholdings among the market participants [...]*".⁹ Cross-shareholding is also mentioned in facilitating possible

¹ Commission's request for information RFI 2, questions 4-7 (ID243). The Parties responded [submission date] to questions 4 and 6, and responded to question 5 and 7 [submission date].

² Commission's request for information RFI 14, question 1, which requested to respond to unanswered pre-notification questions or to complement pre-notification responses, in particular question 4 of RFI 2. The Parties responded to question 1 of RFI 14 [submission date].

³ More precisely, "RFI 2 data" refers to the following files: [internal document] (ID1329-480), [internal document] (ID1329-481), [internal document] (ID1329-479), [internal document] (ID1329-477), [internal document] (ID1329-482), [internal document] (ID1329-483), all submitted along the Form CO after being submitted in response to RFI 2.

⁴ Commission's request for information RFI 38, questions 16-18 (ID5993), to which each of the Parties responded [submission date] (ID6372 [...] and ID6378 [...]).

⁵ Parties' response to the Statement of Objections, paragraph 250.

⁶ Parties' response to the Statement of Objections, annex 4 entitled [submission document] (ID10182).

⁷ The main arguments made by the Parties in their Submission on common shareholding, all addressed in this annex, are the following: (1) the HMG safe harbors already embed the average common ownership in the economy, and "*any difference to the HHI and HHI delta to account for common ownership should be based on differences from the relevant averages*" which the Commission did not perform; (2) the MHHI is an unreliable indicator of competitive effects and concentration in this case, in particular as the "*Commission did not measure the control weights required for its MHHI calculations*" and "*provides no evidence that managers in this industry are compensated in ways that give them incentives to behave as assumed under proportional control*"; (3) the empirical work cited by the Commission to support its concerns about common shareholding is "*highly flawed*", and (4) the MHHI, properly calculated and construed, does not elevate any competitive concerns in this case.

⁸ Official Journal C 031, 5.2.2004, pages 5-18.

⁹ HHI is the acronym of the Herfindahl-Hirschman index.

coordinated effects, both as providing an information channel amongst competitors (recital 47) and as providing “*help in aligning incentives among the coordinating firms*” (recital 48).

- (3) The Commission therefore assesses whether the Parties and their main competitors have cross-shareholding positions and/or common shareholders, as well as their likely consequences in terms of competitive assessment.
- (4) For reasons detailed below, and taking account of the recent insights provided, both theoretically and empirically, by the economic literature, the Commission comes to the conclusion that (i) concentration measures, such as market shares or the Herfindahl-Hirschman index (“HHI”), are likely to underestimate the level of concentration of the market structure and, thus, the market power of the Parties; (ii) common shareholding is a reality in the agrochemical industry, both in terms of the number of common shareholders as well as with respect to the level of shares possessed by these common shareholders; and, thus, (iii) common shareholding in the agrochemical industry is to be taken as an element of context in the appreciation of any significant impediment to effective competition that is raised in this Decision.

2. THE AGROCHEMICAL INDUSTRY IS CHARACTERIZED BY A CONCENTRATED SHAREHOLDERS STRUCTURE, WITH SIGNIFICANT COMMON SHAREHOLDING, IN PARTICULAR RELATED TO “PASSIVE” SHAREHOLDERS

2.1. The agrochemical industry is characterized by a concentrated shareholders structure

- (5) The Parties provided information on [details on shareholding information provided by the Parties].^{10,11}
- (6) [Details on shareholding information provided by the Parties].¹²
- (7) Table 1 reports several statistics on the number of shareholders reported in RFI 2 data which have specific levels of shares, or which are necessary to reach certain equity share levels. Overall, all firms share the fact that, for each of them, [...] shareholders are necessary to control 20% of each firm’s equity. Dow, DuPont and Monsanto have more concentrated shareholdings, as only [...] shareholders are necessary to reach 30% equity shares, and [...] to reach 50%.

Table 1 – Number of reported equity holders with shares in any of BASF, Bayer, Dow, DuPont, Monsanto and Syngenta

[...]

Source: Commission’s analysis of RFI 2 data

¹⁰ Parties’ response to Commission’s requests for information RFI 2, question 4 (ID753 and ID1159-257).

¹¹ While the Commission does not have comparable information for FMC, publicly available information show that a significant number of shareholders listed in BASF, Bayer, Dow, DuPont, Monsanto and Syngenta are also shareholders of FMC.

¹² Note that the Parties’ response to Commission’s requests for information RFI 2, question 5 (ID753 and ID1159-257) [content from internal document; internal document] (ID743) [content from internal document] the underlying data from S&P Capital IQ lists, referred to in footnote 3, list 1,394 shareholders with positive positions in Dow and 1,446 for DuPont. The same occurs for the other firms. As a consequence, all figures presented in this section are extracted from S&P Capital IQ lists, referred to in footnote 3.

2.2. The agrochemical industry is characterized by significant common shareholding, in particular related to “passive” shareholders

- (8) In order to get a sense of both the number of common shareholders and their importance, Table 2 lists all equity holders provided by the Parties having equity shares in any of the Parties or their main competitors, with a cumulative position in all these firms in excess of EUR 1,000 million. The ranking of each shareholder for each supplier is indicated between brackets.
- (9) For example, [shareholder name] is the shareholder with the highest overall investment in the six firms. [Shareholder name] is also the most important shareholder of BASF with a [...] % equity share, as well as of Bayer with [...] % and of Syngenta with [...] %. It is the second most important shareholder of DuPont with [...] % and the third most important shareholder of Dow with [...] % and of Monsanto with [...] %.
- (10) The 30 equity holders selected in Table 2 collectively amount to a significant portion of the equity share of each of the six firms:¹³ [...] % equity shares of BASF, [...] % of Bayer, [...] % of Dow, [...] % of DuPont, [...] % of Monsanto and [...] % of Syngenta.

Table 2 – Reported equity holders with shares in any of BASF, Bayer, Dow, DuPont, Monsanto or Syngenta, with a total portfolio value in all these companies of EUR 1,000 million or more

[...]

Source: Commission’s analysis of RFI 2 data

Note: Shareholders are ranked by decreased order of their portfolio value in all six companies
The ranking of each shareholder for each supplier is indicated between brackets.

- (11) The most important shareholders listed in Table 2, [shareholder names].¹⁴ These shareholders are often large “passive” mutual funds holdings, in the sense that these shareholders tend to construct well-diversified portfolios of individual stocks, most often based on index funds, with long investment horizons and infrequent selling, and tend not to buy and sale shares for the purpose of influence managerial decisions.¹⁵
- (12) Table 3 provides a more systematic assessment of common equity holders between each of the six firms, by computing how much equity share all reported holders in one company have in each of their competitors. For example, the first row indicates that all reported equity holders of BASF own, collectively, [...] % of Bayer, [...] % of Dow, [...] % of DuPont, [...] % of Monsanto and [...] % of Syngenta. The figure reported in the column “BASF” measures how much shares the reported equity holders of BASF hold, here [...] %, meaning that equity holders representing [...] % of BASF are not reported in the data provided by the Parties.
- (13) On the basis of the reported equity holders, Dow, DuPont and Monsanto seem to be the most “consanguine” agrochemical firms, as they share a significant number of equity holders with, overall, large positions on all of these three firms. Dow’s

¹³ Some equity holders in Table 2 do not have shares in all of the six firms.

¹⁴ Note that each investment company or mutual fund holds several funds, each of which could be managed in a “passive” or in an “active” way.

¹⁵ See, for example, <http://www.investopedia.com/terms/p/passiveinvesting.asp> and Appel, Gormley and Keim (2016), “Passive investors, not passive owners”, *Journal of Financial Economics*, 121(1), page 112.

reported equity holders own [...]% of DuPont and [...]% of Monsanto, while they own [...]%-[...]% of the other firms. For DuPont, its reported holders hold [...]% of Dow and [...]% of Monsanto, and [...]%-[...]% of the other firms. Finally, Monsanto's reported holders represent [...]% of Dow and [...]% of DuPont, and [...]%-[...]% of the others.

Table 3 – Collective shares of reported equity holders of each of BASF, Bayer, Dow, DuPont, Monsanto and Syngenta, in their competitors

[...]

Source: Commission's analysis of RFI 2 data

Note: Values in the diagonal measure the total equity shares in a given firm from all its reported equity holders

- (14) The data report [...] shareholders common to all six companies (see Table 4) which collectively amount to a significant equity share in each of the six firms: [...]% for BASF, [...]% of Bayer, [...]% of Dow, [...]% of DuPont, [...]% of Monsanto and [...]% of Syngenta. Importantly, [...] common shareholders are enough to reach, collectively, between [...]% and [...]% shares in all six firms, and in particular [...]% of Dow and [...]% of DuPont.
- (15) Moreover, Dow and DuPont have [...] common equity holders, with a collective share of [...]% for Dow and [...]% for DuPont. These shareholders common to the Parties also represent a significant equity share of the other 4 firms: around [...]%-[...]% for all but for Monsanto with around [...]. More importantly, [...] only of these common shareholders between the Parties reach, collectively, between [...]% and [...]% in all six firms, and in particular [...]% in Dow and [...]% in DuPont.
- (16) The Parties are well aware of this reality. For example, in the process of the preparation of the Transaction as well as in its promotion, the Parties emphasised that [content from submission document].^{16,17}

Table 4 – Collective shares of reported equity holders with shares in any of BASF, Bayer, Dow, DuPont, Monsanto or Syngenta

[...]

Source: Commission's analysis of RFI 2 data

- (17) On the basis of these factual elements, the Commission concludes that the agrochemical industry is characterized by a significant level of common shareholdings, in particular related to "passive" shareholders, across the integrated R&D players (BASF, Bayer, Dow, DuPont and Syngenta) and Monsanto, and that a limited number of shareholders, namely [...], represent, collectively, a significant share of each single firm, namely between [...]% and [...]%.
- (18) As regards FMC, while the Commission does not have comparable information for FMC as for the other six firms, publicly available information show that a significant number of shareholders listed in in the other six firms are also shareholders of FMC: on 30 June 2016, FMC had, amongst its most important shareholders, Vanguard (with 9.09%), Glenview Capital Management (8.16%), Barrow, Hanley Mewhinney & Strauss (5.18%), State Street (4.19%), Jennison Associates (2.82%),

¹⁶ Parties' presentation, [internal document] (ID5060-509), slide 14.

¹⁷ Parties' presentation, [internal document] (ID5060-509), slide 14.

BlackRock (2.59%).¹⁸ Therefore, the Commission is of the view that the conclusions reached for the integrated R&D players and Monsanto on their concentrated shareholdings and on their common shareholdings also extend to FMC.

3. LARGE MINORITY SHAREHOLDERS, IN PARTICULAR SO-CALLED “PASSIVE” SHAREHOLDERS, HAVE MORE INFLUENCE THAN THEIR FORMAL, MINORITY, EQUITY SHARE

- (19) Large shareholders are often large “passive” mutual funds holdings, in the sense that, as explained in paragraph (11), these shareholders tend to construct well-diversified portfolios of individual stocks, most often based on index funds, with long investment horizons and infrequent selling, and tend not to buy and sale shares for the purpose of influence managerial decisions.¹⁹ Nevertheless, passive investors are not passive owners but they engage in active discussions with companies’ board and management, with a view to influence the companies’ long-term strategy.

3.1. The Parties have a specific treatment for large shareholders

- (20) The Parties note that “*material non-public information may not be selectively disclosed to just one shareholder. Regulation FD (“Fair Disclosure”) in the US requires any answer/information given to a shareholder to be consistent with public disclosed information. Hence, a default premise is that all discussions have to be based on material public information.*”²⁰

- (21) Nevertheless, it remains that large shareholders have a privileged access to the companies’ management and can, therefore, share their views and have the opportunity to shape the companies’ management’s incentives accordingly.

- (22) [...].

3.2. “Passive” investors acknowledge that they exert influence on individual firms with an industry-wide perspective

- (23) This is further confirmed by several stakeholders. In a letter sent to board members of Vanguard funds’ largest portfolio holdings, Vanguard’s chairman and chief executive F. William McNabb III stated that Vanguard, one of the largest mutual funds holdings that manages approximately \$3.6 trillion in assets, will seek active interactions with firms they invest in: “[i]n the past, some have mistakenly assumed that our predominantly passive management style suggests a passive attitude with respect to corporate governance. Nothing could be further from the truth.”²¹ Glenn H. Booraem, controller of the Vanguard Group’s funds and a Vanguard principal, complemented that view: “[w]e believe that engagement is where the action is. We have found through hundreds of direct discussions every year that we are frequently able to accomplish as much—or more—through dialogue as we are through voting. Importantly, through engagement, we are able to put issues on the table for

¹⁸ Figures from publicly available source on FMC’s shareholders, accurate on 30 June 2016 (ID9278).

¹⁹ See, for example, <http://www.investopedia.com/terms/p/passiveinvesting.asp> and Appel, Gormley and Keim (2016), “Passive investors, not passive owners”, *Journal of Financial Economics*, 121(1), page 112.

²⁰ Parties’ response Commission’s request for information RFI 38, questions 17 (ID6372 for Dow), paragraph 17.5.

²¹ Letter sent by F. William McNabb III, Vanguard’s Chairman and CEO, to the independent leaders of the boards of directors of the Vanguard funds’ largest portfolio holdings, dated 27 February 2015, available at https://about.vanguard.com/vanguard-proxy-voting/CEO_Letter_03_02_ext.pdf (last accessed on 10 November 2016).

discussion that aren't on the proxy ballot. We believe that our active engagement on all manner of issues demonstrates that passive investors don't need to be passive owners. [...] The bottom line is that we believe that the vast majority of boards and management teams are appropriately focused on the same long-term value objectives as we are."²²

- (24) A similar message emerges from other large shareholders. BlackRock's chairman and chief executive Larry Flink confirmed that "[w]e are an active voice, we work with companies, but we need to work for the long-term interest"²³ and BlackRock's head of Asia Pacific corporate governance and responsible investment Pru Bennett further declared that "[w]e actively engage, we vote all our proxies. We're not just voting but have a lot of engagement with companies."²⁴
- (25) A former head of corporate governance at TIAA-CREF, one of the world's largest pension funds, also declared that "[h]aving a passive investment strategy has nothing to do with your behaviour as an owner. It is very clear from stewardship codes around the world that there are ownership responsibilities to owning shares, no matter how you got there."²⁵
- (26) State Street Global Advisors' head of corporate governance Rakhi Kumar stated that "[a]s an asset manager with one of the world's largest passive offerings and a near-perpetual holder of index constituents, active ownership represents the tangible way in which SSgA can positively impact the value of our underlying holdings. [...] Our size, experience and long-term outlook provide us with corporate access and allow us to establish and maintain an open and constructive dialogue with company management and boards. The option of exercising our substantial voting rights in opposition to management provides us with sufficient leverage and ensures our views and client interests are given due consideration."²⁶
- (27) As a last example, State Street Global Advisors' president and CEO, Ronald P. O'Hanley agreed on Appel, Gomley and Keym (2016)'s conclusions that "investors' interests are unquestionably being represented aggressively by passive fund [...] and that] long-term ownership requirement actually enhances influence and perspective." He further explained the means through which such influence can be achieved which is consistent with the general picture painted above: "[b]ut how can passive managers make a difference when they are required to own every stock in the index? The most effective way to create meaningful change is to build a thoughtful

²² Vanguard, "Passive investors, not passive owners", dated 20 June 2013, accessible at <https://www.vanguardinvestments.se/portal/site/institutional/se/en/articles/research-and-commentary/topical-insights/passive-investors-passive-owners-flor> (last accessed on 10 November 2016).

²³ Benoit (2014), "BlackRock's Larry Fink: typical activists are too short-term", dated 16 January 2014, available at <http://blogs.wsj.com/moneybeat/2014/01/16/blackrocks-larry-fink-typical-activists-are-too-short-term/> (last accessed on 10 November 2016).

²⁴ The Sydney Morning Herald, "BlackRock, Vanguard, State Street are not passive on corporate governance", dated 1 November 2016, available at <http://www.smh.com.au/business/markets/blackrock-vanguard-state-street-are-not-passive-on-corporate-governance-20161030-gseb74.html> (last accessed on 10 November 2016).

²⁵ Financial Times, "Passive investment, active ownership", dated 6 April 2014, available at <https://www.ft.com/content/7c5f8d60-ba91-11e3-b391-00144feabdc0> (last accessed on 10 November 2016).

²⁶ Financial Times, "Passive investment, active ownership", dated 6 April 2014, available at <https://www.ft.com/content/7c5f8d60-ba91-11e3-b391-00144feabdc0> (last accessed on 10 November 2016).

*engagement program with a focus on sector, thematic or market-specific issues that can scale across multiple companies. [...] However, they must also be prepared to use their voting power to reinforce value priorities with clearly articulated rationales if engagement falls short.”*²⁷

3.3. The economic literature provides empirical evidence showing that “passive” investors are active owners

- (28) Several academic work have provided empirical evidence that “passive” investors are, in fact, active owners, in the sense that they act to influence the behaviour of the firms in which they have shares.
- (29) Appel, Gomley and Keym (2016)²⁸ investigate empirically whether passive investors affect firms’ governance and performance. Their finding suggests that passive mutual funds influence firms’ governance choices, and that they exert their influence through their large voting blocs. In particular, they find that *“passive mutual funds have a significant impact on each of the three aspects of [firms’] governance. First, an increase in ownership by passive funds is associated with an increase in board independence. [...] Second, passive ownership is associated with the removal of takeover defences. [...] These findings are economically large [compared to the average situation.] Finally, an increase in passive ownership is associated with firms being less likely to have unequal voting rights, as captured by having a dual class share structure.”* They also note that *“[o]ur evidence suggests that a key mechanism by which passive investors exert their influence is through the power of their large voting blocs”*.
- (30) Azar, Schmalz and Tecu (2016)²⁹ review of the available evidence of the activity of “passive” investors, in particular their public declarations (along the lines of Section 3.2), their fiduciary duties, the coordination of voting opinions across funds belonging to the same mutual fund, and the variety of tools used to engage with companies. They note that *“[t]he combined effect [of their fiduciary duty to vote and their activism, in particular in determining executive compensations, retention, and the election of the directors,] can be consistent with incentivizing the CEO to not only maximize the own firm’s performance, but also take industry performance or specific competitors’ profits into account.”* They also note that *“although communication is not necessary to implement unilateral anti-competitive incentives that arise from publicly known common ownership links, the above evidence suggests that frequent and active communication, explicitly also about product market strategy, does take place between the largest investors and their portfolio firms. We also find it implausible that the worlds’ largest and most powerful investors are unaware of or unable to maximize their economic incentives - the evidence above certainly suggests a significant degree of sophistication.”*³⁰

²⁷ Pensions & Investments, “Passive managers take to shareholder activism”, dated 7 March 2016, accessible at <http://www.pionline.com/article/20160307/PRINT/303079994/passive-managers-take-to-shareholder-activism> (last accessed on 10 November 2016).

²⁸ Appel, Gormley and Keim (2016), “Passive investors, not passive owners”, *Journal of Financial Economics*, 121(1), pages 111-141.

²⁹ Azar, Schmalz and Tecu (2016), “Anti-competitive effects of common ownership”, Ross School of Business working paper 1235.

³⁰ Azar, Schmalz and Tecu (2016), section 6.3.

(31) Fichtner, Heemskerk and Garcia-Bernardo (2016)³¹ investigate to what extent BlackRock, Vanguard and State Street pursue an active corporate governance strategy. They “*measure how coordinated voting behavior of asset managers is in corporate elections as well as how often they vote with management.*” Using data from the Institutional Shareholder Services (ISS), a major proxy voting advisory firm, they find that (i) funds within BlackRock, Vanguard and State Street tend to vote similarly in almost all instances (more than 99% of votes for each of them); (ii) their voting behavior is similar to that of most large mutual funds and they vote with management in more than 90% of votes, (iii) they tend to ally with management against shareholders’ proposals, and (iv) half of the opposition to a positive management recommendation are related to the (re)election of directors. In other words, Fichtner, Heemskerk and Garcia-Bernardo (2016) show that BlackRock, Vanguard and State Street typically support firm’s management and use their shareholder power to replace management when they are dissatisfied.

3.4. The distribution of equity holders in the agrochemical industry contains a significant tail of atomistic shareholders

(32) Moreover, BASF, Bayer and Syngenta have a significant tail of atomistic equity holders. For example, the tail of non-reported equity holders represents a significant share: [...] % for BASF, [...] % for Bayer, [...] % for Dow, [...] % for DuPont, [...] % for Monsanto and [...] % for Syngenta (see Table 4).³² Adding reported equity holders with less than [0-5] % shares, the tail amounts to [...] % for BASF, [...] % for Bayer, [...] % for Dow, [...] % for DuPont, [...] % for Monsanto and [...] % for Syngenta (see Table 5). Such a tail of atomistic equity holders is less likely to be able to exert influence over general assemblies and the companies’ management.

Table 5 – Shares of equity holders tail of BASF, Bayer, Dow, DuPont, Monsanto and Syngenta

[...]

Source: Commission’s analysis of RFI 2 data

(33) Overall, the control exerted by large shareholders seems to be more important than their ownership equity share suggests.

4. LARGE MINORITY SHAREHOLDERS CAN EXERT MORE CONTROL THAN THEIR EQUITY SHARE SUGGESTS

4.1. The Commission’s notices recognizes that minority shareholders can have more control than their equity share suggests

(34) The Commission Notice on the concept of concentration under Council Regulation (EEC) N° 139/2004 on the control of concentrations between undertaking³³

³¹ Fichtner, Heemskerk and Garcia-Bernardo (2016), “Hidden power of the Big Three, Passive index funds, re-concentration of corporate ownership, and new financial risk”, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2 (last accessed 31 October 2016).

³² The equity share of the non-listed tail corresponds to 100% minus the equity shares reported in the last row of Table 4.

³³ Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings, OJ C95, 16.4.2008, pages 1-48.

recognises that, for a minority shareholder, “[s]ole control can be acquired on a *de jure* and/or *de facto* basis.”³⁴

- (35) As regards the *de facto* basis, the Notice further stipulates that the Commission should assess whether “*the [minority] shareholder is highly likely to achieve a majority at the shareholders’ meetings, given the level of its shareholding and the evidence resulting from the presence of shareholders in the shareholders’ meetings in previous years.*” In particular, “[w]here, on the basis of its shareholding, the historic voting pattern at the shareholders’ meeting and the position of other shareholders, a minority shareholder is likely to have a stable majority of the votes at the shareholders’ meeting, then that large minority shareholder is taken to have sole control.”³⁵

4.2. The Commission’s past practice recognizes that minority shareholders can have more control than their equity share suggests

- (36) In past cases, the Commission acknowledged the importance of shareholder fragmentation on effective control, in particular on the aspect resulting from voting.³⁶ For example in Cases IV/M.343 – Société Générale de Belgique / Générale de Banque,³⁷ M.3330 – RTL / M6³⁸ and M.4336 – MAN / Scania.³⁹
- (37) In Case IV/M.343 – Société Générale de Belgique / Générale de Banque, the Commission established that an increase in the capital participation from 20.94% to 25.96% was such as to lead to a change of ownership of control, in particular due to the participation in general meetings.⁴⁰
- (38) In Case M.3330 – RTL / M6, the Commission concluded “*it is almost certain that RTL will achieve a majority of vote casts at future shareholders’ meetings*” despite the fact that the voting rights associated to its 48.39% were limited by regulation to 34%, as “[t]he remaining 50.7% of shares and votes are widely dispersed among a large number of small shareholders” on the basis of past record of shareholders’ presence and the very unlikely possibility of their coalescence to reach a majority of the votes.⁴¹
- (39) In Case M.4336 – MAN / Scania, the Commission took account of the fact that, in a number of instances in the preceding years, the voting rights held by Volkswagen would not have been enough to obtain a majority at the annual general meeting of

³⁴ Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings, paragraph 55.

³⁵ Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings, OJ C95, 16.4.2008, paragraph 59.

³⁶ On other *de facto* aspect, see Cases IV/M.025 – Arjomari/Wiggins Teape Appleton (OJ C 321, 21.12.1990, page 16) and IV/M.764 – Saint Gobain/Poliet (OJ C225, page 8). In Case IV/M.0025 – Arjomari/Wiggins Teape Appleton, the Commission found that Arjomari was able to exercise decisive influence over Wiggins Teape with 39% of the shares since the rest was spread among 107,000 other shareholders, none of whom holding more than 4% and only three shareholders owned over 3% (see recital 4). In Case IV/M.764 – Saint Gobain/Poliet, a 4.7% interest in Poliet was enough for Saint Gobain to have sole control when the majority shareholder agreed that Saint Gobain would appoint the majority of the supervisory board (see recital 6).

³⁷ Case IV/M.343 – Société Générale de Belgique/Générale de Banque, OJ C225, 20.08.1993, page 2.

³⁸ Case M.3330 – RTL/M6, OJ C95, 20.4.2004, page 35.

³⁹ Case M.4336 – MAN/Scania, OJ C100, 4.5.2007, page 3.

⁴⁰ Case IV/M.343 – Société Générale de Belgique/Générale de Banque, recitals 7-14.

⁴¹ Case M.3330 – RTL/M6, recitals 8-12.

shareholders of MAN, and of other factors suggesting that a similar situation could arise again in the future.⁴²

5. THE THEORETICAL AND EMPIRICAL ECONOMIC LITERATURE PROVIDES GUIDANCE ON THE EFFECTS OF COMMON SHAREHOLDING

5.1. The economic literature show that firms' incentives to increase prices increase with partial ownership of competitors

- (40) The Commission understands that the three main economic papers analysing the theoretical unilateral impact of direct partial competitor ownership on competition are Reynolds and Snapp (1986),⁴³ Bresnahan and Salop (1986)⁴⁴ and O'Brien and Salop (2000).⁴⁵ This literature has already been discussed by the Commission in the context of the 2013 public consultation "Towards more effective EU merger control".⁴⁶
- (41) In a nutshell, Reynolds and Snapp (1986) analyse the unilateral competitive effects of direct partial financial interests and small joint ventures in the context of a Cournot homogeneous-product model. Such, potentially small, partial financial interests could result in lower equilibrium market output and higher equilibrium market prices when entry is difficult. Bresnahan and Salop (1986) build on Reynolds and Snapp (1986) by introducing the distinction between financial interest and corporate control. O'Brien and Salop (2000) extend Bresnahan and Salop (1986) to, among other things, account for a richer set of corporate control scenarios, including silent financial interests, total control, one-way control, Coasian joint control and proportional control, and multiple, overlapping, joint ventures. O'Brien and Salop (2000) analysis also encompasses both Cournot and Bertrand-type competition. Finally, Brito, Cabral and Vasconcelos (2014)⁴⁷ extend O'Brien and Salop (2000) by modelling the relationship between financial interest and control through the distinction between voting stock and preferred stock.
- (42) As summarized by O'Brien and Salop (2000), "*[i]ntuition might suggest that partial ownership is less competitively problematical than a full merger because the parties can continue to compete with one another after the transaction. Indeed, in their treatise, Phillip Areeda and Donald Turner conclude that a "noncontrolling acquisition has no intrinsic threat to competition at all."* However, this intuition is not always correct. We find that partial investments can raise either larger or smaller concerns than complete mergers. This may seem surprising, since a partial acquisition would appear to align the parties' interests less in all cases than would a

⁴² Case M.4336 – MAN/Scania, recitals 7-9.

⁴³ Reynolds and Snapp (1986), "The competitive effects of partial equity interests and joint ventures" (IJIO), *International Journal of Industrial Organization*, 4(2), pages 141-153.

⁴⁴ Bresnahan and Salop (1986), "Quantifying the competitive effects of production joint ventures", *International Journal of Industrial Organization*, 4(2), pages 155-175.

⁴⁵ O'Brien and Salop (2000), "Competitive effects of partial ownership: Financial interest and corporate control", *Antitrust Law Journal*, 67(3), pages 559-614.

⁴⁶ The economic literature on non-controlling minority shareholdings has been presented in the context of the 2013 public consultation "Towards more effective EU merger control". See "Annex I: Economic Literature on Non-Controlling Minority Shareholdings ("Structural links")", annexed to the Commission staff working document "Towards more effective EU merger control", available at http://ec.europa.eu/competition/consultations/2013_merger_control/consultation_annex1_en.pdf.

⁴⁷ Brito, Cabral and Vasconcelos (2014), "Divesting ownership in a rival", *International Journal of Industrial Organization*, volume 34, pages 9-24, accessible at <http://dx.doi.org/10.1016/j.ijindorg.2014.02.007> (last accessed on 17 November 2016).

*complete merger. The competitive effects of partial ownership depend critically on two separate and distinct elements: financial interest and corporate control. This distinction is absent in merger analysis, which assumes that the acquiring firm (or person) automatically controls the acquired entity after the merger. With partial ownership interests, however, these elements are separable. They also can occur in ways that result in greater or lower harm to competition than a complete merger.*⁴⁸

- (43) For the sake of the argument, assume that a firm (the acquiring firm) acquires a minority share in a competitor (the partially acquired firm). When contemplating a price increase, the acquiring firm anticipates that part of its customers will react to this price increase by diverting their purchase to its competitors, which will see their sales increase, including the one in which it has a minority share. The extra profits generated by the diverted sales to the benefit of the partially acquired firm will, in turn, be partially redistributed to the acquiring firm. As a consequence, when holding a minority share in a competitor, the acquiring firm has higher incentives to increase its prices than in the absence of such a minority share.
- (44) The impact on the acquired firm's incentives depends on how the transaction affects the governance of the acquired firm, that is on the acquiring firm's degree of control, which can range from no control at all (silent financial interest), to partial control, to total control.⁴⁹

5.2. The economic literature on partial ownership applies to the case of common shareholders

- (45) The analysis of the theoretical unilateral impact of common shareholders can be directly derived from the model developed by O'Brien and Salop (2000). As explained in detail in Azar, Schmalz and Tecu (2016),⁵⁰ O'Brien and Salop (2000) develop a model of oligopoly in which firms maximize a weighted sum of the portfolio profits accruing to their shareholders, where a shareholder's weight in a firm's objective function is proportional to the fraction of the control of the firm held by that shareholder. As a consequence, the theoretical framework, the methodology and the conclusions of O'Brien and Salop (2000) apply to common shareholdings.

5.3. Trian's lost proxy fight at DuPont is consistent with the economic rational that large "passive" common shareholders have different economic incentives than non-common shareholders

- (46) The fight that occurred in 2015 between Trian Fund Management ("Trian"), a shareholder of DuPont, and DuPont's management provides an interesting case study to explore the incentives of the different types of shareholders of DuPont.
- (47) Trian notified DuPont of its investment in June 2013, and shortly afterward presented an analysis in which it proposed to split up the company. DuPont resisted the idea of breaking up. Trian requested a seat on DuPont's board but was turned down. It then formally initiated the proxy contest in January 2015.⁵¹ Trian argued that it wanted DuPont to achieve "*best in class revenue growth*", pointing out in particular the

⁴⁸ O'Brien and Salop (2000), page 562.

⁴⁹ For a detailed analysis, see O'Brien and Salop (2000), section III.C.

⁵⁰ Azar, Schmalz and Tecu (2016), "Anti-competitive effects of common ownership", Ross School of Business working paper 1235.

⁵¹ Wall Street Journal's article "DuPont defeats Peltz, Trian in board fight", dated 13 May 2015, accessible at <http://www.wsj.com/articles/dupont-appears-poised-to-win-over-peltz-1431521564> (last accessed on 10 November 2016).

following criticisms:⁵² (i) DuPont's performance in recent years was below DuPont's competitors, in particular Monsanto,⁵³ (ii) DuPont lacked aggressiveness in R&D and other measures to gain market share⁵⁴ and (iii) DuPont reached an agreement with Monsanto over a patent dispute, agreeing to pay \$750 million USD more than required in a settlement.⁵⁵

- (48) Trian lost the proxy vote. It appears that the influence of large "passive" mutual funds have been instrumental in this result. Reuters reported that *"DuPont won the backing of three of its largest shareholders, Vanguard Group, State Street Global and BlackRock Institutional Trust, which are index funds, according to a source close to the matter. Trian won the majority of non-index institutions and would have prevailed had one of those three index funds voted differently, the source said."*⁵⁶
- (49) While some commentators have explained that the negative vote resulted from issues in Trian's campaign or other elements, others such as Schmalz (2015)⁵⁷ noted that: *"a dispassionate look at different shareholders' economic incentives supplies a rather simple rationale for why the passive funds did not themselves enforce relative performance evaluation, protest the weakening of DuPont's CEO's incentives, encourage more R&D and gains in market share, and so forth. Doing so simply isn't in their economic interest."* Indeed, increased competition amongst agrochemical companies would in the first place hurt those having interests across the industry: *"the common shareholders of the two firms [referring to Monsanto and DuPont, which were discussed in Trian's criticisms] would suffer from increased competition [from DuPont against Monsanto]. Because prices would be lower, so would be the combined revenue and profits of DuPont and Monsanto. That outcome is in strict discord with the economic interests of Vanguard, BlackRock, and State Street. That is the second – and socially important – source of disagreement between the economic interests of Trian and the mighty mutual funds."*
- (50) Elhauge (2016)⁵⁸ pointed to the same direction: *"complaints [such as Trian's complaint] are much less likely to persuade horizontal shareholders because they instead benefit from maximizing their returns from the joint profits of DuPont and Monsanto. It was thus unsurprising that Trian's proxy contest was not supported by the four top shareholders of DuPont, given that their 19.8% share of Monsanto slightly exceeded their 19.4% share in DuPont and that Monsanto has nearly double the market capitalization of DuPont."*⁵⁹
- (51) In conclusion, the Commission understands the proxy fight between Trian and DuPont can be interpreted as an illustration of the diverging incentives between large shareholders specific to a firm, which focus on the profitability of this firm, and large

⁵² See Trian's presentation for the proxy vote, available at https://www.sec.gov/Archives/edgar/data/30554/000093041315000509/c80237_ex1.pdf (last accessed on 10 November 2016).

⁵³ See slide 43 of Trian's presentation.

⁵⁴ See slides 11, 56 and 62 of Trian's presentation.

⁵⁵ See slide 59 of Trian's presentation.

⁵⁶ Reuters' article "DuPont wins board proxy fight against activist investor Peltz", dated 13 May 2015, available at <http://www.reuters.com/article/us-dupont-trian-idUSKBN0NY1J120150513> (last accessed on 10 November 2016).

⁵⁷ Schmalz (2015), opinion paper "How passive funds prevent competition", dated 18 May 2015, in Eric Posner's blog, accessible at <http://ericposner.com/martin-schmalz-how-passive-funds-prevent-competition/> (last accessed on 10 November 2016).

⁵⁸ Elhauge (2016), "Horizontal shareholding", Harvard Law Review, volume 129, pages 1267-1317.

⁵⁹ Elhauge (2016), page 1271.

shareholders common to several competing firms, which have lower incentives to enhance competition between these firms.

5.4. The economic literature provides empirical evidence consistent with common shareholders having a negative impact on price competition

- (52) Azar, Schmalz and Tecu (2016) assess, in their working paper, whether common shareholdings in the airline industry had a statistical and economical significant (positive) effect on prices, and estimate that “[U.S. airline ticket] prices are 3-11% higher because of common ownership, compared to a counterfactual world in which firms are separately owned, or in which firms entirely ignore their owners’ anti-competitive incentives caused by common ownership.” They also exploit variations in common shareholdings generated by the merger of two large asset managers (BlackRock’s acquisition of Barclays Global Investors in 2009) and estimate that “the single acquisition of BGI by BlackRock caused U.S. airline ticket prices to increase by 0.6% on average across routes.”
- (53) Anton, Ederer, Gine and Schmalz (2016)⁶⁰ take a complementary angle to the economic papers already quoted. They show, in their working paper, that executives are incentivized to reflect industry-wide focus. More precisely, they show empirically that “executives [of firms in industries with common ownership] are paid less for their own firm’s performance and more for their rival’s performance [... and that] [h]igher common ownership also leads to higher unconditional total pay.” These findings suggest that in industries, such as the agrochemical industry, in which common ownership is prevalent, the common shareholders shape the monetary incentives of firms’ executives in order to align them with industry performance, and not only their firm’s specific performance.
- (54) Building on recent literature, Elhauge (2016) notes the wide spread reality of common shareholding in many industries. He then explains how “new empirical evidence not only indicates pervasive horizontal shareholdings that economic models show are likely to have anticompetitive effects, but also confirms the predictions of those economic models by empirically proving that horizontal shareholdings have the predicted anticompetitive effects.” Elhauge (2016) then “shows that horizontal shareholdings can help explain some fundamental economic puzzles [...] [such as] why large, sophisticated corporate shareholders support executive compensation methods that reward executives for the success of their industry rather than the relative success of their firm alone [...]”
- (55) Finally, Posner, Scott Morton and Weyl (2016)⁶¹ also acknowledge, in their working paper, that “[r]ecent scholarship has shown that mutual funds and other institutional investors may cause softer competition among product market rivals because of their significant ownership stakes in competing firms in concentrated industries.” They stress that “the Department of Justice and the Federal Trade Commission should take the lead by adopting a public enforcement policy of the Clayton Act against institutional investors— the original authors of the Act intended it to be used.” In order to do so, Posner, Scott Morton and Weyl (2016) suggest the following policy

⁶⁰ Anton, Ederer, Gine and Schmalz (2016), “Common ownership, competition, and top management incentives”, Ross School of Business working paper 1328, available at <https://ssrn.com/abstract=2802332> (last accessed on 31 October 2016).

⁶¹ Posner, Scott Morton and Weyl (2016), “A proposal to limit the anti-competitive power of institutional investors”, working paper, available at <https://ssrn.com/abstract=2872754> (last accessed on 23 November 2016).

line: “[i]nvestors in firms in well-defined oligopolistic industries must choose either to limit their holdings of an industry to a small stake (no more than 1% of the total size of the industry) or to hold the shares of only a single “effective firm.” Investors that violate this rule face government litigation.”⁶²

5.5. The economic rationale leading to the indication that significant common shareholding is likely to lower rivalry in price competition applies also to innovation competition

- (56) As explained in Sections 5.1 and 5.2, the economic literature on cross-shareholding, which extends to common shareholding, tends to show that common shareholding of competitors reduces incentives to compete as the benefits of competing aggressively to one firm come at the expense of firms that belong to the same investors’ portfolio.^{63,64}
- (57) Moreover, as show in Section 5.4, some empirical studies tend to confirm that the presence of significant common shareholding in an industry have material consequences on the behaviour of the firms in such industries, in particular that prices are higher⁶⁵ and that common shareholders tend to shape the monetary incentives of firms’ executives in order to align them with industry performance, and not only their firm’s specific performance.⁶⁶
- (58) While the economic literature has, to the best of the Commission’s knowledge, focused on the effects of cross shareholding and common shareholding on price competition, the economic rationale of such effects applies to innovation competition.⁶⁷
- (59) In a nutshell, by increasing its efforts in R&D, a firm incurs a cost that decreases its current profits in expectation of future benefits brought by the resulting products of its innovation. Such future benefits would necessarily materialize through price competition of future products which, given the specificities of the agrochemical industry, in particular the fact that the total size of the crop protection industry is typically not related to innovation, is likely to be mainly at the expense of its competitors. In other words, the decision taken by one firm, today, to increase innovation competition has a downward impact on its current profits and is also likely to have a downward impact on the (expected future) profits of its competitors. This, in turn, will negatively affect the value of the portfolio of shareholders who hold positions in this firm and in its competitors. Therefore, as for current price competition, the presence of significant common shareholding is likely to negatively

⁶² Posner, Scott Morton and Weyl (2016), page 1.

⁶³ See Reynolds and Snapp (1986), “The competitive effects of partial equity interests and joint ventures” (IJIO), *International Journal of Industrial Organization*, 4(2), pages 141-153; Bresnahan and Salop (1986), “Quantifying the competitive effects of production joint ventures”, *International Journal of Industrial Organization*, 4(2), pages 155-175; O’Brien and Salop (2000), “Competitive effects of partial ownership: Financial interest and corporate control”, *Antitrust Law Journal*, 67(3), pages 559-614; Brito, Cabral and Vasconcelos (2014), “Divesting ownership in a rival”, *International Journal of Industrial Organization*, volume 34, pages 9-24; Azar, Schmalz and Tecu (2016), “Anti-competitive effects of common ownership”, Ross School of Business working paper 1235.

⁶⁴ More details are provided in Annex 5 to the Decision.

⁶⁵ Azar, Schmalz and Tecu (2016), “Anti-competitive effects of common ownership”, Ross School of Business working paper 1235.

⁶⁶ Anton, Ederer, Gine and Schmalz (2016), “Common ownership, competition, and top management incentives”, Ross School of Business working paper 1328.

⁶⁷ See Annex 4 to the Decision for more detailed explanations.

affect the benefits of innovation competition for firms subject to this common shareholding.

- (60) In conclusion, the Commission is of the view that (i) the agrochemical industry is characterized by a significant level of common shareholding, and that (ii) in the context of innovation competition, such findings provide indications that the reaction of competitors to a decrease in innovation effort by the merged entity is likely to be more limited than if these competitors were independent from the firm resulting from the Transaction.

6. CURRENT MARKET SHARES AND CONCENTRATION MEASURES SUCH AS THE HHI UNDERESTIMATE THE MARKET CONCENTRATION AND THE MARKET POWER OF THE PARTIES

6.1. The Herfindahl-Hirschman index and the related safe harbors in the Horizontal Merger Guidelines are based on a number of assumptions, including that each firm maximizes its own profits irrespectively of the profits generated by other competitors

- (61) In order to assess the level of concentration in an industry, the Horizontal Merger Guidelines rely on the use of the Herfindahl-Hirschman index (“HHI”) and its paragraph 20(c) defines ranges of HHI levels and changes for which the Commission is unlikely to identify non-coordinated effects (so-called safe harbors). It is therefore an important first element of appreciation of the likely anticompetitive effect of a concentration between undertakings.
- (62) The HHI amounts to the sum of the square of each competitor’s market share, in a given relevant market. Its values range from 0, for a (theoretical) purely competitive market with atomistic competitors, to 10,000 for a monopolistic market. One of the main advantages of the HHI is that it reflects the distribution of market shares in one single figure. Nevertheless, the HHI assumes, among other things,⁶⁸ that competitors are fully independent one from the other, that is that each competitor maximizes the profit it generated on its own, irrespectively of the profits generated by other competitors.
- (63) In the Parties’ Submission on common shareholding, [...] argues that “[t]he current safe harbors in the European Union Horizontal Merger Guidelines do not explicitly take account of common ownership, and hence should be viewed as based on the average level and impact of common ownership in the economy.”
- (64) [...] concludes that (i) “[a]bsent this demonstration [that the level and impact of common ownership in the agrochemical industry are higher than average, or that increases in common ownership from this merger are higher than is typical across industries], it would be inappropriate to adjust the concentration measure based on common ownership for the purpose of assessing whether the safe harbors are satisfied” and (ii) “[t]he Commission’s MHHI analysis is not based on such differences [from the relevant averages] and therefore does not provide a basis for evaluating whether this merger falls within the safe harbor.”⁶⁹

⁶⁸ The HHI is also related to competition between companies being *à la Cournot*, meaning that companies compete on the amount of output they will produce, which each decides on independently of each other and at the same time.

⁶⁹ [Submission document].

- (65) Such statements are at odds with the Horizontal Merger Guidelines as well as the economic theory underpinning the definition of the HHI. First, as indicated in Section 1, the Horizontal Merger Guidelines explicitly stipulates, in its paragraph 20(c), that significant cross-shareholdings among market participants is one of the special circumstances in which the HHI-defined safe harbour can be ignored. Second, as indicated in the Statement of Objections and in Annex 5 attached to it,⁷⁰ the HHI is theoretically underpinned by the economic model *à la Cournot*, in which firms compete by producing an homogenous good and each firm is identified as one entity which maximize its own profit absent any consideration for the other firms' profits.⁷¹
- (66) The Commission also notes that the test set out by the Parties' [...], is based on the false premise that the HHI is based on average level of common ownership in the economy, and should therefore be dismissed.

6.2. The Herfindahl-Hirschman index can be modified in order to account for the likely anticompetitive effects resulting from the existence of common shareholders

- (67) Reynolds and Snapp (1986), Bresnahan and Salop (1986) and O'Brien and Salop (2000) have suggested and, in turn, enhanced, the creation of a modified HHI ("MHHI") which would account for the existence of partial ownership of competitors as well as common shareholders. The version developed by O'Brien and Salop (2000) is more general one, in the sense that is allows for a richer set of corporate control scenarios and multiple, overlapping ventures, as well as common shareholders.^{72,73}
- (68) Let denote N the number of firms in the industry, each firm being identified by subscript j , and s_j each firm- j 's market share. Let also denote M the overall number of shareholders of the firms in the industry, each owner being identified by subscript i . Each owner- i has an ownership share in firm- j measured by β_{ij} and a degree of control over firm- j measured by γ_{ij} . The computation of the MHHI is then:⁷⁴

$$MHHI = HHI + \sum_{j=1}^N \sum_{\substack{k \neq j \\ k=1}}^N \left(\frac{\sum_{i=1}^M \gamma_{ij} \beta_{ik}}{\sum_{i=1}^M \gamma_{ij} \beta_{ij}} \right) s_k s_j$$

- (69) The difference between the MHHI and the HHI lies in the term on the right which reflects the competitive effects of cross-ownership within the industry, and which is

⁷⁰ See, for example, Professor Bajari's online course on oligopoly models, in particular slides 27-30, available at <http://faculty.washington.edu/bajari/iosp10/lecture5.pdf> (last accessed on 10 February 2017).

⁷¹ Annex 5 to the Statement of Objections, paragraph 59. This was not disputed in the Parties' response to the Statement of Objections.

⁷² See O'Brien and Salop (2000), appendix C for a full description of the theoretical underpinnings of the various versions of MHHIs as well as their computation.

⁷³ The MHHI is mentioned in footnote 25 of the Horizontal Merger Guidelines. It has also been presented in details in the context of the 2013 public consultation "Towards more effective EU merger control". See section 6.1 of "Annex I: Economic Literature on Non-Controlling Minority Shareholdings ("Structural links")", annexed to the Commission staff working document "Towards more effective EU merger control", available at http://ec.europa.eu/competition/consultations/2013_merger_control/consultation_annex1_en.pdf

⁷⁴ O'Brien and Salop (2000), appendix C, formula (C3).

directly related to β_{ij} , each owner- i 's ownership share in firm- j and to γ_{ij} , each owner- i 's degree of control over firm- j .

- (70) Several types of control can be factored in. The simplest one is “proportional control” which describes a situation in which each shareholder’s influence over the firm in which it holds shares is proportional to its equity share. Under such assumption, the Board and managers of the firm is assumed to take into account their shareholders’ interests in their competitors, as defined by their shareholders’ equity shares in those competitors.

6.3. The MHHI has been used in past Commission’s Decisions and it has been referred to in the Commission’s policy papers

- (71) The Commission used the concept of MHHI in past cases as well as in its policy guidelines and discussions.

- (72) As regards policy, the MHHI is mentioned in footnote 25 of the Horizontal Merger Guidelines. It has also been presented in details in the context of the 2013 public consultation “Towards more effective EU merger control”. It is also extensively referred to in the annex I to the Commission staff working document “Towards more effective EU merger control”.⁷⁵ In Case M.6541 – Glencore / Xstrata,⁷⁶ the minority stake of Glencore in Xstrata was taken into account in measuring the increase in concentration in the EEA production of all grades of zinc metal, as well as in the concentration in their EEA supply.⁷⁷

- (73) As regards past cases, the MHHI, or implicitly referred to, is used, for example, in Cases M.1383 – Exxon / Mobil⁷⁸ and M.1715 – Alcan / Pechiney,⁷⁹ in which a series of equity cross-holding between the parties and their competitors affected the competitive assessment;^{80,81} in Case M.2283 – Schneider / Legrand,⁸² in order to assess the adverse effect on competition caused by Schneider’s stake in Legrand;⁸³ and in Case M.6576 – Munksjö / Ahlstrom,⁸⁴ in order to assess the impact of common shareholders on control in relation to the design of the remedy proposal.⁸⁵

6.4. The computation of MHHI requires assumptions on shareholders’ control

- (74) The computation of MHHI requires establishing the effective control exerted by each shareholder on each firm.

⁷⁵ See section 6.1 of “Annex I: Economic Literature on Non-Controlling Minority Shareholdings (“Structural links”)", annexed to the Commission staff working document “Towards more effective EU merger control”, available at http://ec.europa.eu/competition/consultations/2013_merger_control/consultation_annex1_en.pdf.

⁷⁶ Case M.6541 – Glencore/Xstrata, OJ C109, 11.4.2014, page 1.

⁷⁷ Case M.6541 – Glencore/Xstrata, recitals 158, 175.

⁷⁸ Case M.1383 – Exxon/Mobil, OJ L103, 7.4.2004, pages 1-136.

⁷⁹ Case M.1715 – Alcan/Pechiney, withdrawn on 14 March 2000.

⁸⁰ Case M.1383 – Exxon/Mobil, recitals 254-256.

⁸¹ See Competition Policy Newsletter, 2000, number 2, page 11, second paragraph, available at http://ec.europa.eu/competition/publications/cpn/cpn2000_2.pdf.

⁸² Article 8(4) Decision in Case M.2283 – Schneider / Legrand, OJ L101, 6.4.2004, pages 134–148.

⁸³ Article 8(4) Decision in Case M.2283 – Schneider / Legrand, recitals 13-21.

⁸⁴ Case M.6576 – Munksjö/Ahlstrom, available at http://ec.europa.eu/competition/mergers/cases/decisions/m6576_20130524_20600_4231067_EN.pdf.

⁸⁵ Case M.6576 – Munksjö/Ahlstrom, recitals 7, 766 and 798. See also Federico, Motta and Papandropoulos (2015), “Recent Developments at DG Competition: 2014”, Review of Industrial Organization, volume 47(4), pages 22-33.

- (75) Several assumptions can be made, providing more or less control to some types of shareholders. For example, all shareholders, irrespective of their type (institutional, mutual funds, individuals, etc.) can be assumed to exert the same type of control, which is related to their equity shares. Alternatively, some shareholders can be assumed not to take part in the firms' decision making process, for examples by not voting at general assemblies. In such circumstances, the control exerted by the remaining shareholders would be mechanically augmented as a reflection of that fact. Other assumptions could also be made. For example, when there are indications that some types of shareholders have more prominent access to the firms' management, it could be assumed that those firms have more control than their equity shares (or that their equity shares, re-normalized to account for the inactive shareholders) would suggest.
- (76) [...], the Parties argue that “[h]ow ownership may translate into control is an open question in economics and finance, and the answer is likely to vary from case to case” and that “[t]he Commission does not use data or other evidence to measure control weights $[\gamma_{ij}]$ when analyzing the likely competitive effects of the proposed merger of DuPont and Dow.”⁸⁶
- (77) The Parties then suggest that such measurement could result from the investigation of the existence of mechanisms that would incentivize firms' managers to take decisions that do not solely maximize their company's profits but that factor in competitors' profits, for example through the assessment of managers' compensation schemes.
- (78) The Parties also note that “[i]f a majority of shareholders prefers a strategy different than that preferred by some other set of shareholders, then the majority will prevail. The outcome of voting in this case is not a decision that weighs the incentives of shareholders in proportion to their ownership shares, but one that reflects majority rule.”⁸⁷
- (79) The Commission acknowledges that it did not perform a case-specific assessment that would justify applying a specific assumption on the control weights γ_{ij} . As a consequence, the Commission does not rely on MHHI computation in this Decision.

7. CONCLUSION

- (80) In light of the above considerations and taking account of the recent insights provided, both theoretically and empirically, by the economic literature as regards the influence of the number of common shareholders as well as the level of shares possessed by them on the behaviour of companies in industries in which common shareholding is a widespread feature, the Commission concludes that common shareholding is a reality in the agrochemical industry. In particular, a small number of common shareholders, 17, collectively own around 21% of BASF, Bayer and Syngenta and around 29%-36% of Dow, DuPont and Monsanto.

⁸⁶ [...].

⁸⁷ [...].

- (81) Based thereupon, the Commission considers that, in general, market shares used by the Commission for the purpose of the assessment of the Transaction tend to underestimate the concentration of the market structure and, thus, the market power of the Parties, and that common shareholding in the agrochemical industry is to be taken as an element of context in the appreciation of any significant impediment to effective competition that is raised in the Decision.

CASE M.7932 – DOW/DUPONT

ANNEX 6 TO THE COMMISSION DECISION

ASSESSMENT OF THE SWITCHING ANALYSIS SUBMITTED BY THE PARTIES

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1. INTRODUCTION

- (1) In the Form CO, the Parties report the results of a switching analysis which intends to show that the Parties' customers mostly switch to generic suppliers or other branded manufacturers rather than between the Parties (hereafter referred to as "Submission #1").¹ This analysis ("initial analysis") is further developed in their response to the Article 6(1)(c) Decision (hereafter referred to as "Submission #2")² and in their response to the Statement of Objections (hereafter referred to as "Submission #3",³ and collectively referred to as "Submissions on switching" or "Submissions"). The Submission #3 extends the initial analysis and also develops an alternative one ("supplementary analysis").
- (2) Paragraphs 29 and 31 of the Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings⁴ (hereafter the "Horizontal Merger Guidelines") state that "[w]hen data are available, the degree of substitutability may be evaluated through customer preference surveys, analysis of purchasing patterns, estimation of the cross-price elasticities of the products involved, or diversion ratios. [...] Evidence of past customer switching patterns and reactions to price changes may provide important information in [...] respect [to Parties' customers' ability to protect themselves against price increases]."
- (3) The analysis of switching data is regularly performed in the context of the assessment of closeness of competition between merging firms, either directly in the context of customer surveys, win/loss data, portability data in the telecom industry, or bidding data.⁵
- (4) The Commission has therefore assessed the Parties' submissions as such type of analysis can be informative on the level of competitive constraint brought by one Party to the other in the (downstream) markets groupings for formulated products.
- (5) For reasons detailed below, the Commission comes to the conclusion that the switching analysis submitted by the Parties does not allow the Commission to validate the Parties' claim of lack of closeness of competition between Dow and DuPont.
- (6) More generally, the Commission is of the view that it is not possible to perform a meaningful switching analysis when, as is the case in the Submissions on switching, the only data available are sales data from both Parties to their customers, with *no* understanding of sales made by other suppliers, customers' characteristics or markets' characteristics and evolution.

2. DATA PROVIDED BY THE PARTIES

- (7) The underlying data and methodology were not provided along Submission #1, as requested by DG Competition Best Practices for the submission of economic

¹ Form CO, part B.I, paragraphs 181-189.

² Parties' response to the Article 6(1)(c) Decision, annex 4, entitled [...] (ID6097).

³ Parties' response to the Statement of Objections, annex 5, entitled [...] (ID10040).

⁴ Official Journal C 031, 5.2.2004, pages 5-18.

⁵ For example, see customer switching analysis in Cases M.4662 – Syniverse/BSG, recitals 79-81, M.4525 – Kronospan/Constantia, recitals 45-58, M.3916 – T-Mobile Austria/Tele ring, recitals 49-54, M.6851 – Baxter International/Gambro, recitals 75-82, M.7018 – Telefonica Deutschland/E-Plus, recitals 692-712, M.7278 – General Electric/Alstom, annex I, M.7555 – Staples/Office Depot, recitals 84-85, M.7612 – Hutchison 3G UK/Telefonica UK, recitals 92-103.

evidence,⁶ but as the result of a request for information RFI 6 (hereafter referred to as “Submission #1 data”).⁷

- (8) The data submitted by the Parties contain sales of each of Dow and DuPont to all their customers⁸ for a selection of their products in the following categories: broadleaf herbicides, cross-spectrum herbicides and insecticides. The data show the yearly amount of a particular product a customer bought from each of the Parties in a given year [...].
- (9) The Parties claim that changes in customers’ sales for each of the Parties can be interpreted as a switching either between the Parties and/or between one of the Party and other suppliers.
- (10) [...]⁹.

3. PARTIES’ VIEWS

3.1. Methodology followed by the Parties

- (11) The Commission notes that the Parties perform their analysis [details on switching analysis methodology].¹⁰ For this reason, the geographic scope of the Parties’ analysis will be referred to as “[...]” in the remainder of this annex. According to the Parties, [...].¹¹
- (12) The analysis is carried out at the level of three different product categories: broadleaf herbicides, cross-spectrum herbicides and insecticides. For each category, the Parties selected their most important active ingredients and, on that basis, all products with one of these active ingredients as the primary active ingredient.¹² [Details on switching analysis methodology].¹³
- (13) The Parties define, in each product category, a customer group called “potential switchers” by identifying customers for whom, first, the value of sales of products in this category from either Party fell by more than a given threshold, 25% in their base analysis, and for whom, second, the value of sales of products in this product did not fall for both Parties at the same time.^{14,15} Customers who reduced their purchases from both Parties are excluded from the analysis on the basis that such scenario could reflect a reduction in customer’s total demand rather than a switch of the customer from one supplier to the other.
- (14) For the customers identified as “potential switchers”, the Parties compute the proportion of sales which switched from one Party to the other as follows.¹⁶ For the sake of the argument, let assume that a customer decreased its purchases from Dow by more than 25% between 2013 and 2014. If, in the same period, this customer did not increase its purchases from DuPont, then all the sales lost by Dow are flagged as

⁶ DG Competition Best Practices for the submission of economic evidence, accessible at http://ec.europa.eu/competition/antitrust/legislation/best_practices_submission_en.pdf.

⁷ Parties’ response to Commission’s request for information RFI 6, question 22, [...] (ID1029-189) [...].

⁸ [...].

⁹ Submission #1 data.

¹⁰ See Stata code provided along the Submission #1 data.

¹¹ Form CO, part B.I, paragraph 1, footnote 1. [...].

¹² Form CO, part B.I, paragraphs 182-183 and “Switching Methodology” from the Submission #1 data.

¹³ See Section V.6.3.2 of the main body of the Decision.

¹⁴ Form CO, part B.I, paragraph 184.

¹⁵ Note that [...].

¹⁶ Form CO, part B.I, paragraph 185.

resulting from a switch from Dow to other competitors. If, on the contrary, this customer increased its purchases from DuPont, then all the sales gained by DuPont are flagged as resulting from a switch from Dow to DuPont.¹⁷ If, on top of that, this customer increased its purchases from DuPont by less than it decreased its purchases from Dow, then, the difference between the sales lost by Dow and the sales gained by DuPont is flagged as resulting from a switch from Dow to other competitors.

- (15) The results of these figures are then aggregated both at national and at [...] level. The proportion of sales switched from one Party to the other Party is calculated by dividing the potential switchers' sales lost from one Party to the other Party, with the total sales loss of potential switchers.
- (16) In their Submission #2, the Parties also provide two variations of the initial analysis in which potential switchers are defined by customers for whom the value of sales in a product category from either Party fell by more than either 0% or 50% (rather than 25%) but did not fall for both Parties at the same time.¹⁸
- (17) Finally, in their Submission #3, the Parties make a supplementary analysis in which (i) potential switchers include customers for whom the value of sales in a product category from either Party fell by more than a given threshold between 0% or 50% but did not fall for both Parties at the same time, and (ii) potential customers also include, to some extent, customers for whom the value of sales in a product category increased from both Parties or decreased from both Parties.^{19,20} The switching rates for these customers are computed following the rule used in stylised examples provided by the Commission in its Statement of Objections²¹ for the purpose of showing the strong limitations of the data provided by the Parties.

3.2. Results derived by the Parties

- (18) On a [...] level and with the 25% threshold, the Parties' analysis shows that the value of customer sales switched between the Parties is [...] for both broadleaf and cross-spectrum herbicides: in broadleaf herbicides the proportion is [...], while in cross-spectrum herbicides the proportion is [...].²² On insecticides, the Parties' analysis shows a [...].
- (19) For the 50% threshold, the Parties' analysis finds that the proportion of switching acquired by the other Party is [...] for each of the three categories (broadleaf herbicides, cross-spectrum herbicides and insecticides) at [...] level.²³

¹⁷ If the sales gained by DuPont exceed the sales lost by Dow, then the proportion of sales switched from Dow to DuPont is set at 100%.

¹⁸ Submission #2, section 3.2.

¹⁹ Submission #3, section 3.1.

²⁰ Customers for whom the value of sales from both Parties increased are all taken into account. Those for whom the value of sales from both Parties decreased are further divided in 4 categories, depending on whether the decrease is below or above a fixed threshold of 25%. Customers for whom the value of sales from both Parties decreased by less than 25% are excluded, other are included with specific computation rules for the switching rate. The annex does not provide any justification for the choice of 25% for this threshold as well as why the logic of having a given threshold between 0% and 50% was not applied to these customers.

²¹ Annex 6 to the Statement of Objections, Section 4.3.2. This section is also present in this annex, in Section 4.3.2.

²² Form CO, part B.I, paragraph 189.

²³ Submission #2, section 3.2.1, figure 9.

- (20) Using the 0% threshold, the proportion of DuPont switching acquired by Dow is around [...] % in cross-spectrum herbicides and about [...] % in all other combinations of direction and category at [...].²⁴
- (21) Looking at the country level, the Parties find that there are a [details on switching analysis].²⁵ For instance, [details on switching analysis].
- (22) In their supplementary analysis, the Parties compute the proportion of switching at [...] level for all years combined, for each of broadleaf herbicides, cross-spectrum herbicides, insecticides and nematicides. The Parties provide no analysis at country level and do not distinguish between the two periods. Overall, the switching rates computed by the Parties [details on switching analysis methodology].
- (23) According to the Parties' own computations, and independently of the threshold chosen for purchase reduction, the switching rate for broadleaf herbicides is [...] and [...]. For cross spectrum herbicides, the switching rate lies between [...] and between [...]. For insecticides, according to the Parties, the switching rate is between [...] and between [...].
- (24) In another scenario of their supplementary analysis which uses an alternative assumption on the computation of the switching rate,²⁶ [...].

3.3. Interpretation of the results and further arguments of the Parties

- (25) The Parties interpret the results of their analysis as evidence that there is [...] switching and that the Parties are therefore not close competitors.²⁷
- (26) The Parties argue that their assumptions are conservative in the sense that they exclude instances of possible switching away from the Parties to other firms, as they might also be considered as demand reductions.²⁸ For example, instances when one customer reduces its sales to one Party by less than 25% and did not increase its sales to the other Party are excluded.²⁹
- (27) In their Submission #2, the Parties essentially agree with the Commission's statement in the Article 6(1)(c) Decision that a clear differentiation between switching and demand reductions is not possible. Nevertheless, they argue that large changes in the quantity bought by one of the Parties are likely to reflect switching while small changes are more likely to reflect overall fluctuations in the market environment.³⁰
- (28) The Parties also agree with the Commission's statement in the Article 6(1)(c) Decision that situations in which customers decrease or increase their sales from both Parties simultaneously could include occurrences of switching of sales between the Parties. Nevertheless, they mention that in the absence of specific information on the actual behaviour of these customers, it is not possible to incorporate these customers in the switching analysis.³¹ However, the Parties argue that excluding those customers do not bias the results towards less switching between the Parties since these sales could also include switches to other firms, and customers for which

²⁴ Submission #2, section 3.2.2, figure 12.

²⁵ Submission #2, section 3.2, figures 10, 11, 13, 14, 16 and 17.

²⁶ Submission #3, annex D.

²⁷ Submission #2, section 1.

²⁸ See Form CO, part B.I, paragraphs 184 and 185.

²⁹ These customers are defined in Table 1 as categories [...].

³⁰ Submission #2, section 3.2.

³¹ Submission #2, section 3.2.

purchases from both Parties fell would be less likely to have switched between the Parties than other customers' categories included in the Parties' analysis (see Section 4.1 for a description of the customers' categories included in the Parties' analysis).³²

- (29) Irrespective of their general claims, [...].³³
- (30) Eventually, the Parties argue that the Commission's preliminary findings in the Article 6(1)(c) Decision that common customers [...] switch between the Parties does not make the Parties close competitors since such findings [...] the extent of switching between the Parties. This is because there are also many customers who buy from only one of the Parties and, possibly, from other competitors.³⁴
- (31) In their Submission #3, the Parties review their initial analysis and develop a supplementary analysis which includes, to some extent, [...].³⁵

4. COMMISSION'S ASSESSMENT

4.1. Customers reported in the data provided by the Parties can be distinguished by their changes in purchasing patterns

- (32) Table 1 presents descriptive statistics on the number of reported customers of broadleaf herbicides, as well as on their related sales value based on the [...] dataset provided by the Parties. Table 1 as well as the following explanations focus on broadleaf herbicides. Similar arguments can be made for cross-spectrum herbicides and insecticides.³⁶
- (33) The Commission distinguishes between "common customers", defined as customers who purchased products (of this product category) from both Dow and DuPont in the same period (...), and "non-common customers", defined as those who purchased products (in this product category) from only one of the Parties in the same period.³⁷
- (34) The first column displays a number between brackets, which identifies categories of customers with similar changes in purchasing patterns. This pattern is described in the second column. For example, customer category [...] corresponds to customers who, in any two consecutive years, experienced an increase in their purchase ("demand increase" or "DI") from both Dow and DuPont. Customer category [...] corresponds to customers who, in any two consecutive years, experienced a decrease in their purchase from Dow ("demand reduction" or "DR") and had no sales from DuPont.
- (35) The third and sixth columns, entitled "#", report the number of "non-common customers" and, respectively, of "common customers" belonging to each customer category. For example, customer category [...] identifies [...] which, in two consecutive years, did not purchase any product (from this product category) from any of Dow or DuPont.³⁸
- (36) The fourth and fifth columns report sales values of Dow and DuPont for non-common customers. The seventh and eight columns report sales values of Dow and

³² Submission #2, section 3.2.

³³ Submission #2, section 3.2.2.

³⁴ Submission #2, section 3.3.

³⁵ The supplementary analysis includes customers belonging to categories [...], as defined in Table 1.

³⁶ [...].

³⁷ [...].

³⁸ This can result from customers which did not buy from any of the Party in two consecutive years.

DuPont for common customers. The sales values reported are purchases of products (from this product category, in millions EUR) made by customers belonging to a specific customer category, from the Party indicated in the column, in the year of reference ([...]).

- (37) The ninth column reports the percentage of the total number of customers that belongs to a customer category. The tenth column reports the percentage of total sales that all customers in a customer category represent.
- (38) For instance, customer category [details on switching analysis], which the Parties identify as being part of the “potential switchers”, amount for [details on switching analysis].
- (39) In their initial analysis, the Parties consider customers in categories [...] as “potential switchers” between the Parties. Potential switchers (as defined by the Parties) amount to [30-40]% of the customers and [10-20]% of the purchases of all customers reported in the [...] dataset. The others categories are not considered in the Parties’ initial analysis.
- (40) In their supplementary analysis, the Parties consider customers in categories [...] partially, [...] as “potential switchers” between the Parties. The others categories are not considered in the Parties’ initial analysis.

Table 1 – Number and sales value of reported customers of broadleaf herbicides, using a 25% threshold for identifying “potential switchers” (as defined by the Parties)

[...] ^{39,40}

Source: Commission’s analysis of the Submissions on switching

Note (1): [...]

Note (2): [...]

4.2. The Parties’ analysis is not reliable to assess switching between the Parties

- (41) The Commission considers that the switching analysis provided by the Parties is not reliable for the following reasons.

4.2.1. The Parties exclude customer categories who buy from both Dow and DuPont and which are likely to have switched between Dow and DuPont

- (42) The Commission notes that the customer categories [...] are excluded from the initial analysis provided by the Parties despite the fact that each of them include only common customers between Dow and DuPont and are therefore likely to include customers who switched their sales between Dow and DuPont. [...]. ⁴¹ The supplementary analysis still excludes part of customer categories [...] as well as customer categories [...] and [...]. Therefore, the Commission considers that the Parties’ analysis is not reliable since it is likely to exclude [...].
- (43) [...]. ⁴²
- (44) The Commission agrees with the observation made by the Parties in their Submission #2 that, in the absence of specific information on the actual behaviour of these customers, it is not possible to differentiate customers having switched between Dow and DuPont from the other. However, the Commission considers that this is

³⁹ [...].

⁴⁰ [...].

⁴¹ [...].

⁴² Submission #2, section 3.2 and Submission #3, section 3.1 and annex C. See also paragraph (28).

precisely because of, first, such data limitation and, second, the importance of these two categories that the Parties' switching analysis cannot provide reliable results on the switching rate between Dow and DuPont, and therefore on the degree of substitution between the Party's products.

4.2.2. *The Parties include customer categories who did not buy from one of the Party in two consecutive years*

(45) Third, the Parties include in their analysis customers who did not buy from one of the Parties in two consecutive years, namely customer categories [...] and [...] as defined in Table 1.⁴³ [Details on switching analysis methodology].⁴⁴

(46) Moreover, it is unclear whether customers in categories [...] and [...] actually had the possibility to buy from the other Party. As the Commission shows in Section 4.2.5, focusing the switching analysis on customers that had actually access to both Parties (called "choice customers") [...].

4.2.3. *Solely changing the threshold for selecting customers of interests, as did by the Parties, does not address the Commission's concerns*

(47) In their Submission #2, the Parties attempt to address this concern by using a 50% threshold, rather than the 25% threshold used in the Submission #1, [...].⁴⁵ However, using a different threshold of 50% does not solve the Commission's concern. Indeed, irrespectively of its value, 25% or 50%, using such threshold excludes [...].

(48) Without prejudice to this methodological issue, The Parties' supplementary analysis does also not fully address the Commission's concerns. [...].

(49) Table 2 replicates Table 1 with a threshold value of 50%, instead of 25%, for broadleaf herbicides products.⁴⁶ [Details on switching analysis].

(50) The Parties also report a switching analysis using a 0% threshold. [Details on switching analysis methodology].

(51) The Parties' supplementary analysis does also not fully address the Commission's concerns. First, the thresholds applied to customer categories [...] and the fixed 25% threshold applied to customer categories [...] exclude common customers. Second, irrespectively of the value of the thresholds, common customers in categories [...] are still excluded in all Parties' analyses.

Table 2 – Number and sales value of reported customers of broadleaf herbicides, using a 50% threshold for identifying "potential switchers" (as defined by the Parties)

[...] ^{47,48}

Source: Commission's analysis of the Submissions on switching

4.2.4. *The Parties do not carefully address the variations in the switching rates resulting from their computation methodology*

(52) The Commission notes that [...]. In their submissions, [details on switching analysis]. In such a case, typically, the switching analysis would need to be

⁴³ [...].

⁴⁴ Article 6(1)(c) Decision, Section 5.2.3.5.(b)(ii).

⁴⁵ Submission #2, section 3.2.1.

⁴⁶ [...].

⁴⁷ [...].

⁴⁸ [...].

performed over a longer time horizon and would need to attempt to control for market and customers' characteristics, in order to provide confidence that the overall picture resulting from the analysis is robust and, thus, in order to shed light on the closeness of competition between the Parties in the downstream markets. In their Submission #3, the Parties do not address this concern.

Table 3 – Switching rate for all “potential switchers”, namely all customers in categories [...] (as defined by the Parties), using a 25% threshold as well as the Parties’ computation methodology, for each period

[...]

Source: Commission’s analysis of the Submissions on switching

4.2.5. *An analysis on customers who have had actually the choice between Dow and DuPont (“choice customers”) [...]*

(53) The Commission considers that one important reason why the Parties find, in general, [...] switching rates is [...]. The Commission therefore repeats the Parties’ analysis [...].

(54) Indeed, it is likely that customers who actually bought from Dow in at least one of the [...] years and who also bought from DuPont in the same or any other of the [...] years had the choice to purchase from both firms and, as a consequence, that Dow and DuPont were alternatives in their choice set. Table 4 reports the switching rates computed by the Commission, using Parties’ computation methodology, when selecting “choice customers” who belong to the categories selected by the Parties, namely customer categories [...] defined with a 25% threshold.

Table 4 - Switching rates for “choice customers” in categories [...], using a 25% threshold and the Parties’ computation methodology, for each period

[...]

Source: Commission’s analysis of the Submissions on switching

(55) Overall, the switching rates between the Dow and DuPont for those customers, who had both Dow and DuPont in their choice set, [...]. These results contradict the Parties’ claim that Dow and DuPont are not close competitors. As for the “potential switchers” and for the “common customers”, the switching rates on “choice customers” also exhibit significant variability between the [...], further suggesting that the data provided by the Parties do not allow to infer robust conclusions on the switching rates between Dow and DuPont.

4.2.6. *The Parties’ arguments on the structural bias of the “common customers” or “choice customers” approach are incorrect*

(56) While the Commission recognizes that the computation of switching rates on the basis of “common customers” in categories [...] will [...] the results compared to their computation on the basis of “potential switchers”, which pulls together common and non-common customers of categories [...], the Commission rejects the Parties’ claim that a switching analysis focusing on common customers would by construction [...].⁴⁹

(57) While customer categories [...] experienced a demand decrease in one Party and a demand decrease in the other Party, this does not imply that there must be a high

⁴⁹ Submission #2, section 3.3; Submission #3, section 3.2.

switching rate. Table 5 shows the switching rates, computed using the Parties' methodology. The Commission finds [...] for broadleaf herbicides.

(58) [Details on switching analysis methodology].

Table 5 - Switching rates for “common customers” in categories [...], using a 0% threshold as well as the Parties' computation methodology, for each period

[...]

Source: Commission's analysis of the Submissions on switching

(59) Moreover, switching rates computed using common customers [...]. Table 6 compares the switching rates, computed using the Parties' methodology, of common customers belonging to categories [...]. It shows that [...].

Table 6 - Comparison of the switching rates for “common customers” in categories [...] and for each of 0%, 25% and 50% threshold, using the Parties' computation methodology

[...]

Source: Commission's analysis of the Submissions on switching

4.2.7. *The Parties' argument that customers who never purchased from either Dow or DuPont have just revealed their preferences and should be included in the analysis misses the Commission's concern*

(60) The Parties argue that [details on switching analysis methodology].⁵⁰

(61) First, the Parties did not provide any explanation on the methodology followed to identify, gather, match and clean the data from Dow and DuPont. [...].

(62) Second, as recognized by the Parties in the Form CO,⁵¹ [...].

(63) Third, [...].

(64) Fourth, [...].

4.3. Using standard techniques for measuring likely price effects of mergers, and without prejudice to the Commission's assessment of the relevance of the Parties' switching analysis, the [...] computed by the Parties would lead to the anticipation of significant price increases

(65) In their Submissions #3, the Parties insist in concluding that “*the switching between the Parties remains below any reasonable figure that would indicate that the Parties are particularly close competitors*”⁵² and therefore the Transaction would not lead to significant impediment to effective competition for (downstream) product markets for formulations.

(66) In order to address this argument, and without prejudice to the Commission's assessment of the relevance of the Parties' switching analysis, the Commission notes that, [...], standard techniques used for measuring likely price effects of merger would lead to the anticipation of significant price increases.

⁵⁰ Submission #3, section 3.2.

⁵¹ Form CO, part B.I, paragraph 183, footnote 128.

⁵² Submission #3, section 3.1, page 23.

- (67) In the late 90's, different methodologies, in particular by Shapiro (1996)⁵³ and Werden (1996)⁵⁴ and later by Farrell and Shapiro (2010),⁵⁵ have been developed in the economic literature for estimating likely price effects resulting from mergers. These approaches typically required data only on markups and diversion ratios, and made different sets of simplifying assumptions. These approaches led to several measures, amongst which the Upward Pricing Pressure ("UPP") and the Gross Upward-Pricing Pressure Index ("GUPPI").⁵⁶
- (68) Such techniques have been implemented by various Competition Authorities around the world, in particular the U.S. Department of Justice and Federal Trade Commission, which mention them in their Horizontal Merger Guidelines,⁵⁷ as well as the European Commission.⁵⁸
- (69) These measures intend to quantify the effect of a merger in a differentiated products industry with two merging firms, each of which produces a single product. For example, the GUPPI measures the value of diverted sales in proportion to the lost revenues attributable to the reduction in unit sales when the price of product 1 increases.
- (70) GUPPI is defined, for a given merging company's product 1 in relation to the other merging company's product 2, as

$$GUPPI_1 = D_{12} \frac{p_2 - c_2}{p_1}$$

- (71) The variables p_1 and p_2 are the pre-Transaction prices of the two merging products, D_{12} is the diversion ratio from product 1 to product 2 when the price of product 1 increases, and c_2 is the marginal cost of product 2.
- (72) Therefore, in order to quantify the likely price effects of the Transaction, one would need to obtain relevant data on margins, prices and diversion ratios for competing products sold by both Parties, and to adequately factor in the multiplicity of such products. This section does not provide such exercise but it simply intends, in reaction to the Parties' argument in their Submission #3, to provide a *sense of the magnitude* of the price increases that would result from the Transaction in some downstream markets.

⁵³ Shapiro (1996), "Mergers with differentiated products", Antitrust, 10, pages 23-30.

⁵⁴ Werden (1996), "A robust test for consumer welfare enhancing mergers among sellers of differentiated products", The Journal of Industrial Economics, 44(4), pages 409-413.

⁵⁵ Farrell Shapiro (2010), "Antitrust evaluation of horizontal mergers: An economic alternative to market definition", The B.E. Journal of Theoretical Economics, 10(1).

⁵⁶ Other techniques have also been developed, such as the Compensating Marginal Cost Reduction ("CMCR"), the First-Order Approach to Mergers ("FOAM") or the Indicative Price Rise ("IPR"). See Baltzopoulos Kim Mandorff (2015), "UPP analysis in five recent merger cases", Konkurrensvetket working paper, for a review of these various techniques.

⁵⁷ U.S. Department of Justice and the Federal Trade Commission (2010). "Horizontal Merger Guidelines", available at <http://www.ftc.gov/os/2010/08/100819hmg.pdf> (last accessed 17 February 2017), page 21.

⁵⁸ For example, on UPP and merger simulations, see in Cases M.5644 – Kraft Foods/Cadbury, recitals 64-69, 97-99 on merger simulation; M.5658 – Unilever/Sara Lee, Technical Annex on merger simulation; M.6497 – Hutchison 3G Austria/Orange Austria, section 6.8 and Annex II on GUPPI/UPP; M.6992 – Hutchison 3G UK/Telefonica Ireland, Annex I on CMCR/GUPPI/IPR/UPP and merger simulation; M.7018 – Telefonica Deutschland/E-Plus, section 6.3.1.7 and Annex A on CMCR/GUPPI/UPP and merger simulation; M.7421 – Orange/Jazztel, section 7.2.7 and Annex A on IPR/UPP and merger simulation; and M.7612 – Hutchison 3G UK/Telefonica UK, Annex A on CMCR and merger simulation,

- (73) In a nutshell, the measure of pricing pressure results from the multiplication of the diversion ratio from one product to a competing product, with the margins of the competing products. This provides the expected price increase in absolute value. In the case at hand, the diversion ratios resulting from a price increase can be approximated by the switching rates between the Parties, and the margins can be extracted from the documents of both Parties.
- (74) Let's for example take insecticides. One version of the switching rate from DuPont to Dow, as computed by the Parties in their Submission #4, is around [20-30]%. Let's thus assume that the diversion ratio from DuPont to Dow is [20-30]% for insecticides. Dow's formulated products based upon spinosad and spinetoram (collectively referred to as spinosyns) are reported to generate a margin of [...] % of their corresponding revenues.⁵⁹ Therefore, if DuPont increases the price of its insecticides (for example its Rynaxypyr insecticide, which is competing against Dow's Spinetoram, see Section V.6.4), it will lose sales but [...] % of its losses will be recouped by its merging partner, through the sale of a product generating a margin of [...] %. As a consequence, the merged entity would have a strong interest in unilaterally increasing the price of its products post-Transaction. As discussed in the Horizontal Merger Guidelines, high pre-merger margins may also make significant price increases more likely.⁶⁰
- (75) The Commission therefore notes, in response to the Parties' argument that Transaction would not lead to significant impediment to effective competition for (downstream) product markets for formulations as the "*switching between the Parties remains below any reasonable figure that would indicate that the Parties are particularly close competitors*",⁶¹ without prejudice to the Commission's assessment of the relevance of the Parties' switching analysis, that, [...], standard techniques used for measuring likely price effects of merger would lead to the anticipation of significant price increases. This contradicts the Parties' conclusion.

4.4. The Parties' data and assumptions are not suited for a meaningful switching analysis

4.4.1. The assumptions of the Parties

- (76) Fundamentally, the data provided by the Parties suffer from severe limitations: [...]
- (77) To overcome these limitations, as well as to criticize the Commission's response to their submission, the Parties make several critical assumptions:
- (a) [Details on switching analysis methodology].⁶² In their supplementary analysis, [details on switching analysis methodology]. See Section 4.2.1 on this issue.
 - (b) [Details on switching analysis methodology]^{63, 64}. In their supplementary analysis, [details on switching analysis methodology]. See Section 4.2.1 on this issue.
 - (c) [Details on switching analysis methodology].⁶⁵ In their supplementary analysis, [details on switching analysis methodology]. See Section 4.2.3 on this issue.

⁵⁹ See Dow's and DuPont's responses to the request for information RFI 66, questions 1 and 6, [reference to internal document].

⁶⁰ Horizontal Merger Guidelines, paragraph 28.

⁶¹ Submission #3, section 3.1, page 23.

⁶² Submission #2, section 3.2.

⁶³ Submission #2, section 3.1.

⁶⁴ Form CO, part B.I, paragraph 184.

(d) [Details on switching analysis methodology]^{66,67}. See Section 4.2.2 on this issue.

(e) [Details on switching analysis methodology].

4.4.2. *Stylised examples with various scenarios of demand change and purchasing patterns*

(78) In this section, the Commission intends to show, through stylised examples, that the limitations of the data provided by the Parties are such that the Parties' interpretations do not hold in the presence of changes in customers' demand between two consecutive years.

(79) Table 7 summarizes examples of change in purchases from a hypothetical customer, in several scenarios which depend on the possibility of change in overall demand for this customer (increase, reduction) as well as on its purchasing pattern (only from Dow and DuPont, from Dow and other suppliers but not from DuPont, from Dow, DuPont and other suppliers).

(80) Table 7 is split in several parts. The first part, from the left, provides hypothetical volumes purchased in the first year from Dow, DuPont and other suppliers, for each scenario. The second part provides hypothetical volumes purchased in the second year by the same customer, as well as the gains/losses compared to the first year, and the customer category a customer with such change in purchases would belong to.

(81) The third part describes what should be the appropriate counterfactual under the demand scenario, namely the volumes that should be purchased by the customer under the assumption that its preferences for its suppliers do not change from the first year to the second year. Under such assumption, the customer should have divided its demand between its suppliers in the second year following the same ratios as in the first year. For example, if a customer purchased in the first year a third of its demand from each of Dow, DuPont and other suppliers (accounted for collectively), and if this customer experienced a demand increase in the second year, the counterfactual should be that it purchased a third of its new demand from each supplier. Once this counterfactual is computed, Table 7 provides gains and losses compared to this counterfactual, and indicates to which customer category a customer with such change in purchases vis-à-vis the counterfactual would belong to.

(82) Note that the data provided by the Parties [...].

(83) In their Submission #3, the Parties argue that these “*stylised examples are highly speculative and do not provide any justification for including the groups of customers identified*” and that, discussing scenario #4 as an example, “*it is plausible that even within the scenario [#4] no switching between the Parties occurred.*”⁶⁸ The Parties devote an entire page in identifying other alternative scenarios. This further reinforces the main point made by the Commission: indeed, there are multiple likely plausible switching scenarios that would correspond to the same changes in sales from the Parties.

(84) Table 7 provides six such scenarios. Because the switching study of the Parties is solely based on the observation of [...], there is no way to disentangle which scenario has indeed occurred and, consequently, there is no way to make any meaningful

⁶⁵ Submission #2, section 3.2.

⁶⁶ Submission #2, section 3.2.

⁶⁷ Form CO, paragraph 185.

⁶⁸ Submission #3, section 3.2.

assessment of the true switching that might or might not have occurred between Dow and DuPont.

Table 7 – Stylised examples of customers’ purchases from Dow and DuPont, with different demand scenarios (increase, reduction) and purchasing patterns (only from Dow and DuPont, from Dow and other suppliers but not from DuPont, from Dow, DuPont and other suppliers), using a 25% threshold for identifying customer categories

	Year 1	Absolute values for Year 2			Counterfactual for Year 2		
	Volume	Volume	Gain/Loss	Category	Volume	Gain/Loss	Category
<i>Scenario with overall demand reduction by 90 units (DR)</i>							
#1	Dow	100	90	-10	55	+35	
	DuPont	100	20	-80	[...]	-35	[...]
	Others	0	0		0		
#2	Dow	100	80	-20	70	+10	
	DuPont	100	60	-40	[...]	-10	[...]
	Others	100	70	-30	70	0	
#3	Dow	100	70	-30	55	+15	
	DuPont	0	0		[...]	0	[...]
	Others	100	40	-60	55	-15	
<i>Scenario with overall demand increase by 90 units (DI)</i>							
#4	Dow	100	180	+80	145	+35	
	DuPont	100	110	+10	[...]	-35	[...]
	Others	0	0		0		
#5	Dow	100	140	+40	130	+10	
	DuPont	100	110	+10	[...]	-20	[...]
	Others	100	140	+40	130	+10	
#6	Dow	100	110	+10	145	-35	
	DuPont	0	0		[...]	0	[...]
	Others	100	180	+80	145	+35	

Source: Commission’s analysis

4.4.3. Assumption #1

(85) In scenario #4 of Table 7, Dow and DuPont are the only two suppliers of a customer who buys 100 units from each of them in the first year, sharing equally its 200 units demand amongst the Parties. Assume that, between the first year and the second year, this customer experiences an overall and exogenous increase in demand of 90 units. If the customer was to purchase its required 290 units according to his first year preference, he would purchase half of its demand, 145 units, from each of Dow and DuPont. This is referred to as the “counterfactual” situation. Assume now that he eventually purchases in the second year 180 units from Dow and 110 units from DuPont. Such purchases would be the values observed in the data provided by the Parties. Compared to its first year purchase, this customer buys more from both Dow and DuPont, therefore belonging to category [...]. According to the Parties, customers from category [...] should be excluded from the switching analysis. Nevertheless, compared to the counterfactual situation, this customer has increased its purchases from Dow, to the expense of its purchases from DuPont by more than 25%, therefore belonging to category [...]. Even according to the Parties, customers belonging to category [...] need to be included in the switching analysis.

- (86) Scenario #5 provides an example of customers sourcing equally its first year demand from Dow, DuPont and another supplier, with 300 units each. Facing a demand increase of 90 units, the same customer would, keeping the same preferences amongst suppliers, source 130 from each of them. Assume now that, in the second year, the customer purchases 140 from Dow, 110 from DuPont and 140 from the other supplier. From the point of view of the Party analysis, this customer would belong to category [...] as his purchases in the second year increases for both Dow and DuPont, compared to the first year. In other words, this customer switched away from DuPont to the benefit of both Dow and the other supplier. Because he increases his purchase from Dow and decreases his purchase from DuPont (below 25%), compared to the counterfactual situation, he belongs to category [...].
- (87) These examples show that the interpretation of an identical evolution of an increase in purchases from Dow and DuPont, as well as its inclusion in the computation of switching rages, can change drastically depending on the understanding of the change in demand faced by the customer. Therefore, assumption #1, based on the fact that customers in category [...] “*are less likely to have switched between the Parties than other customers*” does not seem to be sound.

4.4.4. Assumption #2

- (88) Customers experiencing scenario #1, that is a demand reduction and no other supplier than Dow and DuPont, decrease their purchases in both Dow and DuPont in the second year, therefore belonging to category [...]. Nevertheless, with respect to the counterfactual situation in which the demand reduction is properly taken into account, this customer switches away purchases from DuPont to the benefit of Dow, belonging to category [...].
- (89) Under scenario #2, the customer purchases equally 100 units from Dow, from DuPont and from another supplier in the first year and experiences a demand reduction of 90 units in the second year. Even is the second year purchases (80 for Dow, 60 for DuPont and 70 for the other supplier) decreased compared to the ones in the first year, they in fact correspond to a switch away from DuPont to the benefit of Dow. This customer would be categorized as [...] in comparison from its first year, while he would belong to category [...] in comparison to the counterfactual situation.
- (90) These examples show that a demand decrease from Dow and DuPont can represent at the same time a reduction in the customer’s total demand and a switch from one supplier to the other. Moreover, it remains to be proven that excluding such customers is in fact conservative, in particular in the absence of information on third parties’ sales to these customers.

4.4.5. Assumption #3

- (91) Scenario #2 provides an example of customers who supply from only Dow and DuPont, who experience a small reduction in purchases from Dow and DuPont, in reference to the counterfactual, and for whom such changes reflect a (limited) switch of purchases from DuPont to Dow. Scenario #5 provides a similar example for customers supplying their needs from Dow, DuPont and another supplier.
- (92) These examples show that small reductions in purchases are concomitant to switching behaviour between Dow and DuPont.

4.4.6. *Assumption #4*

- (93) As explained in Section 4.2.2, this assumption means that both common customers and non-common customers are included in the Parties' switching analysis.
- (94) The purpose of a switching analysis is to provide insights into the question of closeness of competition by measuring to what extent customers who can choose between the two companies' products tend to switch between them as well as switch to or from other suppliers' products.
- (95) Therefore, the assumption #4 implicitly assumes that (non-common) customer categories [...] and [...] had the choice of both Dow's and DuPont's products, and decided not to source from one of them.
- (96) The switching analysis made in Section 4.2.5, which focuses on "choice customers" that had actually access to both Parties in the (limited) period provided by the Parties, shows similar results than for "common customers", strongly suggesting that the implicit assumption of assumption #4 does not hold, namely that most customers who are not buying from either Dow or DuPont in any two given contingent years, is in fact not buying from it at any point in time in the data provided by the Party.

4.4.7. *Assumption #5 and reverse switching*

- (97) Scenarios #1 and #2 have already been discussed. They each show a change in switching pattern. Scenarios #3 and #6 provides other interesting examples of inaccurate switching that could be deduced from the observation of Dow's and DuPont's purchases.
- (98) In scenario #3, the customer decreases his purchase from Dow from 100 units to 70 units, and does not purchase from DuPont. Moreover, the customer purchases 100 units from another supplier. Dow seems to lose sales and, absent any information on purchases made to other suppliers, one can believe that such loss is to the benefit of the other supplier. Nevertheless, because of a demand reduction of 90 units, Dow in fact increases its sales from the counterfactual of 55 units to its actual sales in the second year, 70, whereas the other supplier decreases its sales from the counterfactual of 55 units to its final sales of 40 units. In other words, Dow is winning sales from another supplier even if its sales are decreasing (DuPont is not selling to that customer).
- (99) In scenario #6, a similar situation occurs in which Dow seems to win 10 units (DuPont is not selling to that customer) whereas, due to the demand increase, Dow is in fact loosing sales to the other supplier.
- (100) The Commission notes that the Parties' methodology would take up the perceived switch to other suppliers in scenario #3 as an 100% switch to other companies, whereas the perceived gain of Dow in scenario #6 would be excluded from the analysis because neither Dow nor DuPont lost sales in this scenario.

5. CONCLUSION

- (101) The Commission concludes that the switching analysis submitted by the Parties does not allow the Commission to validate their claim of lack of closeness of competition between Dow and DuPont, for the following reasons.
- (102) First, the data provided by the Parties suffer from many limitations. [...]. This in itself limits the ability to identify precisely customers who have switches purchases between Dow and DuPont and other suppliers.

- (103) Second, as a consequence of this lack of certainty on which customers do switch purchases between Dow and DuPont and other suppliers, the Parties make assumptions which exclude from their analysis [...] of customers and sales. Common customers that increase or decrease their purchases from both Parties represent a [...] of the Parties' sales, which could include [...] between the Parties. All these customers are excluded from the analysis and only partially incorporated in the supplementary analysis.
- (104) Third, the Parties also include in their switching analysis customers who never bought from one of them. On the one hand, the fact that these customers never bought from one of the Parties suggest that this supplier was not present in these customers' choice set, and as a consequence they did not have the possibility to switch purchase to this supplier. On the other hand, the switching analysis assumes that any decrease in the purchase from the supplying Party is switched away to other competitors, whereas such decrease may just be due to a change in demand. The Parties' approach therefore mechanically underestimates the switching rate between the Parties.
- (105) Fourth, the analysis provided by the Parties suffers from significant volatility of switching rates, depending on the period considered. Such volatility typically requires more attention and, absent robustness checks, casts doubts on whether any inference on closeness can be made from the Parties' analysis.
- (106) Fifth, if anything, the Commission's assessment of the data provided by the Parties in support of their Submissions on switching provides indication of [...] rates between Dow and DuPont than those provided in their Submissions.
- (107) Sixth, and without prejudice to the Commission's assessment of the relevance of the Parties' switching analysis, the Commission notes that, [...] computed by the Parties would lead to significant price increases using standard approached such as UPP.
- (108) Seventh, the limitations of the data provided by the Parties are such that the Parties' switching analyses need to make several critical assumptions which are not correct as soon as, for example, the customers' demand increase or decrease over time.
- (109) Finally, and more generally, the Commission is of the view that it is not possible to perform a meaningful switching analysis when, as it is the case in the Submissions on switching, the only data available are sales data from both Parties to their customers, with *no* understanding of sales made by other suppliers, customers' characteristics or markets' characteristics and evolution.

6. APPENDIX

6.1. Tables for cross-spectrum herbicides

Table 8 – Number and sales value of reported customers of cross-spectrum herbicides, using a 25% threshold for identifying “potential switchers” (as defined by the Parties)

[...] ^{69,70}

Source: Commission's analysis of the Submissions on switching

⁶⁹ [...].
⁷⁰ [...].

Table 9 – Number and sales value of reported customers of cross-spectrum herbicides, using a 50% threshold for identifying “potential switchers” (as defined by the Parties)

[...] ^{71,72}

Source: Commission’s analysis of the Submissions on switching

6.2. Tables for insecticides

Table 10 – Number and sales value of reported customers of insecticides, using a 25% threshold for identifying “potential switchers” (as defined by the Parties)

[...] ^{73,74}

Source: Commission’s analysis of the Submissions on switching

Table 11 – Number and sales value of reported customers of insecticides, using a 50% threshold for identifying “potential switchers” (as defined by the Parties)

[...] ^{75,76}

Source: Commission’s analysis of the Submissions on switching

71 [...] .
72 [...] .
73 [...] .
74 [...] .
75 [...] .
76 [...] .

Case No. COMP/M.7932

DOW/DUPONT

COMMITMENTS TO THE EUROPEAN COMMISSION

17 February 2017

Pursuant to Article 8(2) of Council Regulation (EC) No 139/2004 (the “**Merger Regulation**”), E. I. du Pont de Nemours and Company (“**DuPont**”) and The Dow Chemical Company (“**Dow**”; DuPont and Dow jointly referred to as the “**Notifying Parties**” or “**Parties**”) hereby enter into the following Commitments (the “**Commitments**”) vis-à-vis the European Commission (the “**Commission**”) with a view to rendering the Parties’ proposed merger of equals (the “**Transaction**”) compatible with the internal market and the functioning of the EEA Agreement.

This text shall be interpreted in light of the Commission’s decision pursuant to Article 8(2) of the Merger Regulation to declare the Concentration compatible with the internal market (the “**Decision**”), and in order to enable the European Commission to declare the acquisition compatible with the common market in the general framework of European Union law, in particular in light of the Merger Regulation, and by reference to the Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 (the “**Remedies Notice**”).

Section A. Definitions

1. For the purpose of the Commitments, the following terms shall have the following meaning:

AIs: active ingredients. Active substances, or molecules, on the basis of which formulated products are manufactured, and typically determining formulated products’ core characteristics, specific use and efficacy.

Affiliated Undertakings: undertakings controlled by DuPont and/or by the ultimate parents of the Parties, whereby the notion of control shall be interpreted pursuant to Article 3 of the Merger Regulation and in light of the Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the “*Consolidated Jurisdictional Notice*”).

Assets: the assets that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business as indicated in Section B and described more in detail in the Schedule.

Closing: the transfer of the legal title to the Divestment Business to the Purchaser.

Closing Period: the longer of the period of [...] from the signing of an agreement for sale of the Divestment Business to the Purchaser or the obtaining of all required regulatory approvals prior to Closing.

Confidential Information: any business secrets, know-how, commercial information, or any other information of a proprietary nature that is not in the public domain.

Conflict of Interest: any conflict of interest that impairs the Trustee's objectivity and independence in discharging its duties under the Commitments.

Divestment Business: the business to be divested which includes (i) the Herbicide Division, (ii) the Insecticide Division and (iii) the R&D Division, as further defined herein and in the Schedule.

Divestiture Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by DuPont and who has/have received from DuPont the exclusive trustee mandate to sell the Divestment Business to a Purchaser at no minimum price.

Effective Date: the date of adoption of the Decision.

First Divestiture Period: the period of [...] from the Effective Date.

Hold Separate Manager: the person appointed by DuPont for the Divestment Business to manage the day-to-day business under the supervision of the Monitoring Trustee.

Key Personnel: personnel necessary to maintain the viability and competitiveness of the Divestment Business, as listed in **Appendix 4**.

Monitoring Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by DuPont, and who has/have the duty to monitor DuPont's compliance with the conditions and obligations attached to the Decision.

Personnel: all staff currently employed by the Divestment Business, including staff seconded to the Divestment Business, shared personnel as well as the additional personnel listed in the Schedule.

Purchaser: the entity approved by the Commission as acquirer of the Divestment Business in accordance with the criteria set out in Section D.

Purchaser Criteria: the criteria laid down in Section D of these Commitments that the Purchaser must fulfil in order to be approved by the Commission.

Retained Business: Portions of DuPont's business that are not part of the Divestment Business, as described in the Schedule.

Schedule: the schedule to these Commitments describing the Divestment Business in more detail.

Trustee(s): the Monitoring Trustee and/or the Divestiture Trustee as the case may be.

Trustee Divestiture Period: the period of [...] from the end of the First Divestiture Period.

Section B. The commitment to divest and to license and the Divestment Business

Commitment to divest

2. DuPont commits to divest a Divestment Business consisting of (i) the Herbicide Division and the Insecticide Division, as described in these commitments and the schedule thereof; and (ii) DuPont's R&D organisation, consisting of all tangible and intangible assets, including but not limited to pipeline, IP rights, personnel, facilities used by DuPont worldwide for its R&D activities, with the sole exception of those retained assets which are expressly listed in these Commitments and in the schedule thereof.
3. In order to maintain effective competition, DuPont commits to divest, or procure the divestiture of the Divestment Business by the end of the Trustee Divestiture Period as a going concern to a Purchaser and on terms of sale approved by the Commission in accordance with the procedure described in Section D of these Commitments.
4. To carry out the divestiture, DuPont commits to find a suitable Purchaser, to be approved by the Commission, before the closing of the Transaction. The Transaction shall not be consummated before DuPont or the Divestiture Trustee have entered into a final binding sale and purchase agreement for the sale of the Divestment Business and the Commission has approved the Purchaser and the terms of sale in accordance with Section D. The divestiture of the Divestment Business shall only be consummated if, and after, the Transaction is consummated. To carry out the divestiture, DuPont commits to find a purchaser and to enter into a final binding sale and purchase agreement for the sale of the Divestment Business within the First Divestiture Period. If DuPont has not entered into such an agreement at the end of the First Divestiture Period, DuPont shall grant the Divestiture Trustee an exclusive mandate to sell the Divestment Business in accordance with the procedure described in paragraph 37 in the Trustee Divestiture Period.
5. DuPont shall be deemed to have complied with this commitment if:
 - (a) by the end of the Trustee Divestiture Period, DuPont or the Divestiture Trustee has entered into a final binding sale and purchase agreement and the Commission approves the proposed Purchaser and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph 25;
 - (b) the Closing of the sale of the Divestment Business to the Purchaser takes place within the Closing Period; and
 - (c) all other obligations in the Commitments and its Schedule have been complied with, including those relating to the transitional services and supply agreements.
6. In order to maintain the structural effect of the Commitments, the Notifying Parties shall, for a period of [...] after Closing, not acquire, whether directly or indirectly, the possibility of exercising influence (as defined in paragraph 50 of the Remedies Notice, footnote 3) over the whole or part of the Divestment Business, unless, following the submission of a reasoned request from DuPont showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph 50 of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over the Divestment Business is no longer necessary to render the proposed Transaction compatible with the internal market.
7. With respect to each crop protection product registration included in the Divestment Business, the Parties shall not, for [...] after Closing, introduce and sell any new product that is identical or has substantially the same formulation composition (meaning the same active ingredients). Notwithstanding the foregoing, the Parties remain free to commercialize any currently existing products of Dow as well as any new products currently in development/registration by Dow.

Commitment to license

8. The purpose of the commitment to license is for the Parties to ensure, by granting an exclusive license to the Purchaser for Picoxystrobin in the EEA for rice applications, that the Parties and the Purchaser will continue to compete in the EEA market for fungicides for rice. In accordance with the commitment to license, DuPont shall not sell Picoxystrobin for rice use in the EEA.
9. As part of the agreement for the sale of the Divestment Business to the Purchaser, the Parties commit to supply to the Purchaser a straight Picoxystrobin finished product under an exclusive license for the sale of such product for use solely for rice in the EEA. At the request of the Purchaser, the Parties will also supply straight Picoxystrobin which the Purchaser will be able to use for producing its own straight Picoxystrobin finished product or mixtures with other AIs, solely for use in rice. The products in the foregoing will be supplied [...].
10. The Parties shall provide the Purchaser with the necessary intellectual property, know-how and related registration data to ensure the continued sale of Picoxystrobin for use solely on rice in the EEA. The Parties shall apply for two clone registrations in all EEA Member States in which current registrations are approved for these crops/diseases (i) for rice (excluding cereals) (ii) for cereal (excluding rice).
11. Any actions taken by the Parties to ensure the continued use of Picoxystrobin in the EEA shall include such use in rice in the EEA so that the Purchaser continue to benefit from this commitment as long as Picoxystrobin is approved for sale in the EEA. [...].
12. DuPont shall be deemed to have complied with this commitment if it has entered into the relevant license agreement with Purchaser prior to consummation of the Transaction. If the Transaction is abandoned, unwound or otherwise terminated, or if and as long as the use of Picoxystrobin is prohibited, this commitment to license shall automatically cease to apply.

Structure and definition of the Divestment Business

13. The Divestment Business consists of the Herbicide Division, the Insecticide Division, the R&D Division.
 - (a) **The Herbicide Division** consists of the Herbicide Divestment AIs, the Herbicide Divestment Formulated Products and all tangible and intangible assets and personnel related to DuPont's business of developing, synthesizing, manufacturing, packaging and selling the Herbicide Divestment AIs and the Herbicide Divestment Formulated Products for their use globally.
 - (i) **The Herbicide Divestment AIs** include Thifensulfuron Methyl, Tribenuron Methyl, Metsulfuron Methyl, Chlorsulfuron Methyl, Triflursulfuron Methyl, Lenacil, Flupyrsulfuron Methyl, Ethametsulfuron Methyl and Azimsulfuron. See **Appendix 2** for an overview of the Herbicide Divestment AIs and **Appendix 13** for the technical characteristics of the Herbicide Divestment AIs.
 - (ii) **Herbicide Divestment Formulated Products** include the DuPont formulated products containing the Herbicide Divestment AIs, and all related registrations and pending registrations and except those formulated products included in the Retained Business below. For the avoidance of doubt, these assets include the products listed in **Appendix 5**, and all registrations and pending registrations listed in **Appendix 7**. For information, **Appendix 10** includes a list of legal entities holding these registrations.
 - (b) **The Insecticide Division** consists of the Insecticide Divestment AIs, the Insecticide Divestment Formulated Products and all tangible and intangible assets and personnel related to DuPont's business of developing, synthesizing, manufacturing, packaging

and selling the Insecticide Divestment AIs and the Insecticide Divestment Formulated Products for their use globally.

- (i) **The Insecticide Divestment AIs** include Cyantraniliprole, Chlorantraniliprole and Indoxacarb. See **Appendix 2** for an overview of the Insecticide Divestment AIs and **Appendix 13** for the technical characteristics of the Insecticide Divestment AIs.
 - (ii) **Insecticide Divestment Formulated Products** include the DuPont formulated products containing the Insecticide Divestment AIs, and all related registrations and pending registrations and except those formulated products included in the Retained Business below. For the avoidance of doubt, these assets include the products listed in **Appendix 5**, and all registrations and pending registrations listed in **Appendix 7**. For information, **Appendix 10** includes a list of legal entities holding these registrations.
- (c) **The R&D Division** includes the Divestment R&D Organization and Divestment Pipeline.
- (i) **The Divestment Pipeline** includes all DuPont crop protection pipeline products, excluding only the Retained Pipeline (as defined below). The Divestment Pipeline includes DuPont's library of [number of compounds] compounds and the pipeline projects included in the table below.
[Confidential pipeline information]
 - (ii) **The Retained Pipeline** (part of the Retained Business) is limited to the pipeline products included in the table below.
[Confidential pipeline information]
 - (iii) **The Divestment R&D Organization** includes DuPont's global R&D organization, including DuPont's Global Technology Organization and DuPont's Regional Development Organization. The only assets and personnel in the global DuPont R&D organization that will not be included in the Divestment R&D Organization are those expressly listed under the Retained Business below.
 - (iv) **Global Technology Organization** includes DuPont's discovery chemistry, discovery biology, development biology, process development, formulations and analytical sciences, stewardship and regulatory department and Crop Protection commercialization, portfolio and resource management groups.
 - (v) **Regional Development Organization** includes scientists and personnel worldwide providing regulatory and registration work and field biology testing and analysis.
- (d) DuPont will retain the following products that are in the process of being launched ("venture launch stage") and therefore are not considered pipeline products: Pyraxalt, Zorvec, Fluazaindolizine and Aminocyclopyrachlor.
14. The legal and functional structure of the Divestment Business as operated to date is described in the Schedule. The Divestment Business, described in more detail in the Schedule, includes all assets and staff that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business, in particular:
- (a) all tangible and intangible assets (including intellectual property rights) described in the Schedule;
 - (b) all licenses, permits and authorisations issued by any governmental organisation for the benefit of the Divestment Business;

- (c) customer lists, distributor and customer contracts relating to the Divestment Business; and
 - (d) for the Herbicide Division and the Insecticide Division all Personnel described in the Schedule, for the R&D Division all the Personnel in the R&D Division, except for those expressly listed in the Retained Business.
15. In addition, the Divestment Business includes the benefit, for a transitional period of [...] after Closing, on terms and conditions equivalent to those at present afforded to the Divestment Business of all current arrangements under which DuPont or its Affiliated Undertakings supply products or services to the Divestment Business, as detailed in the Schedule, unless otherwise agreed with the Purchaser. This [...] period can be extended at the Purchaser's option, where such arrangements will be offered at reasonable commercial terms negotiated with the Purchaser. Strict firewall procedures will be adopted so as to ensure that any competitively sensitive information related to, or arising from such supply arrangements will not be shared with, or passed on to, anyone outside the DuPont's relevant Crop Protection operations.

Section C. Related commitments

Preservation of viability, marketability and competitiveness

16. From the Effective Date until Closing, DuPont shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Business, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Business. In particular DuPont undertakes:
- (a) not to carry out any action that might have a significant adverse impact on the value, management or competitiveness of the Divestment Business or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Business;
 - (b) to make available, or procure to make available, sufficient resources for the development of the Divestment Business, on the basis and continuation of the existing business plans;
 - (c) to take all reasonable steps, or procure that all reasonable steps are being taken, including appropriate incentive schemes (based on industry practice), to encourage all Key Personnel to remain with the Divestment Business, and not to solicit or move any Personnel to DuPont's remaining business. Where, nevertheless, individual members of the Key Personnel exceptionally leave the Divestment Business, DuPont shall provide a reasoned proposal to replace the person or persons concerned to the Commission and the Monitoring Trustee. DuPont must be able to demonstrate to the Commission that the replacement is well suited to carry out the functions exercised by those individual members of the Key Personnel. The replacement shall take place under the supervision of the Monitoring Trustee, who shall report to the Commission.

Hold-separate obligations

17. DuPont commits, from the Effective Date until Closing, to procure that the Divestment Business is kept separate from the businesses that it will be retaining and, after Closing of the notified Transaction to keep the Divestment Business Separate from the business that it is retaining and to ensure that unless explicitly permitted under these Commitments: (i) management and staff of the businesses retained by DuPont have no involvement in the

Divestment Business; (ii) the Key Personnel and Personnel of the Divestment Business have no involvement in any business retained by DuPont and do not report to any individual outside the Divestment Business.

18. Until Closing, DuPont shall assist the Monitoring Trustee in ensuring that the Divestment Business is managed as a distinct and saleable business separate from the businesses which DuPont are retaining. Immediately after the adoption of the Decision, DuPont shall appoint a Hold Separate Manager. The Hold Separate Manager, who shall be part of the Key Personnel, shall manage the Divestment Business independently and in the best interest of the business with a view to ensuring its continued economic viability, marketability and competitiveness and its independence from the businesses retained by DuPont. The Hold Separate Manager shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Manager shall be subject to the procedure laid down in paragraph 16(c) of these Commitments. The Commission may, after having heard DuPont, require DuPont to replace the Hold Separate Manager.

Ring-fencing

19. The Parties shall implement, or procure to implement, all necessary measures to ensure that it does not, after the Effective Date, obtain any Confidential Information relating to the Divestment Business and that any such Confidential Information obtained by DuPont before the Effective Date will be eliminated and not be used by DuPont. This includes measures vis-à-vis the DuPont appointees on the supervisory board and/or board of directors of the Divestment Business. In particular, the participation of the Divestment Business in any central information technology network shall be severed to the extent possible, without compromising the viability of the Divestment Business. DuPont may obtain or keep information relating to the Divestment Business which is reasonably necessary for the divestiture of the Divestment Business or the use or disclosure of which to DuPont is required by law.

Non-solicitation clause

20. The Parties undertake, subject to customary limitations, not to solicit, and to procure that Affiliated Undertakings do not solicit, the Key Personnel transferred with the Divestment Business for a period of [...] after Closing.

Due diligence

21. In order to enable potential purchasers to carry out a reasonable due diligence of the Divestment Business, DuPont shall, subject to customary confidentiality assurances and dependent on the stage of the divestiture process:
 - (a) provide to potential purchasers sufficient information as regards the Divestment Business;
 - (b) provide to potential purchasers sufficient information relating to the Personnel and allow them reasonable access to the Personnel.

Reporting

22. DuPont shall submit written reports in English on potential purchasers of the Divestment Business and developments in the negotiations with such potential purchasers to the Commission and the Monitoring Trustee no later than [...] after the end of every month following the Effective Date (or otherwise at the Commission's request). DuPont shall submit a list of all potential purchasers having expressed interest in acquiring the Divestment Business to the Commission at each and every stage of the divestiture process, as well as a copy of all the offers made by potential purchasers within [...] of their receipt.

23. DuPont shall inform the Commission and the Monitoring Trustee on the preparation of the data room documentation and the due diligence procedure and shall submit a copy of any information memorandum to the Commission and the Monitoring Trustee before sending the memorandum out to potential purchasers.

Section D. The Purchaser

24. In order to be approved by the Commission, the Purchaser must fulfil the following criteria:
- (a) The Purchaser shall be independent of and unconnected to the Parties and their Affiliated Undertakings (this being assessed having regard to the situation following the divestiture).
 - (b) The Purchaser shall have the financial resources, proven expertise and incentive to maintain and develop the Divestment Business as a viable and active competitive force in competition with the Parties and other competitors;
 - (c) The acquisition of the Divestment Business by the Purchaser must neither be likely to create, in light of the information available to the Commission, *prima facie* competition concerns nor give rise to a risk that the implementation of the Commitments will be delayed. In particular, the Purchaser must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Business.
 - (d) The Purchaser shall be a company already active in the crop protection industry, [...].
25. The final binding sale and purchase agreement (as well as ancillary agreements) relating to the divestment of the Divestment Business shall be conditional on the Commission's approval. When DuPont has reached an agreement with a purchaser, it shall submit a fully documented and reasoned proposal, including a copy of the final agreement(s), within [...] to the Commission and the Monitoring Trustee. DuPont must be able to demonstrate to the Commission that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commission's Decision and the Commitments. For the approval, the Commission shall verify that the Purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commitments including their objective to bring about a lasting structural change in the market. The Commission may approve the sale of the Divestment Business without one or more Assets or parts of the Personnel, or by substituting one or more Assets or parts of the Personnel with one or more different assets or different personnel, if this does not affect the viability and competitiveness of the Divestment Business after the sale, taking account of the proposed purchaser.

Section E. Trustee

I. Appointment procedure

26. DuPont shall appoint a Monitoring Trustee to carry out the functions specified in these Commitments for a Monitoring Trustee. DuPont commits not to close the Transaction before the appointment of a Monitoring Trustee.
27. If DuPont has not entered into a binding sale and purchase agreement regarding the Divestment Business [...] before the end of the First Divestiture Period or if the Commission has rejected a purchaser proposed by DuPont at that time or thereafter, DuPont shall appoint a Divestiture Trustee. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.
28. The Trustee shall:
- (a) at the time of appointment, be independent of the Parties and their Affiliated Undertakings;
 - (b) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and
 - (c) neither have nor become exposed to a Conflict of Interest.
29. The Trustee shall be remunerated by the Parties in a way that does not impede the independent and effective fulfilment of its mandate. In particular, where the remuneration package of a Divestiture Trustee includes a success premium linked to the final sale value of the Divestment Business, such success premium may only be earned if the divestiture takes place within the Trustee Divestiture Period.

Proposal by DuPont

30. No later than [...] after the Effective Date, DuPont shall submit the names of at least two natural or legal persons whom DuPont proposes to appoint as the Monitoring Trustee to the Commission for approval. No later than [...] before the end of the First Divestiture Period or on request by the Commission, DuPont shall submit a list of two or more persons whom DuPont proposes to appoint as Divestiture Trustee to the Commission for approval. The proposal shall contain sufficient information for the Commission to verify that the person or persons proposed as Trustee fulfil the requirements set out in paragraph 28 and shall include:
- (a) the full terms of the proposed mandate, which shall include all provisions necessary to enable the Trustee to fulfil its duties under these Commitments;
 - (b) the outline of a work plan which describes how the Trustee intends to carry out its assigned tasks; and
 - (c) an indication whether the proposed Trustee is to act as both Monitoring Trustee and Divestiture Trustee or whether different trustees are proposed for the two functions.

Approval or rejection by the Commission

31. The Commission shall have the discretion to approve or reject the proposed Trustee(s) and to approve the proposed mandate subject to any modifications it deems necessary for the Trustee to fulfil its obligations. If only one name is approved, DuPont shall appoint or cause to be appointed the person or persons concerned as Trustee, in accordance with the mandate approved by the Commission. If more than one name is approved, DuPont shall be free to choose the Trustee to be appointed from among the names approved. The Trustee shall be appointed within [...] of the Commission's approval, in accordance with the mandate approved by the Commission.

New proposal by DuPont

32. If all the proposed Trustees are rejected, DuPont shall submit the names of at least two more natural or legal persons within [...] of being informed of the rejection, in accordance with paragraph 31 of these Commitments.

Trustee nominated by the Commission

33. If all further proposed Trustees are rejected by the Commission, the Commission shall nominate a Trustee, whom DuPont shall appoint, or cause to be appointed, in accordance with a trustee mandate approved by the Commission.

II. Functions of the Trustee

34. The Trustee shall assume its specified duties and obligations in order to ensure compliance with the Commitments. The Commission may, on its own initiative or at the request of the Trustee or the Parties, give any orders or instructions to the Trustee in order to ensure compliance with the conditions and obligations attached to the Decision.

Duties and obligations of the Monitoring Trustee

35. The Monitoring Trustee shall:
- (a) propose in its first report to the Commission a detailed work plan describing how it intends to monitor compliance with the obligations and conditions attached to the Decision.
 - (b) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Business with a view to ensuring its continued economic viability, marketability and competitiveness and monitor compliance by the Parties with the conditions and obligations attached to the Decision. To that end the Monitoring Trustee shall:
 - (i) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Business, and the keeping separate of the Divestment Business from the business retained by the Parties, in accordance with paragraphs 16 and 17 of these Commitments;
 - (ii) supervise the management of the Divestment Business as a distinct and saleable entity, in accordance with paragraph 18 of these Commitments;

- (iii) with respect to Confidential Information:
 - (1) determine all necessary measures to ensure that the Parties do not after the Effective Date obtain any Confidential Information relating to the Divestment Business,
 - (2) in particular strive for the severing of the Divestment Business' participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Business,
 - (3) make sure that any Confidential Information relating to the Divestment Business obtained by the Parties before the Effective Date is eliminated and will not be used by the Parties,
 - (4) decide whether such information may be disclosed to or kept by the Parties as the disclosure is reasonably necessary to allow the Parties to carry out the divestiture or as the disclosure is required by law; and
 - (5) monitor the splitting of assets and the allocation of Personnel between the Divestment Business and the Parties or Affiliated Undertakings;
 - (iv) propose to the Parties such measures as the Monitoring Trustee considers necessary to ensure the Parties' compliance with the conditions and obligations attached to the Decision, in particular the maintenance of the full economic viability, marketability or competitiveness of the Divestment Business, the holding separate of the Divestment Business and the non-disclosure of competitively sensitive information;
- (c) review and assess potential purchasers as well as the progress of the divestiture process and verify that, dependent on the stage of the divestiture process:
 - (i) potential purchasers receive sufficient and correct information relating to the Divestment Business and the Personnel in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process, and
 - (ii) potential purchasers are granted reasonable access to the Personnel;
 - (iii) act as a contact point for any requests by third parties, in particular potential purchasers, in relation to the Commitments;
 - (d) provide to the Commission, sending the Parties a non-confidential copy at the same time, a written report within [...] after the end of every month that shall cover the operation and management of the Divestment Business as well as the splitting of assets and the allocation of Personnel so that the Commission can assess whether the business is held in a manner consistent with the Commitments and the progress of the divestiture process as well as potential purchasers;
 - (e) promptly report in writing to the Commission, sending the Parties a non-confidential copy at the same time, if it concludes on reasonable grounds that either Party is failing to comply with these Commitments;
 - (f) within [...] after receipt of the documented proposal referred to in paragraph 25 of these Commitments, submit to the Commission, sending the Parties a non-confidential copy at the same time, a reasoned opinion as to the suitability and independence of the proposed purchaser and the viability of the Divestment Business after the Sale and as to whether the Divestment Business is sold in a manner consistent with the conditions and obligations attached to the Decision, in particular, if relevant, whether the Sale of the Divestment Business without one or more Assets or not all of the Personnel affects the viability of the Divestment Business after the sale, taking account of the proposed purchaser;

- (g) assume the other functions assigned to the Monitoring Trustee under the conditions and obligations attached to the Decision.
36. If the Monitoring and Divestiture Trustee are not the same legal or natural persons, the Monitoring Trustee and the Divestiture Trustee shall cooperate closely with each other during and for the purpose of the preparation of the Trustee Divestiture Period in order to facilitate each other's tasks.

Duties and obligations of the Divestiture Trustee

37. Within the Trustee Divestiture Period, the Divestiture Trustee shall sell at no minimum price the Divestment Business to a purchaser, provided that the Commission has approved both the purchaser and the final binding sale and purchase agreement (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs 24 and 25 of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement (as well as in any ancillary agreements) such terms and conditions as it considers appropriate for an expedient sale in the Trustee Divestiture Period. In particular, the Divestiture Trustee may include in the sale and purchase agreement such customary representations and warranties and indemnities as are reasonably required to effect the sale. The Divestiture Trustee shall protect the legitimate financial interests of the Parties, subject to the Parties' unconditional obligation to divest at no minimum price in the Trustee Divestiture Period.
38. In the Trustee Divestiture Period (or otherwise at the Commission's request), the Divestiture Trustee shall provide the Commission with a comprehensive monthly report written in English on the progress of the divestiture process. Such reports shall be submitted within [...] after the end of every month with a simultaneous copy to the Monitoring Trustee and a non-confidential copy to the Parties.

III. Duties and obligations of the Parties

39. The Parties shall provide and shall cause its advisors to provide the Trustee with all such cooperation, assistance and information as the Trustee may reasonably require to perform its tasks. The Trustee shall have full and complete access to any of the Parties' or the Divestment Business' books, records, documents, management or other personnel, facilities, sites and technical information necessary for fulfilling its duties under the Commitments and the Parties and the Divestment Business shall provide the Trustee upon request with copies of any document. The Parties and the Divestment Business shall make available to the Trustee one or more offices on their premises and shall be available for meetings in order to provide the Trustee with all information necessary for the performance of its tasks.
40. The Parties shall provide the Monitoring Trustee with all managerial and administrative support that it may reasonably request on behalf of the management of the Divestment Business. This shall include all administrative support functions relating to the Divestment Business which are currently carried out at headquarters level. The Parties shall provide and shall cause its advisors to provide the Monitoring Trustee, on request, with the information submitted to potential purchasers, in particular give the Monitoring Trustee access to the data room documentation and all other information granted to potential purchasers in the due diligence procedure. The Parties shall inform the Monitoring Trustee on possible purchasers, submit lists of potential purchasers at each stage of the selection process, including the offers made by potential purchasers at those stages, and keep the Monitoring Trustee informed of all developments in the divestiture process.
41. The Parties shall grant or procure Affiliated Undertakings to grant comprehensive powers of attorney, duly executed, to the Divestiture Trustee to effect the sale (including ancillary agreements), the Closing and all actions and declarations which the Divestiture Trustee

considers necessary or appropriate to achieve the sale and the Closing, including the appointment of advisors to assist with the sale process. Upon request of the Divestiture Trustee, the Parties shall cause the documents required for effecting the sale and the Closing to be duly executed.

42. The Parties shall indemnify the Trustee and its employees and agents (each an “*Indemnified Party*”) and hold each Indemnified Party harmless against, and hereby agrees that an Indemnified Party shall have no liability to the Parties for, any liabilities arising out of the performance of the Trustee’s duties under the Commitments, except to the extent that such liabilities result from the wilful default, recklessness, gross negligence or bad faith of the Trustee, its employees, agents or advisors.
43. At the expense of the Parties, the Trustee may appoint advisors (in particular for corporate finance or legal advice), subject to the Parties’ approval (this approval not to be unreasonably withheld or delayed) if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the mandate, provided that any fees and other expenses incurred by the Trustee are reasonable. Should the Parties refuse to approve the advisors proposed by the Trustee, the Commission may approve the appointment of such advisors instead, after having heard the Parties. Only the Trustee shall be entitled to issue instructions to the advisors. Paragraph 28 of these Commitments shall apply *mutatis mutandis*. In the Trustee Divestiture Period, the Divestiture Trustee may use advisors who served the Parties during the Divestiture Period if the Divestiture Trustee considers this in the best interest of an expedient sale.
44. The Parties agree that the Commission may share Confidential Information proprietary to the Parties with the Trustee. The Trustee shall not disclose such information and the principles contained in Article 17 (1) and (2) of the Merger Regulation apply *mutatis mutandis*.
45. The Parties agree that the contact details of the Monitoring Trustee are published on the website of the Commission’s Directorate-General for Competition and they shall inform interested third parties, in particular any potential purchasers, of the identity and the tasks of the Monitoring Trustee.
46. For a period of ten (10) years from the Effective Date, the Commission may request all information from the Parties that is reasonably necessary to monitor the effective implementation of these Commitments.

IV. Replacement, discharge and reappointment of the Trustee

47. If the Trustee ceases to perform its functions under the Commitments or for any other good cause, including the exposure of the Trustee to a Conflict of Interest:
 - (a) the Commission may, after hearing the Trustee and the Parties, require the Parties to replace the Trustee; or
 - (b) the Parties may, with the prior approval of the Commission, replace the Trustee.
48. If the Trustee is removed according to paragraph 47 of these Commitments, the Trustee may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full hand over of all relevant information. The new Trustee shall be appointed in accordance with the procedure referred to in paragraphs 26-33 of these Commitments.
49. Unless removed according to paragraph 47 of these Commitments, the Trustee shall cease to act as Trustee only after the Commission has discharged it from its duties after all the Commitments with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Monitoring Trustee if it subsequently appears that the relevant remedies might not have been fully and properly implemented.

Section F. The review clause

50. The Commission may extend the time periods foreseen in the Commitments in response to a request from DuPont or, in appropriate cases, on its own initiative. Where the Parties request an extension of a time period, they shall submit a reasoned request to the Commission no later than [...] before the expiry of that period, showing good cause. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Notifying Parties. Only in exceptional circumstances shall the Parties be entitled to request an extension within [...] of any period. In this case, the request will be made no later than [...] from the deadline.
51. The Commission may further, in response to a reasoned request from the Parties showing good cause waive, modify or substitute, in exceptional circumstances, one or more of the undertakings in these Commitments. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Parties. The request shall not have the effect of suspending the application of the undertaking and, in particular, of suspending the expiry of any time period in which the undertaking has to be complied with.

Section G. Entry into force

52. The Commitments shall take effect upon the date of adoption of the Decision.

duly authorized for and on behalf of:

E. I. du Pont de Nemours and Company

duly authorized for and on behalf of:

The Dow Chemical Company

SCHEDULE

[...]

Appendices

[...]

European Commission
DG Competition
Place Madou
1210 BRUSSELS

Case M. 7932 – DOW / DUPONT

COMMITMENTS TO THE EUROPEAN COMMISSION ACID CO-POLYMERS

Pursuant to Article 8(2), of Council Regulation (EC) No 139/2004 (the “*Merger Regulation*”), The Dow Chemical Company (“*Dow*”) and E.I. du Pont de Nemours and Company (“*DuPont*”) (“*together or separately the Party/ies*”) hereby enter into the following Commitments (the “*Commitments*”) vis-à-vis the European Commission (the “*Commission*”) with a view to rendering the proposed merger between Dow and DuPont (the “*Concentration*”) compatible with the internal market and the functioning of the EEA Agreement.

This text shall be interpreted in light of the Commission’s decision pursuant to Article 8(2) of the Merger Regulation to declare the Concentration compatible with the internal market and the functioning of the EEA Agreement (the “*Decision*”), in the general framework of European Union law, in particular in light of the Merger Regulation, and by reference to the Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 (the “*Remedies Notice*”).

Section A. Definitions

1. For the purpose of the Commitments, the following terms shall have the following meaning:

ACP(s): acid co-polymer(s).

Affiliated Undertakings: undertakings controlled by Dow or DuPont, whereby the notion of control shall be interpreted pursuant to Article 3 of the Merger Regulation and in light of the Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the “*Consolidated Jurisdictional Notice*”).

Assets: the assets that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business as indicated in Section B, paragraph 6 (a), (b) and (c) and described more in detail in the Schedule.

Closing: the transfer of the legal title to the Divestment Business to the Purchaser.

Closing Period: the period of [...] from the approval of the Purchaser and the terms of sale by the Commission or Closing of the Concentration, whatever occurs later.

Confidential Information: any business secrets, know-how, commercial information, or any other information of a proprietary nature that is not in the public domain.

Conflict of Interest: any conflict of interest that impairs the Trustee's objectivity and independence in discharging its duties under the Commitments.

Divestment Business: the business or businesses as defined in Section B and in the Schedule which the Parties commit to divest.

Divestiture Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by the Parties and who has/have received from the Parties the exclusive Trustee Mandate to sell the Divestment Business to a Purchaser at no minimum price.

Effective Date: the date of adoption of the Decision.

Exceptions From Hold-Separate: Exceptions from the hold-separate and ring-fencing obligations that are strictly necessary to provide services under the OSA, Transitional OSA, SSAs (as further explained in paragraph 9), agreements for other Transitional Services or that are the consequence of the Divestment Business' participation in any central information technology network that cannot be severed immediately as of the Effective Date, despite the Parties' reasonable best efforts. Employees involved in providing services under the OSA, Transitional OSA, SSAs or employees who have access to any central information technology network that contains Confidential Information relating to the Divestment Business will be subject to strict firewalls and confidentiality agreements.

First Divestiture Period: the period of [...] from the Effective Date.

Freeport ACP Facility: the ACP production facility in Freeport, Texas, U.S.

Hold Separate Manager: the person appointed by the Parties for the Divestment Business to manage the day-to-day business under the supervision of the Monitoring Trustee.

Initial Transition Period: a period of up to [...] following Closing during which Dow will [details on the separation of assets]. During this period, Dow will continue to operate the Tarragona ACP Facility on behalf and for the benefit of the Purchaser.

Key Personnel: all personnel necessary to maintain the viability and competitiveness of the Divestment Business, as listed in the Schedule, including the Hold Separate Manager.

Monitoring Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by the Parties, and who has/have the duty to monitor the Parties' compliance with the conditions and obligations attached to the Decision.

Operational Personnel: staff with operational roles at Tarragona as further defined in Section 2(f)i. of the Schedule

OSA: Operating Services Agreement.

Parties: Dow and DuPont.

Personnel: all staff supporting the Divestment Business, [...], as further defined in Section 2(f) of the Schedule.

Purchaser: the entity approved by the Commission as acquirer of the Divestment Business in accordance with the criteria set out in Section D.

Purchaser Criteria: the criteria laid down in paragraph 17 of these Commitments that the Purchaser must fulfil in order to be approved by the Commission.

Schedule: the schedule to these Commitments describing more in detail the Divestment Business.

Supplemental Transition Period: up to [...] periods by which the Initial Transition Period can be extended, each at the Parties' request and each subject to the consent of the Monitoring Trustee.

Tarragona ACP Facility: the ACP production facility in Tarragona, Spain.

Tarragona LDPE Facility: the low density polyethylene production facility in Tarragona, Spain that [details on Dow's Tarragona site].

Transfer Personnel: personnel chosen by the Purchaser at the appropriate time to form part of the Divestment Business.

Transitional OSA: A transitional Operating Services Agreement for the Tarragona ACP Facility for the duration of the Initial Transition Period and, if applicable, the Supplemental Transition Period.

Transitional Services: the services to be provided to the Purchaser by Dow in the period following Closing, including, but not limited to data processing services, emergency and security consulting, product safety and regulatory compliance consulting, and IT support.

Transitional Services Team: the Parties' personnel providing the Transitional Services.

Trustee(s): the Monitoring Trustee and/or the Divestiture Trustee as the case may be.

Trustee Divestiture Period: the period of [...] from the end of the First Divestiture Period.

Section B. The commitment to divest and the Divestment Business

Commitment to divest

2. In order to maintain effective competition, the Parties commit to divest, or procure the divestiture of the Divestment Business by the end of the Trustee Divestiture Period as a going concern to a

purchaser and on terms of sale approved by the Commission in accordance with the procedure described in paragraph 18 of these Commitments. To carry out the divestiture, Dow commits to find a purchaser and to enter into a final binding sale and purchase agreement for the sale of the Divestment Business within the First Divestiture Period. If Dow has not entered into such an agreement at the end of the First Divestiture Period, Dow shall grant the Divestiture Trustee an exclusive mandate to sell the Divestment Business in accordance with the procedure described in paragraph 30 in the Trustee Divestiture Period.

3. The proposed concentration shall not be implemented before the Dow or the Divestiture Trustee has entered into a final binding sale and purchase agreement for the sale of the Divestment Business and the Commission has approved the purchaser and the terms of sale in accordance with paragraph 18
4. The Parties shall be deemed to have complied with this commitment if:
 - (a) by the end of the Trustee Divestiture Period, Dow or the Divestiture Trustee have entered into a final binding sale and purchase agreement and the Commission approves the proposed purchaser and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph 18; and
 - (b) the Closing of the sale of the Divestment Business to the Purchaser takes place within the Closing Period.
5. In order to maintain the structural effect of the Commitments, the Parties shall, for a period of [...] after Closing, not acquire, whether directly or indirectly, the possibility of exercising influence (as defined in paragraph 43 of the Remedies Notice, footnote 3) over the whole or part of the Divestment Business, unless, following the submission of a reasoned request from the Notifying Party showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph 44 of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over the Divestment Business is no longer necessary to render the proposed concentration compatible with the internal market.

Structure and definition of the Divestment Business

6. The Divestment Business consists of Dow's global ACP business, as further defined in the Schedule. The proposed structure of the Divestment Business as operated to date is described in the Schedule. The Divestment Business, described in more detail in the Schedule, includes all assets and staff that are necessary to ensure the viability and competitiveness of the Divestment Business, in particular:
 - (a) all tangible and intangible assets (including intellectual property rights) that are necessary to ensure the viability and competitiveness of the Divestment Business under the control of Purchaser;
 - (b) all transferable licences, permits and authorisations issued by governmental organisations for the benefit of the Divestment Business;

- (c) all dedicated contracts, leases, commitments, and customer orders of the Divestment Business; all dedicated customer and other records of the Divestment Business; and
 - (d) the personnel necessary to ensure the viability and competitiveness of the Divestment Business under the control of Purchaser.
7. At the option of the Purchaser, on terms negotiated with the Purchaser, the transfer of the Divestment Business will be accompanied by an OSA under which operational personnel of the Parties would continue to operate the Freeport ACP Facility for the benefit of the Purchaser, providing a range of operational and administrative services as detailed in the Schedule. Strict firewall procedures will be adopted so as to ensure that any competitively sensitive information related to, or arising from, such arrangements will not be shared with, or passed on to, other businesses of the party concerned. In relation to the Tarragona ACP Facility, Dow commits, subject to applicable labor laws, to transfer personnel and to provide the Purchaser with the related assets required to operate the ACP train on a standalone basis following the Initial Transition Period and, if necessary, the Supplemental Transition Period, during which Dow will continue to operate the Tarragona ACP Facility on behalf and for the benefit of the Purchaser under a transitional OSA, subject to the same strict firewalls as for the OSA relating to the Freeport ACP Facility. In addition, at the option of the Purchaser, the Divestment Business includes the benefit (i) for a period of up to [...] after Closing and on terms and conditions [details on raw material supply to Purchaser], of the supply of the main raw materials (namely ethylene [details on raw material supply to Purchaser] and glacial acrylic acid [details on raw material supply to Purchaser]) to the Divestment Business and (ii) on terms and conditions equivalent to those at present afforded to [details on site services to be provided to Purchaser], as detailed in the Schedule, unless otherwise agreed with the Purchaser. Strict firewall procedures will be adopted so as to ensure that any competitively sensitive information related to, or arising from such supply and service arrangements (for example, product roadmaps) will not be shared with, or passed on to, anyone outside the Dow units providing these products and services.

Section C. Related commitments

Preservation of viability, marketability and competitiveness

8. From the Effective Date until Closing, the Parties shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Business, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Business. In particular the Parties undertake:
- (a) not to carry out any action that might have a significant adverse impact on the value, management or competitiveness of the Divestment Business or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Business;
 - (b) to make available, or procure to make available, sufficient resources for the development of the Divestment Business, on the basis and continuation of the existing business plans;
 - (c) to take reasonable steps, or procure that reasonable steps are being taken, including appropriate incentive schemes (based on industry practice), to encourage all Key

Personnel and Operational Personnel to remain with the Divestment Business, and not to solicit or move any Personnel to the Parties' remaining business for [...] as of the Effective Date. Where, nevertheless, individual members of the Key Personnel exceptionally leave the Divestment Business, the Parties shall provide a reasoned proposal to replace the person or persons concerned to the Commission and the Monitoring Trustee. The Parties must be able to demonstrate to the Commission that the replacement is well suited to carry out the functions exercised by those individual members of the Key Personnel. The replacement shall take place under the supervision of the Monitoring Trustee, who shall report to the Commission.

Hold-separate obligations

9. The Parties commit, from the Effective Date until Closing, to keep the Divestment Business separate from the businesses they are retaining and to ensure that unless explicitly permitted under these Commitments: (i) management and staff of the ACP business retained by the Parties have no involvement in the Divestment Business; (ii) the Key Personnel and Personnel of the Divestment Business have no involvement in any ACP business retained by the Parties and do not report to any individual outside the Divestment Business with respect to their activities relating to ACP. Employees retained by Dow who will operate the Freeport ACP Facility at the option of the Purchaser for the Purchaser under the OSA and the Tarragona ACP Facility under the transitional OSA will be directed by the Purchaser with respect to the Divestment Business and ring-fenced, *i.e.*, will be subject to strict firewalls as of the closing of the Transaction and have no contact with DuPont's business that competes with the Divestment Business. Likewise, employees retained by Dow who will provide site services to the Divestment Business at Freeport and Tarragona under SSAs will be ring-fenced, *i.e.*, will be subject to strict firewalls as of the closing of the Transaction and have no contact with DuPont's business that competes with the Divestment Business. Other Personnel supporting the Divestment Business, except for employees operating the Freeport ACP Facility under an OSA and the Tarragona ACP Facility under a transitional OSA, will report regarding the Divestment Business exclusively to the Hold Separate Manager as of the Effective Date. This Personnel will be ring-fenced as of the closing of the Transaction and have no contact with DuPont's business that competes with the Divestment Business. The Transfer Personnel, including the Key Personnel, will, as soon as chosen by the Purchaser, have no involvement in any retained business by Dow and be strictly firewalled from such retained businesses.
10. Until Closing, the Parties shall assist the Monitoring Trustee in ensuring that the Divestment Business is managed as a distinct and saleable entity separate from the businesses which Dow is retaining (save with the Exceptions From Hold-Separate). Immediately after the adoption of the Decision, the Parties shall appoint a Hold Separate Manager. The Hold Separate Manager, who shall be part of the Key Personnel, shall manage the Divestment Business independently and in the best interest of the business with a view to ensuring its continued economic viability, marketability and competitiveness and its independence from the businesses retained by Dow (save with the Exceptions From Hold-Separate). The Hold Separate Manager shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Manager shall be subject to the procedure laid down in paragraph 8(c) of these Commitments. The Commission may, after having heard the Parties, require the Parties to replace the Hold Separate Manager.
11. *[Intentionally left blank]*

Ring-fencing

12. The Parties shall implement, or procure to implement, all necessary measures to ensure that they do not, after the Effective Date, obtain any Confidential Information relating to the Divestment Business and that any such Confidential Information obtained by the Parties before the Effective Date will be eliminated and not be used by the Parties, save with the Exceptions From Hold-Separate. This includes measures vis-à-vis the Parties' appointees on the supervisory board and/or board of directors of the Divestment Business. In particular, the participation of the Divestment Business in any central information technology network shall be severed to the extent possible, without compromising the viability of the Divestment Business. The Parties may obtain or keep information relating to the Divestment Business which is reasonably necessary for the divestiture of the Divestment Business or the disclosure of which is required by law. In light of the required Transitional Services and services under the SSAs and OSAs, the Parties commit to create effective compliance mechanisms.

Non-solicitation clause

13. The Parties undertake, subject to customary limitations, not to solicit, and to procure that Affiliated Undertakings do not solicit, the Key Personnel and Operational Personnel transferred with the Divestment Business for a period of [...] from the end of the Initial Transition Period and, if applicable, the Supplemental Transition Period for the Operational Personnel. In addition, from the Effective Date until [...] after the end of the Initial Transition Period and, if applicable, the Supplemental Transition Period, the Parties commit to not directly solicit any customer of the Divestment Business to transfer to the Parties any of that customers' ACP business (which the Purchaser acquired as part of the Divestment Business), provided that the Parties may continue to supply ACPs to customers acquired as part of the Transaction (*i.e.*, customers to which DuPont already supplies ACPs) and to respond to unsolicited invitations to bid on any ACP business from any customer worldwide.

Due diligence

14. In order to enable potential purchasers to carry out a reasonable due diligence of the Divestment Business, the Parties shall, subject to customary confidentiality assurances and dependent on the stage of the divestiture process:
 - (a) provide to potential purchasers sufficient information as regards the Divestment Business;
 - (b) provide to potential purchasers sufficient information within the boundaries of applicable data privacy regulations relating to the Personnel and allow them reasonable access to the Personnel.

Reporting

15. The Parties shall submit written reports in English on potential purchasers of the Divestment Business and developments in the negotiations with such potential purchasers to the Commission and the Monitoring Trustee no later than [...] after the end of every month following the Effective

Date (or otherwise at the Commission's request). The Parties shall submit a list of all potential purchasers having expressed interest in acquiring the Divestment Business to the Commission at each and every stage of the divestiture process, as well as a copy of all the offers made by potential purchasers within [...] of their receipt.

16. The Parties shall inform the Commission and the Monitoring Trustee on the preparation of the data room documentation and the due diligence procedure and shall submit a copy of any information memorandum to the Commission and the Monitoring Trustee before sending the memorandum out to potential purchasers.

Section D. The Purchaser

17. In order to be approved by the Commission, the Purchaser must fulfil the following criteria:

- (a) The Purchaser shall be independent of and unconnected to the Parties and their Affiliated Undertakings (this being assessed having regard to the situation following the divestiture).

- (b) The Purchaser shall have the financial resources, proven expertise and incentive to maintain and develop the Divestment Business as a viable and active competitive force in competition with the Parties and other competitors;

- (c) The acquisition of the Divestment Business by the Purchaser must neither be likely to create, in light of the information available to the Commission, *prima facie* competition concerns nor give rise to a risk that the implementation of the Commitments will be delayed. In particular, the Purchaser must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Business.

18. The final binding sale and purchase agreement (as well as ancillary agreements) relating to the divestment of the Divestment Business shall be conditional on the Commission's approval. When Dow has reached an agreement with a purchaser, it shall submit a fully documented and reasoned proposal, including a copy of the final agreement(s), within [...] to the Commission and the Monitoring Trustee.¹ The Parties must be able to demonstrate to the Commission that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commission's Decision and the Commitments. For the approval, the Commission shall verify that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commitments including their objective to bring about a lasting structural change in the market. The Commission may approve the sale of the Divestment Business without one or more Assets or parts of the Personnel, or by substituting one or more Assets or parts of the Personnel with one or more different assets or different personnel, if this does not affect the viability and competitiveness of the Divestment Business after the sale, taking account of the proposed purchaser.

¹ But not before one week after these Commitments shall take effect.

Section E. Trustee

I. Appointment procedure

19. The Parties shall appoint a Monitoring Trustee to carry out the functions specified in these Commitments for a Monitoring Trustee. The Parties commit not to close the Concentration before the appointment of a Monitoring Trustee.
20. If Dow has not entered into a binding sale and purchase agreement regarding the Divestment Business [...] before the end of the First Divestiture Period or if the Commission has rejected a purchaser proposed by the Parties at that time or thereafter, the Parties shall appoint a Divestiture Trustee. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.
21. The Trustee shall:
- (i) at the time of appointment, be independent of the Parties and their Affiliated Undertakings;
 - (ii) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and
 - (iii) neither have nor become exposed to a Conflict of Interest.
22. The Trustee shall be remunerated by the Parties in a way that does not impede the independent and effective fulfilment of its mandate. In particular, where the remuneration package of a Divestiture Trustee includes a success premium linked to the final sale value of the Divestment Business, such success premium may only be earned if the divestiture takes place within the Trustee Divestiture Period.

Proposal by the Parties

23. No later than [...] after the Effective Date, the Parties shall submit the name or names of one or more natural or legal persons whom the Parties propose to appoint as the Monitoring Trustee to the Commission for approval. No later than [...] before the end of the First Divestiture Period or on request by the Commission, the Parties shall submit a list of one or more persons whom the Parties propose to appoint as Divestiture Trustee to the Commission for approval. The proposal shall contain sufficient information for the Commission to verify that the person or persons proposed as Trustee fulfil the requirements set out in paragraph 21 and shall include:
- (a) the full terms of the proposed mandate, which shall include all provisions necessary to enable the Trustee to fulfil its duties under these Commitments;
 - (b) the outline of a work plan which describes how the Trustee intends to carry out its assigned tasks;
 - (c) an indication whether the proposed Trustee is to act as both Monitoring Trustee and Divestiture Trustee or whether different trustees are proposed for the two functions.

Approval or rejection by the Commission

24. The Commission shall have the discretion to approve or reject the proposed Trustee(s) and to approve the proposed mandate subject to any modifications it deems necessary for the Trustee to fulfil its obligations. If only one name is approved, the Parties shall appoint or cause to be appointed the person or persons concerned as Trustee, in accordance with the mandate approved by the Commission. If more than one name is approved, the Parties shall be free to choose the Trustee to be appointed from among the names approved. The Trustee shall be appointed within [...] of the Commission's approval, in accordance with the mandate approved by the Commission.

New proposal by the Parties

25. If all the proposed Trustees are rejected, the Parties shall submit the names of at least two more natural or legal persons within [...] of being informed of the rejection, in accordance with paragraphs 19 and 24 of these Commitments.

Trustee nominated by the Commission

26. If all further proposed Trustees are rejected by the Commission, the Commission shall nominate a Trustee, whom the Parties shall appoint, or cause to be appointed, in accordance with a trustee mandate approved by the Commission.

II. Functions of the Trustee

27. The Trustee shall assume its specified duties and obligations in order to ensure compliance with the Commitments. The Commission may, on its own initiative or at the request of the Trustee or the Parties, give any orders or instructions to the Trustee in order to ensure compliance with the conditions and obligations attached to the Decision.

Duties and obligations of the Monitoring Trustee

28. The Monitoring Trustee shall:

- (i) propose in its first report to the Commission a detailed work plan describing how it intends to monitor compliance with the obligations and conditions attached to the Decision.
- (ii) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Business with a view to ensuring its continued economic viability, marketability and competitiveness and monitor compliance by the Parties with the conditions and obligations attached to the Decision. To that end the Monitoring Trustee shall:
 - (a) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Business, and the keeping separate of the Divestment Business from the business retained by Dow, in accordance with paragraphs 8 and 9 of these Commitments;

- (b) supervise the management of the Divestment Business as a distinct and saleable entity, in accordance with paragraph 10 of these Commitments;
- (c) with respect to Confidential Information:
 - determine all necessary measures to ensure that the Parties do not after the Effective Date obtain any Confidential Information relating to the Divestment Business, save as strictly necessary in order to carry out the required Transitional Services and services under the OSAs and SSAs.
 - in particular strive for the severing of the Divestment Business’ participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Business,
 - make sure that any Confidential Information relating to the Divestment Business obtained by the Parties before the Effective Date is eliminated and will not be used by the Parties, save as strictly necessary in order to carry out the required Transitional Services and services under the OSAs and SSAs, and
 - decide whether such information may be disclosed to or kept by the Parties as the disclosure is strictly necessary to allow the Parties to carry out the divestiture, as the disclosure is required by law, or is strictly necessary to allow the Parties to carry out the Transitional Services and services under the OSAs and SSAs;
- (d) monitor the splitting of assets and the allocation of Personnel between the Divestment Business and Dow or Affiliated Undertakings;
- (iii) propose to the Parties such measures as the Monitoring Trustee considers necessary to ensure the Parties’ compliance with the conditions and obligations attached to the Decision, in particular the maintenance of the full economic viability, marketability or competitiveness of the Divestment Business, the holding separate of the Divestment Business and the non-disclosure of competitively sensitive information;
- (iv) review and assess potential purchasers as well as the progress of the divestiture process and verify that, dependent on the stage of the divestiture process:
 - (a) potential purchasers receive sufficient and correct information relating to the Divestment Business and the Personnel in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process, and
 - (b) potential purchasers are granted reasonable access to the Personnel;
- (v) act as a contact point for any requests by third parties, in particular potential purchasers, in relation to the Commitments;
- (vi) provide to the Commission, sending the Parties a non-confidential copy at the same time, a written report within [...] after the end of every month that shall cover the operation and

management of the Divestment Business as well as the splitting of assets and the allocation of Personnel so that the Commission can assess whether the business is held in a manner consistent with the Commitments and the progress of the divestiture process as well as potential purchasers;

- (vii) promptly report in writing to the Commission, sending the Parties a non-confidential copy at the same time, if it concludes on reasonable grounds that the Parties are failing to comply with these Commitments;
- (viii) within [...] after receipt of the documented proposal referred to in paragraph 18 of these Commitments, submit to the Commission, sending the Parties a non-confidential copy at the same time, a reasoned opinion as to the suitability and independence of the proposed purchaser and the viability of the Divestment Business after the Sale and as to whether the Divestment Business is sold in a manner consistent with the conditions and obligations attached to the Decision, in particular, if relevant, whether the Sale of the Divestment Business without one or more Assets or not all of the Personnel affects the viability of the Divestment Business after the sale, taking account of the proposed purchaser;
- (ix) assume the other functions assigned to the Monitoring Trustee under the conditions and obligations attached to the Decision.

29. If the Monitoring and Divestiture Trustee are not the same legal or natural persons, the Monitoring Trustee and the Divestiture Trustee shall cooperate closely with each other during and for the purpose of the preparation of the Trustee Divestiture Period in order to facilitate each other's tasks.

Duties and obligations of the Divestiture Trustee

30. Within the Trustee Divestiture Period, the Divestiture Trustee shall sell at no minimum price the Divestment Business to a purchaser, provided that the Commission has approved both the purchaser and the final binding sale and purchase agreement (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs 17 and 18 of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement (as well as in any ancillary agreements) such terms and conditions as it considers appropriate for an expedient sale in the Trustee Divestiture Period. In particular, the Divestiture Trustee may include in the sale and purchase agreement such customary representations and warranties and indemnities as are reasonably required to effect the sale. The Divestiture Trustee shall protect the legitimate financial interests of the Parties, subject to the Parties' unconditional obligation to divest at no minimum price in the Trustee Divestiture Period.

31. In the Trustee Divestiture Period (or otherwise at the Commission's request), the Divestiture Trustee shall provide the Commission with a comprehensive monthly report written in English on the progress of the divestiture process. Such reports shall be submitted within [...] after the end of every month with a simultaneous copy to the Monitoring Trustee and a non-confidential copy to the Parties.

III. Duties and obligations of the Parties

32. The Parties shall provide and shall cause its advisors to provide the Trustee with all such cooperation, assistance and information as the Trustee may reasonably require to perform its tasks. The Trustee shall have full and complete access to any of Dow's or the Divestment Business' books, records, documents, management or other personnel, facilities, sites and technical information necessary for fulfilling its duties under the Commitments and Dow and the Divestment Business shall provide the Trustee upon request with copies of any document. Dow and the Divestment Business shall make available to the Trustee one or more offices on their premises and shall be available for meetings in order to provide the Trustee with all information necessary for the performance of its tasks.
33. Dow shall provide the Monitoring Trustee with all managerial and administrative support that it may reasonably request on behalf of the management of the Divestment Business. This shall include all administrative support functions relating to the Divestment Business which are currently carried out at headquarters level. Dow shall provide and shall cause its advisors to provide the Monitoring Trustee, on request, with the information submitted to potential purchasers, in particular give the Monitoring Trustee access to the data room documentation and all other information granted to potential purchasers in the due diligence procedure. Dow shall inform the Monitoring Trustee on possible purchasers, submit lists of potential purchasers at each stage of the selection process, including the offers made by potential purchasers at those stages, and keep the Monitoring Trustee informed of all developments in the divestiture process.
34. Dow shall grant or procure Affiliated Undertakings to grant comprehensive powers of attorney, duly executed, to the Divestiture Trustee to effect the sale (including ancillary agreements), the Closing and all actions and declarations which the Divestiture Trustee considers necessary or appropriate to achieve the sale and the Closing, including the appointment of advisors to assist with the sale process. Upon request of the Divestiture Trustee, Dow shall cause the documents required for effecting the sale and the Closing to be duly executed.
35. The Parties shall indemnify the Trustee and its employees and agents (each an "***Indemnified Party***") and hold each Indemnified Party harmless against, and hereby agrees that an Indemnified Party shall have no liability to Dow for, any liabilities arising out of the performance of the Trustee's duties under the Commitments, except to the extent that such liabilities result from the wilful default, recklessness, gross negligence or bad faith of the Trustee, its employees, agents or advisors.
36. At the expense of Dow, the Trustee may appoint advisors (in particular for corporate finance or legal advice), subject to Dow's approval (this approval not to be unreasonably withheld or delayed) if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the Mandate, provided that any fees and other expenses incurred by the Trustee are reasonable. Should Dow refuse to approve the advisors proposed by the Trustee the Commission may approve the appointment of such advisors instead, after having heard Dow. Only the Trustee shall be entitled to issue instructions to the advisors. Paragraph 35 of these Commitments shall apply *mutatis mutandis*. In the Trustee Divestiture Period, the Divestiture Trustee may use advisors who served Dow during the Divestiture Period if the Divestiture Trustee considers this in the best interest of an expedient sale.

37. Dow agrees that the Commission may share Confidential Information proprietary to Dow with the Trustee. The Trustee shall not disclose such information and the principles contained in Article 17 (1) and (2) of the Merger Regulation apply *mutatis mutandis*.
38. The Parties agree that the contact details of the Monitoring Trustee are published on the website of the Commission's Directorate-General for Competition and they shall inform interested third parties, in particular any potential purchasers, of the identity and the tasks of the Monitoring Trustee.
39. For a period of 10 years from the Effective Date the Commission may request all information from the Parties that is reasonably necessary to monitor the effective implementation of these Commitments.

IV. Replacement, discharge and reappointment of the Trustee

40. If the Trustee ceases to perform its functions under the Commitments or for any other good cause, including the exposure of the Trustee to a Conflict of Interest:
- (a) the Commission may, after hearing the Trustee and the Parties, require the Parties to replace the Trustee; or
 - (b) the Parties may, with the prior approval of the Commission, replace the Trustee.
41. If the Trustee is removed according to paragraph 40 of these Commitments, the Trustee may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full hand over of all relevant information. The new Trustee shall be appointed in accordance with the procedure referred to in paragraphs 19-26 of these Commitments.
42. Unless removed according to paragraph 40 of these Commitments, the Trustee shall cease to act as Trustee only after the Commission has discharged it from its duties after all the Commitments with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Monitoring Trustee if it subsequently appears that the relevant remedies might not have been fully and properly implemented.

Section F. The review clause

43. The Commission may extend the time periods foreseen in the Commitments in response to a request from the Parties or, in appropriate cases, on its own initiative. Where the Parties request an extension of a time period, it shall submit a reasoned request to the Commission no later than [...] before the expiry of that period, showing good cause. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Notifying Party. Only in exceptional circumstances shall the Parties be entitled to request an extension within [...] of any period. In this case, the request shall not be made any later than [...] from the deadline.
44. The Commission may further, in response to a reasoned request from the Parties showing good cause waive, modify or substitute, in exceptional circumstances, one or more of the undertakings in these Commitments. This request shall be accompanied by a report from the Monitoring

Trustee, who shall, at the same time send a non-confidential copy of the report to the Parties. The request shall not have the effect of suspending the application of the undertaking and, in particular, of suspending the expiry of any time period in which the undertaking has to be complied with.

Section G. Entry into force

45. The Commitments shall take effect upon the date of adoption of the Decision.

duly authorised for and on behalf of
The Dow Chemical Company

duly authorised for and on behalf of
E.I. du Pont de Nemours and Company

SCHEDULE

[...]

Annex 1

Services To Be Provided By Dow Under The Freeport Site Services Agreement

[...]

Annex 2

Services To Be Provided By Dow Under The Tarragona Site Services Agreement

[...]

Annex 3

Allocation of Roles Under The Operating Services Agreement In Freeport And The Transitional Operating Services Agreement In Tarragona

[...]

Annex 4

Transitional Business Services Overview

[...]

Annex 5

Overview Of Physical Assets In Freeport ACP Facility

[...]

Annex 6

Overview Of Physical Assets In Tarragona ACP Facility

[...]

Annex 7

Dow's ACP Products

[...]

February 17, 2017

European Commission
DG Competition
Place Madou
1210 BRUSSELS

Case M. 7932 – DOW / DUPONT

COMMITMENTS TO THE EUROPEAN COMMISSION IONOMERS

Pursuant to Article 8(2), of Council Regulation (EC) No 139/2004 (the “*Merger Regulation*”), The Dow Chemical Company (“*Dow*”) and E.I. du Pont de Nemours and Company (“*DuPont*”) (“together or separately the “*Party/ies*”) hereby enter into the following Commitments (the “*Commitments*”) vis-à-vis the European Commission (the “*Commission*”) with a view to rendering the proposed merger between Dow and DuPont (the “*Concentration*”) compatible with the internal market and the functioning of the EEA Agreement.

This text shall be interpreted in light of the Commission’s decision pursuant to Article 8(2) of the Merger Regulation to declare the Concentration compatible with the internal market and the functioning of the EEA Agreement (the “*Decision*”), in the general framework of European Union law, in particular in light of the Merger Regulation, and by reference to the Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 (the “*Remedies Notice*”).

Section A. Definitions

1. For the purpose of the Commitments, the following terms shall have the following meaning:

ACP(s): acid co-polymer(s).

Affiliated Undertakings: undertakings controlled by the Parties and/or by the ultimate parents of the Parties, whereby the notion of control shall be interpreted pursuant to Article 3 of the Merger Regulation and in light of the Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the “*Consolidated Jurisdictional Notice*”).

Assets: the assets that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business as indicated in Section B, paragraph 6 (a), (b) and (c) and described more in detail in the Schedule.

Closing: the transfer of the legal title to the Divestment Business to the Purchaser.

Closing Period: the period of [...] from the approval of the Purchaser and the terms of sale by the Commission or Closing of the Concentration, whatever occurs later.

Confidential Information: any business secrets, know-how, commercial information, or any other information of a proprietary nature that is not in the public domain.

Conflict of Interest: any conflict of interest that impairs the Trustee's objectivity and independence in discharging its duties under the Commitments.

Divestment Business: the business or businesses as defined in Section B and in the Schedule which the Parties commit to divest.

Divestiture Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by the Parties and who has/have received from the Parties the exclusive Trustee Mandate to sell the Divestment Business to a Purchaser at no minimum price.

Effective Date: the date of adoption of the Decision.

Exceptions from Hold-Separate: Exceptions from the hold-separate and ring-fencing obligations that are strictly necessary to provide services under the acid co-polymers-related agreements, agreements for other Transitional Services or that are the consequence of the Divestment Business' participation in any central information technology network that cannot be severed immediately as of the Effective Date, despite the Parties' reasonable best efforts. Employees involved in providing services under these agreements or employees who have access to any central information technology network that contains Confidential Information relating to the Divestment Business will be subject to strict firewalls and confidentiality agreements.

First Divestiture Period: the period of [...] from the Effective Date.

Hold Separate Manager: the person appointed by the Parties for the Divestment Business to manage the day-to-day business under the supervision of the Monitoring Trustee.

Monitoring Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by the Parties, and who has/have the duty to monitor the Parties' compliance with the conditions and obligations attached to the Decision.

Parties: Dow and DuPont.

Purchaser: the entity approved by the Commission as acquirer of the Divestment Business in accordance with the criteria set out in Section D.

Purchaser Criteria: the criteria laid down in paragraph 17 of these Commitments that the Purchaser must fulfil in order to be approved by the Commission.

Schedule: the schedule to these Commitments describing more in detail the Divestment Business.

Transitional Services: The services to be provided to the Purchaser by Dow in the period following Closing, including, but not limited to data processing services, emergency and security consulting, product safety and regulatory compliance consulting, and IT support.

Transitional Services Team: the Parties' personnel providing the Transitional Services.

Trustee(s): the Monitoring Trustee and/or the Divestiture Trustee as the case may be.

Trustee Divestiture Period: the period of [...] from the end of the First Divestiture Period.

Section B. The commitment to divest and the Divestment Business

Commitment to divest

2. In order to maintain effective competition, the Parties commit to divest, or procure the divestiture of the Divestment Business by the end of the Trustee Divestiture Period as a going concern to a purchaser and on terms of sale approved by the Commission in accordance with the procedure described in paragraph 18 of these Commitments. To carry out the divestiture, Dow commits to find a purchaser and to enter into a final binding sale and purchase agreement for the sale of the Divestment Business within the First Divestiture Period. If Dow has not entered into such an agreement at the end of the First Divestiture Period, Dow shall grant the Divestiture Trustee an exclusive mandate to sell the Divestment Business in accordance with the procedure described in paragraph 30 in the Trustee Divestiture Period.
3. The proposed concentration shall not be implemented before Dow or the Divestiture Trustee has entered into a final binding sale and purchase agreement for the sale of the Divestment Business and the Commission has approved the purchaser and the terms of sale in accordance with paragraph 18.
4. The Parties shall be deemed to have complied with this commitment if:
 - (a) by the end of the Trustee Divestiture Period, Dow or the Divestiture Trustee have entered into a final binding sale and purchase agreement and the Commission approves the proposed purchaser and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph 18; and
 - (b) the Closing of the sale of the Divestment Business to the Purchaser takes place within the Closing Period.
5. In order to maintain the structural effect of the Commitments, the Parties shall, for a period of [...] after Closing, not acquire, whether directly or indirectly, the possibility of exercising influence (as defined in paragraph 43 of the Remedies Notice, footnote 3) over the whole or part of the Divestment Business, unless, following the submission of a reasoned request from the Notifying Party showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph 44 of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over the Divestment Business is no longer necessary to render the proposed concentration compatible with the internal market.

Structure and definition of the Divestment Business

6. The Divestment Business consists of Dow's ionomers business, as further defined in the Schedule. The legal and functional structure of the Divestment Business as operated to date is described in the Schedule. The Divestment Business, described in more detail in the Schedule, includes all assets that are necessary to ensure the viability and competitiveness of the Divestment Business, in particular:
 - (a) all tangible and intangible assets (including intellectual property rights); and

- (b) all dedicated contracts, leases, commitments, and customer orders of the Divestment Business; all dedicated customer and other records of the Divestment Business.

7. *[Intentionally left blank]*

Section C. Related commitments

Preservation of viability, marketability and competitiveness

- 8. From the Effective Date until Closing, the Parties shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Business, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Business. In particular the Parties undertake:
 - (a) not to carry out any action that might have a significant adverse impact on the value, management or competitiveness of the Divestment Business or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Business;
 - (b) to make available, or procure to make available, sufficient resources for the development of the Divestment Business, on the basis and continuation of the existing business plans.

Hold-separate obligations

- 9. The Parties commit, from the Effective Date until Closing, to keep the Divestment Business separate from the businesses they are retaining and to ensure that unless explicitly permitted under these Commitments, including under the Exceptions Form Hold-Separate, management and staff of the business(es) retained by the Parties have no involvement in the Divestment Business.
- 10. Until Closing, the Parties shall assist the Monitoring Trustee in ensuring that the Divestment Business is managed as a distinct and saleable entity separate from the businesses which Dow is retaining (save with the Exceptions From Hold-Separate). Immediately after the adoption of the Decision, the Parties shall appoint a Hold Separate Manager. The Hold Separate Manager shall manage the Divestment Business independently and in the best interest of the business with a view to ensuring its continued economic viability, marketability and competitiveness and its independence from the businesses retained by Dow (save with the Exceptions From Hold-Separate). The Hold Separate Manager shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Manager shall be subject to the procedure laid down in paragraph 8(c) of these Commitments. The Commission may, after having heard the Parties, require the Parties to replace the Hold Separate Manager.

11. *[Intentionally left blank]*

Ring-fencing

- 12. Dow shall implement, or procure to implement, all necessary measures to ensure that it does not, after the Effective Date, obtain any Confidential Information relating to the Divestment

Business and that any such Confidential Information obtained by Dow before the Effective Date will be eliminated and not be used by Dow, save with the Exceptions From Hold-Separate. This includes measures vis-à-vis Dow's appointees on the supervisory board and/or board of directors of the Divestment Business. In particular, the participation of the Divestment Business in any central information technology network shall be severed to the extent possible, without compromising the viability of the Divestment Business. Dow may obtain or keep information relating to the Divestment Business which is reasonably necessary for the divestiture of the Divestment Business or the disclosure of which to Dow is required by law. In order to ensure the effectiveness of the strict firewalls, in light of the Transitional Services, the Parties commit to create effective compliance mechanisms.

Non-solicitation clause

13. From the Effective Date until [...] after the end of the Initial Transition Period and, if applicable, the Supplemental Transition Period, the Parties commit to not directly solicit any customer of the Divestment Business to transfer to the Parties any of that customers' ionomers business (which the Purchaser acquired as part of the Divestment Business), provided that the Parties may continue to supply ionomers to customers acquired as part of the Transaction (*i.e.*, customers to which DuPont already supplies ionomers) and to respond to unsolicited invitations to bid on any ionomers business from any customer worldwide.

Due diligence

14. In order to enable potential purchasers to carry out a reasonable due diligence of the Divestment Business, the Parties shall, subject to customary confidentiality assurances and dependent on the stage of the divestiture process provide to potential purchasers sufficient information as regards the Divestment Business.

Reporting

15. The Parties shall submit written reports in English on potential purchasers of the Divestment Business and developments in the negotiations with such potential purchasers to the Commission and the Monitoring Trustee no later than [...] after the end of every month following the Effective Date (or otherwise at the Commission's request). The Parties shall submit a list of all potential purchasers having expressed interest in acquiring the Divestment Business to the Commission at each and every stage of the divestiture process, as well as a copy of all the offers made by potential purchasers within [...] of their receipt.
16. The Parties shall inform the Commission and the Monitoring Trustee on the preparation of the data room documentation and the due diligence procedure and shall submit a copy of any information memorandum to the Commission and the Monitoring Trustee before sending the memorandum out to potential purchasers.

Section D. The Purchaser

17. In order to be approved by the Commission, the Purchaser must fulfil the following criteria:
- (a) The Purchaser shall be independent of and unconnected to the Notifying Party/Notifying Parties and its/their Affiliated Undertakings (this being assessed having regard to the situation following the divestiture).
 - (b) The Purchaser shall have the financial resources, proven expertise and incentive to maintain and develop the Divestment Business as a viable and active competitive force in competition with the Parties and other competitors;
 - (c) The acquisition of the Divestment Business by the Purchaser must neither be likely to create, in light of the information available to the Commission, *prima facie* competition concerns nor give rise to a risk that the implementation of the Commitments will be delayed. In particular, the Purchaser must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Business.
18. The final binding sale and purchase agreement (as well as ancillary agreements) relating to the divestment of the Divestment Business shall be conditional on the Commission's approval. When Dow has reached an agreement with a purchaser, it shall submit a fully documented and reasoned proposal, including a copy of the final agreement(s), within [...] to the Commission and the Monitoring Trustee.¹ The Parties must be able to demonstrate to the Commission that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commission's Decision and the Commitments. For the approval, the Commission shall verify that the purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commitments including their objective to bring about a lasting structural change in the market. The Commission may approve the sale of the Divestment Business without one or more Assets, or by substituting one or more Assets with one or more different assets, if this does not affect the viability and competitiveness of the Divestment Business after the sale, taking account of the proposed purchaser.

Section E. Trustee

I. Appointment procedure

19. The Parties shall appoint a Monitoring Trustee to carry out the functions specified in these Commitments for a Monitoring Trustee. The Parties commit not to close the Concentration before the appointment of a Monitoring Trustee.

¹ But not before one week after these Commitments shall take effect.

20. If Dow has not entered into a binding sale and purchase agreement regarding the Divestment Business [...] before the end of the First Divestiture Period or if the Commission has rejected a purchaser proposed by the Parties at that time or thereafter, the Parties shall appoint a Divestiture Trustee. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.
21. The Trustee shall:
- (i) at the time of appointment, be independent of the Parties and their Affiliated Undertakings;
 - (ii) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and
 - (iii) neither have nor become exposed to a Conflict of Interest.
22. The Trustee shall be remunerated by the Parties in a way that does not impede the independent and effective fulfilment of its mandate. In particular, where the remuneration package of a Divestiture Trustee includes a success premium linked to the final sale value of the Divestment Business, such success premium may only be earned if the divestiture takes place within the Trustee Divestiture Period.

Proposal by the Parties

23. No later than [...] after the Effective Date, the Parties shall submit the name or names of one or more natural or legal persons whom the Parties propose to appoint as the Monitoring Trustee to the Commission for approval. No later than [...] before the end of the First Divestiture Period or on request by the Commission, the Parties shall submit a list of one or more persons whom the Parties propose to appoint as Divestiture Trustee to the Commission for approval. The proposal shall contain sufficient information for the Commission to verify that the person or persons proposed as Trustee fulfil the requirements set out in paragraph 21 and shall include:
- (a) the full terms of the proposed mandate, which shall include all provisions necessary to enable the Trustee to fulfil its duties under these Commitments;
 - (b) the outline of a work plan which describes how the Trustee intends to carry out its assigned tasks;
 - (c) an indication whether the proposed Trustee is to act as both Monitoring Trustee and Divestiture Trustee or whether different trustees are proposed for the two functions.

Approval or rejection by the Commission

24. The Commission shall have the discretion to approve or reject the proposed Trustee(s) and to approve the proposed mandate subject to any modifications it deems necessary for the Trustee to fulfil its obligations. If only one name is approved, the Parties shall appoint or cause to be appointed the person or persons concerned as Trustee, in accordance with the mandate approved by the Commission. If more than one name is approved, the Parties shall be free to choose the Trustee to be appointed from among the names approved. The Trustee shall be appointed within [...] of the Commission's approval, in accordance with the mandate approved by the Commission.

New proposal by the Parties

25. If all the proposed Trustees are rejected, the Parties shall submit the names of at least two more natural or legal persons within [...] of being informed of the rejection, in accordance with paragraphs 19 and 24 of these Commitments.

Trustee nominated by the Commission

26. If all further proposed Trustees are rejected by the Commission, the Commission shall nominate a Trustee, whom the Parties shall appoint, or cause to be appointed, in accordance with a trustee mandate approved by the Commission.

II. Functions of the Trustee

27. The Trustee shall assume its specified duties and obligations in order to ensure compliance with the Commitments. The Commission may, on its own initiative or at the request of the Trustee or the Parties, give any orders or instructions to the Trustee in order to ensure compliance with the conditions and obligations attached to the Decision.

Duties and obligations of the Monitoring Trustee

28. The Monitoring Trustee shall:
- (i) propose in its first report to the Commission a detailed work plan describing how it intends to monitor compliance with the obligations and conditions attached to the Decision.
 - (ii) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Business with a view to ensuring its continued economic viability, marketability and competitiveness and monitor compliance by the Parties with the conditions and obligations attached to the Decision. To that end the Monitoring Trustee shall:
 - (a) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Business, and the keeping separate of the Divestment Business from the business retained by Dow, in accordance with paragraphs 8 and 9 of these Commitments;
 - (b) supervise the management of the Divestment Business as a distinct and saleable entity, in accordance with paragraph 10 of these Commitments;
 - (c) with respect to Confidential Information:
 - determine all necessary measures to ensure that the Parties do not after the Effective Date obtain any Confidential Information relating to the Divestment Business, save as strictly necessary in order to carry out the required Transitional Services,
 - in particular strive for the severing of the Divestment Business' participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Business,
 - make sure that any Confidential Information relating to the Divestment Business obtained by the Parties before the Effective Date is eliminated and will not be used by the Parties save as strictly necessary in order to carry out the required Transitional Services, and

- decide whether such information may be disclosed to or kept by the Parties as the disclosure is strictly necessary (beyond what is necessary to carry out the required Transitional Services) to allow the Parties to carry out the divestiture or as the disclosure is required by law;
 - (d) monitor the splitting of assets between the Divestment Business and Dow or Affiliated Undertakings;
 - (iii) propose to the Parties such measures as the Monitoring Trustee considers necessary to ensure the Parties' compliance with the conditions and obligations attached to the Decision, in particular the maintenance of the full economic viability, marketability or competitiveness of the Divestment Business, the holding separate of the Divestment Business and the non-disclosure of competitively sensitive information;
 - (iv) review and assess potential purchasers as well as the progress of the divestiture process and verify that, dependent on the stage of the divestiture process potential purchasers receive sufficient and correct information relating to the Divestment Business in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process;
 - (v) act as a contact point for any requests by third parties, in particular potential purchasers, in relation to the Commitments;
 - (vi) provide to the Commission, sending the Parties a non-confidential copy at the same time, a written report within [...] after the end of every month that shall cover the operation and management of the Divestment Business as well as the splitting of assets and the allocation of Personnel so that the Commission can assess whether the business is held in a manner consistent with the Commitments and the progress of the divestiture process as well as potential purchasers;
 - (vii) promptly report in writing to the Commission, sending the Parties a non-confidential copy at the same time, if it concludes on reasonable grounds that the Parties are failing to comply with these Commitments;
 - (viii) within [...] after receipt of the documented proposal referred to in paragraph 18 of these Commitments, submit to the Commission, sending the Parties a non-confidential copy at the same time, a reasoned opinion as to the suitability and independence of the proposed purchaser and the viability of the Divestment Business after the Sale and as to whether the Divestment Business is sold in a manner consistent with the conditions and obligations attached to the Decision, in particular, if relevant, whether the Sale of the Divestment Business without one or more Assets affects the viability of the Divestment Business after the sale, taking account of the proposed purchaser;
 - (ix) assume the other functions assigned to the Monitoring Trustee under the conditions and obligations attached to the Decision.
29. If the Monitoring and Divestiture Trustee are not the same [legal or natural] persons, the Monitoring Trustee and the Divestiture Trustee shall cooperate closely with each other during and for the purpose of the preparation of the Trustee Divestiture Period in order to facilitate each other's tasks.

Duties and obligations of the Divestiture Trustee

30. Within the Trustee Divestiture Period, the Divestiture Trustee shall sell at no minimum price the Divestment Business to a purchaser, provided that the Commission has approved both the purchaser and the final binding sale and purchase agreement (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs 17 and 18 of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement (as well as in any ancillary agreements) such terms and conditions as it considers appropriate for an expedient sale in the Trustee Divestiture Period. In particular, the Divestiture Trustee may include in the sale and purchase agreement such customary representations and warranties and indemnities as are reasonably required to effect the sale. The Divestiture Trustee shall protect the legitimate financial interests of the Parties, subject to the Parties' unconditional obligation to divest at no minimum price in the Trustee Divestiture Period.
31. In the Trustee Divestiture Period (or otherwise at the Commission's request), the Divestiture Trustee shall provide the Commission with a comprehensive monthly report written in English on the progress of the divestiture process. Such reports shall be submitted within [...] after the end of every month with a simultaneous copy to the Monitoring Trustee and a non-confidential copy to the Notifying Party/Notifying Parties.

III. Duties and obligations of the Parties

32. The Parties shall provide and shall cause its advisors to provide the Trustee with all such cooperation, assistance and information as the Trustee may reasonably require to perform its tasks. The Trustee shall have full and complete access to any of Dow's or the Divestment Business' books, records, documents, management or other personnel, facilities, sites and technical information necessary for fulfilling its duties under the Commitments and Dow and the Divestment Business shall provide the Trustee upon request with copies of any document. Dow and the Divestment Business shall make available to the Trustee one or more offices on their premises and shall be available for meetings in order to provide the Trustee with all information necessary for the performance of its tasks.
33. Dow shall provide the Monitoring Trustee with all managerial and administrative support that it may reasonably request on behalf of the management of the Divestment Business. This shall include all administrative support functions relating to the Divestment Business which are currently carried out at headquarters level. Dow shall provide and shall cause its advisors to provide the Monitoring Trustee, on request, with the information submitted to potential purchasers, in particular give the Monitoring Trustee access to the data room documentation and all other information granted to potential purchasers in the due diligence procedure. Dow shall inform the Monitoring Trustee on possible purchasers, submit lists of potential purchasers at each stage of the selection process, including the offers made by potential purchasers at those stages, and keep the Monitoring Trustee informed of all developments in the divestiture process.
34. Dow shall grant or procure Affiliated Undertakings to grant comprehensive powers of attorney, duly executed, to the Divestiture Trustee to effect the sale (including ancillary agreements), the Closing and all actions and declarations which the Divestiture Trustee considers necessary or appropriate to achieve the sale and the Closing, including the

appointment of advisors to assist with the sale process. Upon request of the Divestiture Trustee, Dow shall cause the documents required for effecting the sale and the Closing to be duly executed.

35. Dow shall indemnify the Trustee and its employees and agents (each an “*Indemnified Party*”) and hold each Indemnified Party harmless against, and hereby agrees that an Indemnified Party shall have no liability to Dow for, any liabilities arising out of the performance of the Trustee’s duties under the Commitments, except to the extent that such liabilities result from the wilful default, recklessness, gross negligence or bad faith of the Trustee, its employees, agents or advisors.
 36. At the expense of Dow , the Trustee may appoint advisors (in particular for corporate finance or legal advice), subject to the Dow’s approval (this approval not to be unreasonably withheld or delayed) if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the Mandate, provided that any fees and other expenses incurred by the Trustee are reasonable. Should Dow refuse to approve the advisors proposed by the Trustee the Commission may approve the appointment of such advisors instead, after having heard Dow. Only the Trustee shall be entitled to issue instructions to the advisors. Paragraph 35 of these Commitments shall apply *mutatis mutandis*. In the Trustee Divestiture Period, the Divestiture Trustee may use advisors who served Dow during the Divestiture Period if the Divestiture Trustee considers this in the best interest of an expedient sale.
 37. Dow agrees that the Commission may share Confidential Information proprietary to Dow with the Trustee. The Trustee shall not disclose such information and the principles contained in Article 17 (1) and (2) of the Merger Regulation apply *mutatis mutandis*.
 38. The Parties agree that the contact details of the Monitoring Trustee are published on the website of the Commission's Directorate-General for Competition and they shall inform interested third parties, in particular any potential purchasers, of the identity and the tasks of the Monitoring Trustee.
 39. For a period of 10 years from the Effective Date the Commission may request all information from the Parties that is reasonably necessary to monitor the effective implementation of these Commitments.
- IV. Replacement, discharge and reappointment of the Trustee
40. If the Trustee ceases to perform its functions under the Commitments or for any other good cause, including the exposure of the Trustee to a Conflict of Interest:
 - (a) the Commission may, after hearing the Trustee and the Parties , require the Parties to replace the Trustee; or
 - (b) the Parties may, with the prior approval of the Commission, replace the Trustee.
 41. If the Trustee is removed according to paragraph 40 of these Commitments, the Trustee may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full hand over of all relevant information. The new Trustee shall be appointed in accordance with the procedure referred to in paragraphs 19-26 of these Commitments.
 42. Unless removed according to paragraph 40 of these Commitments, the Trustee shall cease to act as Trustee only after the Commission has discharged it from its duties after all the

Commitments with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Monitoring Trustee if it subsequently appears that the relevant remedies might not have been fully and properly implemented.

Section F. The review clause

43. The Commission may extend the time periods foreseen in the Commitments in response to a request from the Parties or, in appropriate cases, on its own initiative. Where the Parties request an extension of a time period, it shall submit a reasoned request to the Commission no later than [...] before the expiry of that period, showing good cause. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Parties. Only in exceptional circumstances shall the Parties be entitled to request an extension within [...] of any period. In this case, the request shall not be made any later than [...] from the deadline.
44. The Commission may further, in response to a reasoned request from the Parties showing good cause waive, modify or substitute, in exceptional circumstances, one or more of the undertakings in these Commitments. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Notifying Party. The request shall not have the effect of suspending the application of the undertaking and, in particular, of suspending the expiry of any time period in which the undertaking has to be complied with.

Section G. Entry into force

45. The Commitments shall take effect upon the date of adoption of the Decision.

duly authorised for and on behalf of
The Dow Chemical Company

duly authorised for and on behalf of
E.I. du Pont de Nemours and Company

SCHEDULE

[...]

Annex 1

Patents To Be Included In The Ionomer Divestment Business

[...]

Annex 2

[Agreement with third-party manufacturer for the production of ionomers]

[...]

Annex 3

Transitional Business Services Overview

[...]