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The case highlights the importance of obtaining accurate market share information. It also illustrates the benefits of international cooperation, as the Commission and the US Department of Justice accepted similar remedies.
Competition merger brief

Dow/DuPont: protecting product and innovation competition

Alexandre Bertuzzi, Soledad Blanco Thomas, Daniel Coublucq, Johan Jonckheere, Julia Tew, Thomas Deisenhofer

Introduction
On 27 March 2017 the Commission cleared the merger of equals between Dow and DuPont (the transaction) subject to conditions.\footnote{Decision in case M.7932 Dow/DuPont, 27 March 2017.}

Dow is a US-based chemicals company, active in plastics and chemicals, agricultural sciences, and hydrocarbon and energy products and services. In 2016 Dow recorded global sales of approximately €48 billion. DuPont is also a US-based chemicals company, which produces a variety of chemical products, polymers, agro-chemicals, seeds, food ingredients, and other materials. In 2016 DuPont recorded global sales of approximately €24 billion. The merged entity will have a market capitalisation of approximately $140 billion.

Dow and DuPont (the parties) intend to turn their combined activities into three separate businesses (Agriculture, Material Science and Specialty Products), which will be spun off as independent, publicly traded companies. The Agriculture business will consist of DuPont's Agriculture division ($11 billion revenue) and Dow's Agricultural Sciences division ($7 billion). The Material Science business will comprise Dow's Performance Plastics, Performance Materials & Chemicals, Infrastructure Solutions and Consumer Solutions divisions ($45 billion) and DuPont's Performance Materials division ($6 billion), while the Specialty Products business will combine Dow's Electronic Materials division ($2 billion) and DuPont's Electronics & Communications, Safety & Protection, Nutrition & Health and Industrial Biosciences divisions ($11 billion).

The transaction was initially announced on 11 December 2015 and was notified to the Commission on 22 June 2016. After an initial investigation, the Commission decided to open an in-depth investigation on 11 August 2016.

This was the first of three major mergers in the agrochemical sector. In line with its case practice, the Commission assesses parallel transactions under what is known as the priority rule - first come, first served. The merger between Dow and DuPont was therefore assessed on the basis of the market situation at the time of the investigation.

The Commission’s concerns related to Agriculture and Material Science. The Agriculture business covers both seeds and crop protection products, also known as pesticides. As an integrated seeds and crop protection company, the merged entity would become the number 1 player in the world, with $19 billion in revenue. However, since Dow is not a strong player in seeds in the EEA, the Commission investigation focussed on crop protection, where the parties’ existing portfolios in the EEA compete on products targeting weeds (herbicides), insects (insecticides) and diseases (fungicides).

In addition to existing products, Dow and DuPont are close competitors in crop protection innovation, where only five players are globally active throughout the research & development process. After the merger only four global R&D-integrated players would remain, in an industry with very high barriers to entry. Importantly, the number of players in specific innovation spaces would be even lower than at industry level.

Material Science covers certain types of materials and chemicals derived from classical petrochemical products. Here the companies’ activities gave rise to problematic overlaps in the markets for acid co-polymers and ionomers, which are products widely used in packaging and adhesive applications.

In a nutshell

The main concerns arising in the Dow/DuPont merger related to crop protection, on both product and innovation competition.

Innovation is of key importance to this industry and the merging parties were two of only five global players active at all stages of the product lifecycle (research, development product launch, and distribution).

The Commission’s remedy was designed to address concerns on both product and innovation competition and to enable the creation of another global R&D-integrated company.

A remedy was also required to address competition concerns regarding petrochemicals.

The authors would like to thank Giulio Federico, Cyril Hariton, Greg Langus and Anatoly Subocs for valuable contributions to this article.
After issuing an Article 6(1)(c) decision on 11 August 2016 and a Statement of Objections on 7 December 2016, the Commission adopted its clearance decision on 27 March 2017, conditional in particular on the divestiture of major parts of DuPont’s global pesticide business, including its global R&D organisation. On 31 March 2017 DuPont announced an agreement with FMC for the purchase of its crop protection divestment business as a single package. This transaction would enable FMC, which is currently a generic player with some development activities in crop protection, to become an integrated R&D company.

The Commission’s decision in Dow/DuPont led to some debate among commentators, notably on the innovation part of the decision. Some observers, who had not had the benefit of reading the non-confidential version of the decision, claimed that the Commission had (1) introduced a new theory of harm regarding innovation in EU merger control, (2) based its innovation concerns not on pipeline competition, but solely on harm to innovation at industry level, (3) focussed on industry R&D competition instead of competition in specific markets, and (4) required an unprecedented and far-reaching remedy. Some have also claimed that the Commission decision constitutes a ‘quantum leap’ or that it creates a significant tension with the approach of US antitrust enforcers.

One of the objectives of this article is to describe in detail the Commission’s investigation and assessment in this case in order to demystify the decision (which runs to more than 1000 pages of detailed reasoning and references to evidence on both product and innovation competition) and thus to provide a better factual basis for the debate.

**Introduction to the competitive assessment in product and innovation competition**

The activities of the parties overlapped in four respects. First, there was an overlap in existing products, since the parties sold competing formulated crop protection products in many markets across Europe. Here, the Commission investigated the extent to which the proposed transaction gave 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 between two close competitors.

Second, there were a number of products in the parties’ respective development pipelines that the parties were either in the process of launching, or intending to launch on the market with a high probability (80-90% chance). Here, the Commission investigated the extent to which the proposed transaction gave rise to non-coordinated effects, in particular whether the proposed transaction affected potential product and price competition between forthcoming and existing products, or between forthcoming products.

Third, the Parties had a number of overlapping lines of research for new AIs and discovery pipeline molecules targeting the same innovation spaces, and therefore compete head-to-head with each other on innovation. Here, the Commission investigated the extent to which the proposed transaction would give rise to the likely discontinuation, delay or redirection of overlapping lines of research in specific innovation spaces targeted by both parties, leading to a significant loss of innovation competition in the short to medium term.

Fourth, the parties were two of only a few global R&D companies with the capability to innovate in certain innovation spaces. The Commission investigated whether the proposed transaction would give rise to a structural reduction of incentives and ability to achieve the same level of innovation as the parties would separately absent the merger, which could lead to a significant loss of innovation competition in the crop protection industry in the medium to long term. The first two elements will be examined in further detail in the following section on product competition, and the second two elements in the subsequent section on innovation competition.

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2 As per 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").
3 As per paragraphs 24 et seq., paragraph 38 and 58 - 60 Horizontal Merger Guidelines.
4 A line of research comprises the set of scientists, patents, assets, equipment, which are dedicated to a given research target (i.e. innovation space), whose output is successive pipeline AIs.
5 As per paragraphs 24 et seq., paragraph 38 Horizontal Merger Guidelines. See also the US Department of Justice and Federal Trade Commission Horizontal Merger Guidelines, Section 6.4
6 As per paragraphs 24 et seq., paragraph 38 Horizontal Merger Guidelines. See also the US Department of Justice and Federal Trade Commission Horizontal Merger Guidelines, Section 6.4
Competitive assessment – product competition

The Commission’s assessment focussed on whether there would be an elimination of competition between either (i) existing crop protection products; (ii) forthcoming crop protection products; and (iii) existing and forthcoming crop protection products. Farmers buy formulated crop protection products to address their particular needs, for the particular crop, pest(s) and (for herbicides) the timing of application, so the Commission found that the relevant product market definition was based on a crop/pest/timing combination. The geographic market was national, since the authorisation of formulated products is still regulated at national level and Member States remain responsible for maintaining specific national data requirements. The parties’ crop protection product portfolios overlapped in three broad areas: herbicides; insecticides; and fungicides.

Herbicides

The Commission found that the parties are strong players in herbicides for use in cereals in most EEA countries, both offering an extensive and successful range of products for spring applications against broadleaf weeds. In oilseed rape, rice and pasture herbicides, Dow is a leading player in many EEA countries while DuPont is a smaller but close competitor. The parties’ combined portfolio is set to become even stronger and closer as Dow is about to roll out Arylex and Rinskor, two promising new products that are likely to capture significant market share. Arylex and Rinskor will strengthen and rejuvenate Dow’s herbicide offering for several crops.

In addition to the significant overlaps on similar crop/weed combinations in various markets, the Commission found that the parties’ portfolios competed closely in terms of both weed spectrum and time of application. Documents from expert sources such as farming consultancies indicated that the parties had the main products recommended for several key weeds and had most of the few products suitable for late spring application.

The Commission further found that competing herbicide suppliers would in all likelihood not be able to constrain the merged entity in the markets concerned. Among the few remaining R&D-integrated players, Dow and DuPont are the only ones who specialise in broadleaf herbicides, in particular for cereals: Bayer's and BASF's portfolios focus less on broadleaf weed herbicides, while Syngenta specialises in herbicides for grass weeds. Monsanto focuses on non-selective herbicides. The Commission also found that competition from generics is limited because of effective defence strategies against generic competition, for instance by extending patent protection through mixtures with new products.

The Commission concluded that in the EEA the proposed transaction gave rise to a significant impediment to effective competition in 28 cereal herbicide markets, seven oilseed rape herbicide markets, 12 sunflower herbicide markets, three rice herbicide markets and five pasture herbicide markets, due to either the creation or strengthening of a dominant position, or the elimination of an important and close competitive constraint.

Insecticides

The parties each had the newest portfolio of insecticide AIs amongst all crop protection players and both targeted similar insect pests (for example lepidoptera, a key “chewing” insect pest). These insecticides were more selective (i.e. they targeted only a narrow group of pests) and more effective than many of the older generation insecticides, and therefore had a lower environmental impact. Increased selectivity is particularly important in insecticides, as this helps to protect against the phenomenon of insects developing resistance to the insecticides.

The Commission found that the parties were important and close competitors in many insecticides markets in the EEA, inter alia, because: (i) both had a strategic focus on the same speciality (i.e. fruits and vegetables) crop segment and were targeting the same insects; (ii) many internal documents showed that the parties were competing against each other across a number of crop segments and different products; (iii) market participants considered that there was a broad overlap between the parties' respective insecticide portfolios, and for a number of markets, the parties' products were the only real effective choices available. Competition from other players was limited, since the other R&D-integrated companies either had a minimal presence (BASF), or their portfolio largely consisted of older products under regulatory pressure (Bayer and Syngenta). While Bayer had two newer insecticides, these were focussed on different target pests (pests belonging to the "sucking" pest group) than those of the parties. Generic players imposed a limited competitive constraint on the parties due to their older product portfolios.

Many of the Commission's findings on the importance and closeness of the parties related to overlaps in lepidoptera and other chewing insect control between the existing product portfolio of DuPont (which included the important insecticide Rynaxypyr) with the existing and soon-to-be launched product portfolio of Dow (existing insecticides chlorpyrifos and spinosad, and Spinetoram, which was in the process of being launched in the EEA). Similarly, the Commission’s findings on the importance and closeness of the parties in aphids and whiteflies control focussed on overlaps between the soon-to-be launched DuPont insecticide, Cyazypyr, with the existing and soon-to-be launched products of Dow (chlorpyrifos and Isoclast).

8 Spinetoram was already marketed in the EEA due to a small number of emergency registrations and its first EEA launches were to take place in late 2016/early 2017. See paragraphs 24 et seq., paragraph 38 and 58 – 60 Horizontal Merger Guidelines.

9 Cyazypyr was already marketed in the EEA due to a small number of emergency registrations and its first EEA launches were to take place in late 2016/early 2017. Isoclast is in the process of being launched by...
The Commission found that, in the EEA, the proposed transaction gave rise to a significant impediment to effective competition in lepidoptera and other chewing insect control in around 40 markets due to either the creation or strengthening of a dominant position, or the elimination of an important and close competitive constraint, in fruit crops, vegetable crops, corn and cotton. The proposed transaction also gave rise to a significant impediment to effective competition in thrips control in four markets due to the elimination of an important and close competitive constraint in fruit and vegetable crops and to a significant impediment to competition in aphids and whitefly ("sucking" insects) control in four markets due to the elimination of an important and close competitive constraint in fruit and vegetable crops.

**Fungicides**

Dow and DuPont are currently relatively small players in this segment, where Bayer and BASF are strong leaders. The Commission concluded that there was no significant impediment to effective competition in fungicides, apart from in rice blast fungicides, where the Commission found that the merger would strengthen Dow's dominant position in the EEA.

**Competitive assessment – innovation competition**

Innovation plays a fundamental role in delivering to the market new AIs with novel features which can be more effective at defeating resistance to pests and increasing overall crop yields, as well as reducing the toxicity of crop protection products. A reduction of innovation through the proposed transaction would therefore have had severe consequences for the future preservation of crops and the environment.

**Legal foundation**

The Merger Regulation establishes a legal framework in which the Commission must investigate not only price effects, but also effects on innovation. Further, the reference to "increased prices" throughout the Horizontal Merger Guidelines is used as "shorthand" for the different ways in which a merger may result in competitive harm, and this may include a reduction in innovation. Consequently, the Commission has a duty to prevent significant impediments to effective competition, by assessing not only price effects or product and price competition, but also whether a merger is likely to lead to diminished future innovation and innovation competition.

Further, while the Horizontal Merger Guidelines recognise that certain mergers may increase innovation, they are also clear that, in markets where innovation is an important competitive force, a merger may give rise to a significant impediment to effective competition where both parties are important innovators. A merger between two companies with pipeline products relating to the same specific product market is only one example of the way in which harm to innovation competition may occur.

**Economic foundation**

The economic literature provides guidance on the circumstances under which a merger between rival innovators is more likely to lead to a reduction in innovation. It suggests in particular that a merger is more likely to harm innovation if it brings together two out of a limited number of close innovation competitors.

The primary mechanism through which a merger may reduce innovation incentives is by suppressing innovation competition between the merging parties ("Innovation rivalry" channel). Prior to the merger, the merging parties would have an incentive to capture profitable sales from each other by introducing new and improved products. This effect is internalized with the merger, and depresses the innovation incentive. This effect from the merger can be thought of as a standard unilateral effect, applied in this case to innovation effort rather than to prices or volumes (as in a conventional/static unilateral effects analysis).

The effect of a loss of innovation competition can be significant if the merger brings together two significant innovators in a concentrated market, and if the merging parties absorb the merger would have been likely to divert future sales from each other by investing in innovation (i.e. the merging parties are close innovation competitors). The competitive role played by non-merging parties also needs to be assessed before concluding on the significance of any loss of innovation competition from the merger. If only a few non-merging parties effectively constrain the merging parties then it is more likely that the merger will lead to a significant loss of innovation competition. Moreover, in a concentrated market, any reaction of non-merging parties to the loss of innovation competition between the merging parties is unlikely to fully offset the reduction in innovation, in particular when competitors have different innovative capabilities than the merging parties (see discussion below).

The economic literature identifies some potential countervailing channels which may act to counter a loss of innovation.

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10 Paragraph 6, Horizontal Merger Guidelines

11 Paragraph 38, Horizontal Merger Guidelines. The US Horizontal Merger Guidelines also specifically addresses unilateral effects arising from diminished innovation competition (Section 6.A). For a similar analysis of innovation competition in an antitrust context, see paragraph 26 of the Guidelines on Technology Transfer Agreements, and paragraphs 199 – 122 of the Horizontal Cooperation Guidelines.

12 In other words, innovating allows them to introduce new and improved products to (i) capture sales away from each other, and (ii) protect their existing sales from each other.

13 See for example Baker (2007, "Beyond Schumpeter vs. Arrow: How antitrust fosters innovation", Antitrust Law Journal), and Shapiro (2012, "Competition and innovation. Did Arrow hit the bull's eye?", chapter 7 of Josh Lerner and Scott Stern (eds.)). These papers also point to a number of empirical studies that support the finding that competition tends to favour innovation.

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Dow. See paragraphs 24 et seq., paragraph 38 and 58 – 60 Horizontal Merger Guidelines.
competition between the merging parties. One of these channels can be the loss of product market competition between the merging parties. However, while on the one hand less intense competition in the product market increases the profits from innovating (profits from post-innovation outcome), which tends to increase innovation incentives, on the other hand it also increases the profits from not innovating (profits from pre-innovation outcome), which tends to decrease innovation incentives. Therefore, less intense competition in the product market has an ambiguous effect on the incentives to innovate.

However, even if the effects of a merger on future product market competition were to increase innovation incentives and be so strong as to neutralise the adverse impact on innovation due to a loss of innovation competition, consumers would still be harmed by a significant loss of future product competition due to the merger (in line with standard theories of harm based on unilateral effects). Moreover, recent economic literature, which analyses how a change in market structure affects both competition in innovation (innovation rivalry) and competition in the final product market (product competition), finds that less competition typically reduces market-wide innovation, in particular in concentrated markets (absent efficiencies) \(^1\)\(^4\).

The second type of possible countervailing effects to the loss of innovation competition between merging parties is efficiencies. If the merger brings about innovation-related efficiencies, it may increase the ability or incentives of the merging parties to increase innovation. A possible efficiency of the merger relates to the notion of appropriability, defined as the ability by an innovator to prevent knowledge spillovers to other firms (that is, to avoid imitation by rivals) \(^1\)\(^5\). In particular, if intellectual property rights (IPR) are weak, a merger may reduce the risk of imitation by a competitor, thus increasing the ability of innovators to appropriate the reward from innovation efforts, and therefore increasing innovation incentives. However, this factor is unlikely to play a role when imitation concerns are properly dealt with by effective IPRs \(^1\)\(^6\). This is why the economic literature suggests that unilateral effects in innovation competition are more likely to be a source of competition concerns if IPRs are strong pre-merger.

In this particular case, the evidence showed that appropriability was already high pre-merger, given that most of the innovation in the crop protection industry takes place via the introduction of new products (i.e. new "active ingredients"), which are patent protected for a long time (25 years), enjoying significant sales with high margins both during the patent period and also post-patent expiry. Moreover, the parties did not make any substantiated efficiency submission \(^1\)\(^7\).

**Structure of the assessment**

In its assessment of the impact on innovation, the Commission considered in particular: (i) the market structure and characteristics (i.e. concentration, barriers to entry, strength of IPR rights); (ii) the importance of both Dow and DuPont as innovators; (iii) the degree of competition between Dow and DuPont in terms of innovation efforts; (iv) direct evidence on planned reduction of innovation efforts by the merged entity; and (iv) whether competitors would have been likely to offset the reduction of innovation brought by the proposed transaction.

**Past consolidations and current market structure**

Following successive waves of consolidation, the number of R&D-integrated companies has decreased from more than 40 firms in 1960-1980 to only five companies. Only these five companies have all the necessary capabilities to do all stages of the innovation process and ultimately bring innovations to the market: BASF, Bayer, Dow, DuPont and Syngenta \(^1\)\(^8\). These capabilities are: (i) discovery capabilities \(^1\)\(^9\); (ii) development capabilities \(^2\)\(^0\); (iii) registration capabilities; and (iv) route-to-market, all on a global basis.

To launch new AIs, crop protection companies need a complex R&D organisation and specific assets, equipped not only to discover new AIs but also to further optimise the molecules; for example, to perform the necessary field tests and studies required to obtain the approval of a new AI in different world regions, which typically requires years. R&D costs for new crop protection products have risen sharply over time, the largest increases being related to regulatory changes. The average overall cost for the discovery and development of a new agrochemical product brought to the market by an R&D company is estimated at around $280 million today.

These five global R&D-integrated companies constitute a narrow oligopoly, which accounts for more than 80-90% of the 2015 turnover of products that include new AIs launched over the past 10 years, while the remaining 10-20% of turnover is divided among a fringe of smaller companies. Moreover, not all five

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\(^{15}\) See for example Shapiro (2012, "Competition and innovation: Did Arrow hit the bull's eye?", chapter 7 of Josh Lerner and Scott Stern (eds.).)

\(^{16}\) See for example Gilbert (2006, "Competition and innovation", Chapter 26 in Wayne Dale Collins (eds.), Issues in Competition Law and Policy, ABA Antitrust Section.
global R&D-integrated companies are equally active in every segment of the crop protection industry. This is due in particular to the fact that these five companies have different innovative strengths depending on the segment of the crop protection industry. This is also consistent with the findings of this investigation, that for the vast majority of product markets only four or fewer of the big five companies are actually active. This high concentration is also confirmed by an analysis of patents, showing a high level of concentration pre-merger with a further significant increase in concentration due to the merger²¹. In addition, there are significant common shareholdings across these five firms, further increasing de facto concentration in the industry²².

Innovation in the crop protection industry largely takes place through product innovation that is protected by effective IPRs and other defence strategies to sustain high profit margins, even post patent expiry, limiting any possible imitation risks by rivals. As discussed above, this implies that appropriability is already high in the absence of the merger, and is unlikely to be significantly increased by the proposed transaction.

The Parties are important innovators
The evidence showed that the parties, and in particular DuPont, were important innovators, having more of an influence on competition than their market shares or their R&D expenditure shares would suggest. First, both companies had ambitious targets for innovation efforts and output (number of new AIs and innovative impact in terms of new mode of actions, chemical classes, and favourable regulatory profile). Second, both companies had a strong track record showing commercial successes. Third, both companies owned some of the best quality patents in crop protection and accounted for a significant patent share for the discovery of new AIs in crop protection. This analysis of patents also showed that the merging parties (and in particular DuPont) were also relatively more present than their competitors if one focused on the highest-quality patents²³. Finally, DuPont's innovation capacity is also externally recognised. DuPont was the only company to win the Agro Awards for "best R&D pipeline in the industry" in crop protection since these awards were created in 2007.

The Parties are close innovation competitors
Closeness in innovation can manifest itself through competitive overlaps within each R&D stage (e.g. overlapping discovery targets/lines of research, overlapping pipelines in the discovery stage, and overlapping pipelines in the development stage), and across different stages of the lifetime of a product (e.g. discovery pipelines-to-development pipelines and discovery pipelines-to-existing product overlaps, and development pipelines-to-existing product overlaps). The existence of such overlaps between the merging parties indicates that absent the merger the merging parties would have been likely to divert (expected) sales from each other by engaging in innovation.

An issue raised in this case concerns the uncertainty characterising lines of research or pipelines at the discovery stage. While lines of research or pipelines at the discovery stages have an uncertain outcome, one should not confuse the uncertain outcome of innovation with whether or not competition concerns are present. Even if there is uncertainty as to the outcome of the innovation process, a merger between firms with competing lines of research is likely to affect the incentives to invest in research, leading to either delay, reorientation, or discontinuation of lines of research or pipelines at the discovery stage. Therefore, while the outcome of any given innovation effort may be uncertain, this does not mean that competition concerns in relation to innovation efforts are not warranted.

Moreover, this investigation showed that firms in the crop protection industry do not innovate randomly. When setting up their innovation capabilities and conducting their research, R&D companies have precise research targets, and they do not innovate for all the product markets in the entire crop protection industry. In this case, in addition to the analysis of existing products and pipelines at the development stages, the characteristics of research targets and pipelines at the discovery stage have been analysed based on an extensive review of the parties' internal documents.

The investigation showed that the parties were competing head-to-head for a significant number of innovation spaces in herbicides, insecticides, and fungicides. This is because they had a number of promising pipelines at the research and development stages, resulting from continuous efforts in certain lines of research, which would likely be taking away revenue from each other in the future. Thus the merger would likely have led to the discontinuation, delay, or reorientation of the parties' overlapping lines of research and pipeline products.

In addition, the investigation showed that the merging parties were two important innovators with the capability to innovate in certain innovation spaces. The merger therefore would likely have resulted in reduced incentives to initiate the discovery and development of new AIs in the future, since the merging parties had the innovation capabilities likely to lead to new AIs in the

²¹ As discussed later (see footnote 23), patent shares are calculated by adjusting each patent by its quality. In addition, even if one fully takes into account discoveries made by smaller companies (like chemical companies located in Japan), an analysis of patent data still shows that research is concentrated (see section below for a discussion on competitors).

²² See Annex 5 of the Dow/DuPont Decision for further details.

²³ The analysis includes patents filed in the EEA during the period 2000-2015. It is well-established in the economic literature that patents can have very different qualities, with few high quality patents and many patents with a low quality. Therefore 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. In the analysis, the quality of each patent is measured by the number of citations accumulated in sub-sequent patents. This methodology is standard in the economic literature (see for example Trajtenberg (1990, "A penny for your quotes: patent citations and the value of innovations", The Rand Journal of Economics).
future that would capture substantial revenues from each other. In particular, the Commission looked at the parties' future plans. In light of the information on the Commission's file, the Commission concluded that the proposed transaction would likely have led to a significant reduction of R&D capabilities, pointing to a significant reduction of innovation efforts post-merger.

Alternative R&D companies are unlikely to offset the reduction of innovation from the proposed transaction

The Commission assessed the competitive role played by the non-merging parties. The investigation showed that competitors were unlikely to compensate for the significant loss of innovation competition between the merging parties.

As regards the other three global R&D integrated companies, in the innovation spaces targeted by the parties, the investigation showed that these competitors generally were often less effective innovators than the parties due to differentiated innovation assets and capabilities. This is reflected notably in their past innovation efforts and current pipelines targeting different innovation spaces than the parties.

As regards smaller companies, who are active to some extent in some stages of the innovation and commercialisation process, the investigation showed that they are not comparable to the five global R&D-integrated players24. In particular, smaller companies do not have the capabilities to engage in all the stages of innovation and commercialisation, and are therefore unlikely to compensate the significant loss of innovation between two global R&D-integrated companies. In particular, the investigation showed that discoveries made by chemical companies in Japan focussed mainly on the Japanese market. While certain discoveries did have applications for the European market, these had historically been further developed by the big five global R&D-integrated companies, who introduced them to the European market. This evidence suggests that only the big five companies are able further to optimise molecules, develop AIs and formulated products, and bear the regulatory burden, necessary for a discovery to be brought to the European market.

Conclusion on the significant loss of innovation competition from the proposed transaction

The proposed transaction, as initially notified, created significant horizontal overlaps in terms of innovation efforts, where the parties were competing head-to-head for a significant number of innovation spaces in herbicides, insecticides, and fungicides. The significant loss of innovation competition from the proposed transaction relied in particular on: (i) the concentrated market structure with high barriers to entry and with only five global R&D-integrated companies active in different product markets and research areas; (ii) the importance of Dow and in particular DuPont as innovators; (iii) the significant innovation rivalry between the parties that would be lost post-transaction; and (iv) a limited number of alternatives for the innovation spaces targeted by the parties.

The proposed transaction would therefore likely lead to a significant reduction of innovation due to: (i) the discontinuation, delay, or reorientation of the parties' existing overlapping lines of research and pipelines products; and (ii) the reduced incentives to initiate the discovery and development of new AIs in the future.

Remedies in crop protection

To address the Commission's concerns both on product competition and innovation competition, Dow and DuPont offered to divest a large part of DuPont's herbicide and insecticide businesses, as well as DuPont's R&D organisation (including pipelines at the discovery stages and R&D facilities and employees, with the exception of a few limited assets to support the retained business).

The divested business included active ingredients for selective herbicides in cereals, rice, pasture, sunflower, OSR, and active ingredients for chewing and sucking insect control for crops including fruits and vegetables, and all tangible and intangible assets underpinning the divested products (including the facilities where the products are manufactured) and relevant personnel25.

Beyond eliminating horizontal product overlaps, the divestiture of DuPont's global R&D organisation not only addresses the Commission's concerns in innovation competition, but also ensures that the purchaser of the remedy will have the capabilities to preserve the viability and competitiveness of the divested current products on a lasting basis throughout their lifecycle, allowing the buyer of the remedy to become a global integrated R&D competitor.

Material science - the petrochemical side of the proposed transaction

The parties sell petrochemical products, in particular performance plastics. Acid co-polymers and ionomers belong to that category. The investigation showed that acid co-polymers and ionomers were separate and highly concentrated markets. Acid co-polymer was an oligopolistic market in which the parties had strong positions in the EEA and worldwide, and post-merger there would be only two other competitors. For ionomers, DuPont had [80-90]% of the market and Dow was perceived as a source of competitive pressure despite its limited market share.

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24 Smaller companies include for example chemical companies located in Japan, and FMC, which is currently a generic player with some development activities in crop protection.

25 For herbicides, the active ingredients divested are: thifensulfuron-methyl, tribenuron-methyl, metsulfuron-methyl, chlorosulfuron-methyl, triflusulfuron-methyl, lenacil, flupyrsulfuron-methyl, ethametsulfuron-methyl and azimsulfuron. For insecticides, the active ingredients divested are: chlorantraniliprole, cyanthraniliprole and indoxacarb. The remedy also included an exclusive licence to DuPont's picoxystrobin for rice applications in the EEA, to address the Commission's concern on product competition for rice blast fungicides.
The Commission concluded that due to high barriers to entry and expansion, limited switching possibilities, limited competitive pressure from other competitors and limited buyer power, the transaction would likely lead to the elimination of an important competitive constraint in the acid co-polymer market, and to the strengthening of DuPont’s position in the ionomers market.

To address the Commission’s concerns, the parties offered to divest Dow’s acid co-polymer and ionomers businesses. The initially proposed remedy was characterised by one modality. Dow offered to run the divested acid co-polymer plants on behalf of the buyer following its operational instructions. This was rejected for the plant located in the EU and it remained a possibility at the option of the buyer for the plant located in the US. Additionally, Dow committed to contribute to any investment made by the buyer to improve or extend the viability of the divested acid co-polymer business. Overall, the Commission found the proposed remedy to be sufficient to solve the identified competition concerns in relation to acid co-polymers and ionomers.

Concluding remarks

In Dow/DuPont, the Commission conducted a thorough investigation and analysis of several theories of harm relating to a multitude of markets. The most noteworthy takeaways of this merger review are the following.

First, as can be seen from above, the concerns in crop protection regarding herbicides and insecticides, the two central parts of the case, related both to price and innovation competition. To a large extent the concerns on innovation were bolt-on concerns, similar to concerns on innovation raised by the US Department of Justice in AT&T/T-Mobile, Halliburton/ Baker Hughes or many other cases.

Secondly, the concerns as regards innovation were based in large part on pipeline-to-pipeline innovation competition and the concern that the parties would discontinue, delay or re-orient some of those competing pipeline efforts post-merger. There was also a forward-looking concern that the parties would reduce in the future their overall innovation effort, but this second concern was complementary to the first and not novel: similar forward-looking concerns were raised by the Commission in GE/Alstom\(^{26}\) or Deutsche Börse/Euronext.\(^{27}\) In the latter case the Commission’s assessment of the effects on innovation was confirmed by the General Court.\(^{28}\)

Thirdly, the investigation and reasoning on the effects of the merger on innovation are based on well-established and sound law and economics. Legally, they are based on the Commission's Horizontal Merger Guidelines, but would also be in line with the innovation section in the US Horizontal Merger Guidelines or consistent with the logic in paragraphs 119 et seq of the Commission’s Antitrust Guidelines on Horizontal Cooperation Agreements. From an economic point of view, the decision does not make novel general claims about possible effects of horizontal mergers on innovation, but applies well-established economic principles to the specific circumstances of the case on the basis of a detailed assessment of the evidence on the file and the arguments of the parties.

Fourthly, as can be seen from the above and beyond what is common or required in pure price competition cases, in the Dow/DuPont case the Commission’s findings on harm to innovation are based on direct evidence of harm to innovation competition and reduction of innovation effort and output post-merger, mainly from post-integration planning documents of the parties.

Fifthly and finally, the remedy including a large part of DuPont’s crop protection R&D organisation was required because of both product and innovation competition concerns, in order to ensure, first, the long-term viability and competitiveness of the divested business and, secondly, also continued R&D competition. The remedy is not unprecedented or unusual: for example, the Commission required a similar remedy in GE/Alstom.

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26 Commission decision in case M.7278 General Electric/Alstom, 8 September 2015.
27 Commission decision in case M.6166 Deutsche Börse/NYSE Euronext, 1 February 2012.
ChemChina/Syngenta: when growth is no longer organic

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Introduction

This case concerned the acquisition of the global integrated R&D crop protection leader Syngenta (turnover of €12 billion), based in Switzerland, by the Chinese corporation ChemChina (turnover €37 billion), which already controlled Adama (turnover €2.7 billion), the main global supplier of generic crop protection products. With a total value of $43 billion, this is the largest foreign acquisition ever by a Chinese company.

ChemChina is a Chinese State-owned enterprise active in the agrochemical sector through its agrochemical company China National Agrochemical Corporation (CNAC). In particular, CNAC controls a wholly-owned subsidiary, ADAMA Agricultural Solutions Ltd (Adama). Adama, based in Israel, is primarily active in the manufacturing and/or distribution of off-patent formulated pesticides (including a wide range of herbicides, insecticides and fungicides and seed treatments), plant growth regulators and products for lawn and gardens.

Syngenta is a global business operating in the agrochemical sector, headquartered in Basel, Switzerland. It produces and sells pesticides, plant growth regulators, seeds, and products for lawn and gardens. It is active on a vertically-integrated basis in the research, development, manufacture and marketing of a wide range of crop protection products and seeds.

This transaction was one of the three recent transformative transactions in the agrochemical sector and the second to be notified to the Commission within that series, after Dow/DuPont (notified on 22 June 2016) and before Bayer/Monsanto (notified on 30 June 2017). While each case was appraised on its own merits, transactions taking place in the same economic sector are assessed by the Commission according to the so-called "priority rule". Under this approach, the Commission assessed the first transaction to be notified (Dow/DuPont) without regard to the subsequently notified acquisition of Syngenta by ChemChina. The latter was, in turn, analysed in light of the market structure that would be created after the Dow/DuPont merger without taking into account the changes brought about by the Bayer/Monsanto deal.

The ChemChina/Syngenta transaction also had the peculiarity of involving a Chinese State-owned Enterprise (SOE) and was, according to public statements of the parties, largely driven by political objectives to increase China’s agricultural supply and yields through easier access to Syngenta’s seed technology. In cases of acquisitions by Chinese SOEs, the question as regards the Commission’s jurisdiction is whether the turnover of other Chinese SOEs should be taken into account when calculating the turnover of the SOE involved in the transaction. In the present case, the reply did not matter since the turnover thresholds of the EU Merger Regulation were met even if only ChemChina’s turnover was taken into account.

Second, as regards the substantive assessment of the transaction’s impact on competition, the Commission performed its analysis under the "worst case" scenario, namely by attributing to the merged entity not only the activities of ChemChina but also the relevant activities of other Chinese SOEs.

The case was notified to the Commission on 23 September 2016 and, based on the findings of the phase I investigation, the Commission opened an in-depth investigation on 28 October 2016. The parties subsequently submitted adequate remedies.
before a statement of objections was issued and the transaction was cleared with conditions on 5 April 2017.

The assessment - Yet another agrochemical case?

The transaction concerns the acquisition of a global integrated R&D agrochemical player, Syngenta, by ChemChina, which is mainly active through Adama as a generic agrochemical supplier. These two companies have different capabilities in the production chain for crop protection products and are active at different stages of the value chain. The distinction between the capabilities of R&D players and those of generic players has important implications for competition in the crop protection industry.

Is Adama a special generic player?

Global integrated R&D agrochemical players, such as Syngenta, are active throughout the value chain of crop protection products, from discovery of new molecules, to research and development and production of crop protection products, to commercial distribution. By contrast, generic agrochemical companies like Adama do not typically engage in the discovery of molecules and related innovation activities, but rather focus on the sale of off-patent products, as well as on developing new formulated products in which off-patent molecules are used. This development activity is key to ensuring competition in the “genericised” parts of the crop protection markets.

These differences in company profile and positioning shaped the Commission’s assessment. Unlike in Dow/DuPont, where two R&D companies were merging and the Commission assessed the impact of the merger also on innovation and (future) patented products, the Commission’s investigation in this case focused on off-patent crop protection products and on areas where an off-patent product constitutes a viable alternative to a patented product. The investigation showed that generic players like Adama appear to represent only a partial constraint on an R&D player, as they do not generally compete on the more profitable part of an R&D player’s portfolio. However, for the sub-set of products where generic players compete, they can exert significant price competition on R&D players.

Adama is by far the largest generic crop protection player worldwide and in the EEA, and it is the only generic supplier with substantial geographic coverage across the EEA. The Commission therefore investigated whether Adama enjoyed this leading position in the EEA by means of any features (portfolio breadth, staff resources) which strongly differentiated it from other generic companies. The investigation showed that there is no major gap between other major generic players and Adama and that no significant differences exist between generic players in the way they operate their business. The Commission therefore concluded that Adama is not special or unique to such an extent that the competitive constraint it exerted in the market could not be replicated by other generic players.

A line-by-line assessment of the overlaps

Crop protection products encompass both pesticides and plant growth regulators. Pesticides are products used in agriculture to control pests that can harm crops. They can be broadly categorised into fungicides (targeting diseases), herbicides (targeting weeds), insecticides (targeting insects), and seed treatment products (targeting insects and diseases at seed level). As regards plant growth regulators, these are used in agriculture to regulate or stimulate a crop’s growth and development. Farmers buy crop protection products suited to the specific pest they want to target (for example fungicides for mildew) on the particular crop they grow (for example grapes). The relevant product market therefore corresponds to a crop/pest combination (in our example fungicides for mildew in grapes).

The geographic markets for crop protection products are national in scope because, from a regulatory point of view, products need to be authorised and registered for marketing in each country, and so product availability differs among countries. Moreover, in view of the different requirements in terms of crops grown, types of recurring pests and climate areas, demand for crop protection products is extremely varied and country-specific.

As explained above, Adama focuses on the sale of off-patent products and competes with Syngenta only in areas in which off-patent molecules are used. Still, Adama has a strong position in terms of product portfolio and geographic coverage and overlapped with Syngenta in many crop/pest combinations. Therefore, the focus of the investigation was on establishing the degree of closeness and the competitive pressure that would be lost in those markets where generic competition existed. Loss of innovation was not at the core of this case in view of the different business models of the two companies and their different competing dynamics.

The transaction gave rise to more than 450 horizontally affected markets for crop protection products where the parties’ combined market share would have exceeded 20%. An additional element of complexity stemmed from the necessity of conducting the analysis also on forward-looking scenarios, whereby products under development and/or pipeline products had also to be taken into account. Generic agrochemical companies are not active in the discovery of new molecules, but they nonetheless do develop new formulated products in which off-patent molecules are combined with one another as well as with other chemicals.

In view of the large number of markets affected by the transaction, the Commission had to devise a methodology of analysis and assessment whereby markets were screened preliminarily on the basis of market structure filters based on the safe harbours in the Horizontal Merger Guidelines. However, in light of the extreme heterogeneity of the product and geographic markets under analysis, these filters could not be used in a mechanical way, but had to be complemented by a case-by-case examination based on qualitative evidence relating to each market (crop/pest combination in a given country). This exercise
resulted in the identification of competition problems in markets, where, for instance, evidence on closeness of competition showed that a significant constraint would be removed from the market and/or pipeline products were about to be launched. Conversely in some markets where shares were high, the Commission concluded that the transaction did not raise concerns because of the limited constraint the parties’ products exerted on one another.

Following a complex in-depth investigation, the Commission concluded that the transaction as notified would have significantly reduced competition in 115 European markets for crop protection products, where the parties would have held high combined market shares with few other competitors remaining and/or where Adama represented a close and important generic competitor of Syngenta.

In particular, the Commission found that the takeover would have significantly impeded effective competition in the following national markets in the EEA:

(i) 23 fungicides markets for cereals, fruits, oilseed rape, and vegetables;
(ii) 22 herbicides markets for cereals, corn, sunflower, and vegetables;
(iii) 43 insecticides markets for cereals, corn, fruits, oilseed rape, and vegetables;
(iv) 5 seed treatment products markets for cereals and sugar beet;
(v) 22 plant growth regulators markets for cereals.

**A comprehensive set of remedies**

To address the issues raised by the transaction in the 115 markets where the Commission found competition concerns, ChemChina and Syngenta proposed a package of remedies in early January 2017 ("the initial remedy proposal"). An improved remedy package was submitted in late January 2017 after a market test ("the final remedy proposal").

The remedy consisted of the divestiture of 74 product registrations of formulated products, based on active ingredients mostly belonging to Adama’s portfolio, which are sold in the national markets raising concerns. Most product registrations are divested at the EEA level, while others are divested only in specific countries (depending on the scope of the concerns raised). For the lead active ingredients on which these products are based, the parties granted an irrevocable, exclusive and royalty-free licence in the EEA. The remedy package also included formulated products which, according to the parties, were likely to lose their regulatory approval in the short/medium term. This divestment package was part of Adama’s and Syngenta’s overall crop protection businesses and as such would have to be carved out from the parties’ respective business entities.

The proposal also covered Adama’s pipeline products and included the transfer of registrations for pipeline products that were about to be launched, as well as access to preparatory studies and field trials for those pipeline products for which no registration has yet been submitted.

In the initial remedy proposal the parties split the divested products into three portfolios. Portfolio 1 included the formulated products currently sold in the market. Portfolio 2 comprised pipeline products still in development. Finally, Portfolio 3 included products currently sold which, according to the parties, were likely to lose their regulatory approval between 2017 and 2023. The parties were planning to sell Portfolio 1 and 2 together. Conversely, Portfolio 3 could be acquired in whole or in part by the purchaser of Portfolio 1 and 2 or another purchaser.

The proposal also included lists of customers, intellectual property rights such as know-how, brands and trademarks, contracts with suppliers and licences for the secondary active ingredients used in the mixtures included in the remedy proposal. However, this initial proposal did not include production facilities or personnel.

The Commission launched a market test to assess whether the initial proposal solved the competition concerns and could be considered as a viable entity. The main challenge in this assessment was to identify the necessary assets to be included in the divestment business, taking into account that the package included assets that were carved out from the respective companies (Adama or Syngenta). The objective of the market test was also to shed some light on the improvements that might be needed to attract a suitable purchaser.

This market test confirmed that the lack of production plants in the initial proposal was not a concern, given that many companies operate in this industry without needing to fully control the production process and rely, like the divestment business, on supply agreements from third parties.

By contrast, leaving the purchaser to rely exclusively on the human resources available to it without any personnel from the parties was not considered by the Commission, following the market test, as a viable solution. Ultimately the final remedy proposal included an option for the purchaser to request the transfer of personnel from Adama and Syngenta who were reasonably considered necessary to maintain the viability and competitiveness of the divestment business, notably regulatory, R&D and sales staff. The option to transfer these employees is open to the purchaser depending on its business model and its current capabilities.

With the objective of raising purchaser incentives to continue selling the divested products in the long run, the final commitments provide for the right of the purchaser to participate in future “task forces” in which the parties are involved for the next round of product registration. Registration task forces are important elements to enable smaller players to have access to...
crop protection markets, in the sense that they allow cost sharing of tests required for registration and avoid duplication of studies and field trials.

In view of the large size and scope of the remedy, the Commission sought the view of respondents to the market test as regards the possibility to sell certain divested assets separately rather than as a whole package. While the Commission in its decision assessed the viability of the divestment package as a whole, the market test also confirmed that the divestment business could be split in order to increase the number of potential buyers, provided that all products are sold and these splits have no detrimental effect on the viability and competitiveness of the divestment business.

Conclusion

Despite their differences in profile and business models, ChemChina’s Adama and Syngenta have been in the recent past strong price rivals for a number of off-patent crop protection products, to the benefit of European farmers. The role of the Commission was to preserve the intensity of this competition through a complete assessment of the product areas and countries where the overlaps were significant, and to identify any negative effects of the transaction.

Cooperation of the parties with the Commission allowed swift formulation of a package of remedies to address the Commission’s concerns, avoiding the need for a statement of objections. A fruitful market test contributed to the refinement of this proposal to fully adapt to a changing competitive environment.
In a nutshell

The Commission prohibited the merger between the two largest European financial infrastructure groups, Deutsche Börse and London Stock Exchange, in March 2017. This case is a telling illustration of the complexity of the merger control assessment in a dynamic industry such as financial infrastructure markets which are constantly evolving and are characterised by specific features (such as economies of scale, scope and network effects).

In terms of merger control process, the remedies offered by the merging parties not only have to address the competition concerns raised by the Commission, but also have to ensure that they create a viable competitive force on a lasting basis. Additionally, the case also clearly illustrates the fact that submitting remedies at a late stage seriously limits the scope for any improvements, should these appear necessary following the market test.

With this, the different activities can be categorised along two axes: first, the type of the service in the lifecycle of a financial product (listing, trading, clearing and settlement), and, second, the types of financial products for which these services are available (e.g. equities, fixed income, derivatives, etc.). Besides providing a useful overview, the matrix structure also serves as a starting point for the market definitions in competition cases, given that the different functions in the value chain and the broad categories of financial products are typically not interchangeable.

Characteristics and specificities of the financial infrastructure markets

Although financial infrastructure operators are typically best known for the stock exchanges they operate, their activities span multiple products and services. A useful way of having a systematic overview of these activities is to refer to a "matrix structure" (see figure below).

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1 In February 2011, the Commission prohibited the proposed merger between Deutsche Börse and NYSE Euronext, as the transaction would have led to a quasi-monopoly in European financial derivatives.
2 Previous attempts occurred in 2000 and 2004.
3 Listing refers to the activity of admitting a particular security for trading on an organised exchange for the first time.
4 Trading, also referred to as execution, is the mutual commitment by two parties to enter into a financial transaction at a certain price.
5 Clearing is the activity that takes place after the trade is entered into (trading) but before the obligations from the trade are discharged (settlement). The purpose of clearing is to make sure that both counterparties honour their obligations resulting from the trade; i.e. to mitigate the risk that either counterparty defaults before settlement.
6 Settlement refers to the actual discharge of the obligations resulting from the trade, i.e. the delivery of securities and payment of monies.
No matter how the markets are delineated, certain features that are relevant for the competitive assessment apply to all of them. These features are economies of scale, scope and network effects. Economies of scale derive from the fact that the relevant fixed costs associated with the upfront IT investments are large, while the incremental costs of trading, clearing, or settling an additional unit are close to zero. Economies of scope result from the fact that the infrastructure used for certain products can be used for additional products without a proportionate cost increase, leading, again, to lower average unit costs. All of the activities mentioned so far also exhibit network effects. Traders prefer to trade on already liquid trading venues where many other traders are present. This is because liquidity leads to more favourable prices for both average and large orders, and increases the chances that the trade can be executed. Network effects are also relevant for clearinghouses (also known as central counterparties or "CCPs") due to the fact that identical but opposing positions can be offset if a trader consolidates all of them at one CCP.

For example, if a trader has a position of five futures contracts as a seller, it can exit this position by entering into five futures contracts as a buyer, which will eliminate the collateral posted at the clearing house. If the trader's sell and buy positions are at different CCPs, the contracts cannot be offset and collateral has to be posted at both CCPs. Similarly, non-identical but correlated opposing positions lead to a reduction of collateral requirements at the same CCP. For example, since both money market futures and interest rate swaps reference short-term interest rates, the posted collateral can be reduced if the futures and the swaps have different directionality, i.e. if the value of the swap increases when the value of the futures decreases (or vice versa) in response to a movement in the underlying interest rate. In this case too, the margin benefits are only available if both the swap and the future are cleared at the same CCP. Finally, settlement venues are also more attractive if they handle a large number of transactions, because moving securities and funds within the same venue is easier than across venues.

The implication of network effects and economies of scale and scope is that almost all markets are dominated by one or very few large players, which tend to enjoy a degree of market power.

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7 Clearing houses or CCPs are financial institutions that guarantee the performance of the concluded trades. The CCP fulfills this function by interposing itself between the buyer and the seller after the trade is concluded. The original contract between the buyer and the seller is split into two identical contracts, one between the buyer and the CCP and the other between the CCP and the seller. The CCP thus becomes the buyer to every seller and the seller to every buyer. The CCP requires both original counterparties to post collateral, also referred to as "margin", in line with the changing value of their position. Cash and liquid, safe securities can be used as collateral. The practice of posting margin ensures that if one of the original counterparties defaults, the CCP is in a position to honour the contract vis-à-vis the other counterparty and thereby prevent a cascade of defaults.

8 A future is a contract between two counterparties, the buyer and the seller, under which the seller has to deliver the asset referenced in the contract at expiry and the buyer has to pay the price agreed at the execution of the contract. Futures contracts thus fix the sale price today for a delivery in the future. The losses and gains for the counterparties result from the difference between the price agreed and the price at expiry. Futures contracts are fully standardized, i.e. the type of asset, its quantity, delivery method etc. are the same for all contracts, and counterparties fix only the price. Futures are traded on exchange and centrally cleared. The equivalent contract traded over-the-counter (OTC) is referred to as a forward. Forwards can be less standardized and more bespoke to the needs of the counterparties and are not necessarily cleared by a CCP.

9 A swap is a contract between two counterparties to exchange a series of cash flows. In a typical interest rate swap contract one party makes periodic payments on the basis of a fixed rate, while the other makes payments with the same periodicity on the basis of a variable rate. The payment is calculated on the "notional amount" that is agreed between the parties. The duration of interest rate swaps ranges from a few years to several decades.
and are protected by high barriers to entry. Specifically, economies of scale imply that a market player with a larger market share has lower costs because it is better able to spread its fixed costs across its larger volume of products. A large player thus enjoys a cost advantage vis-à-vis a smaller player, leading to a dynamic of concentration. Likewise, network effects imply that for users it is cheaper and more efficient to use the platform that is already used by a lot of other market participants, which also has the effect of concentrating activity to one or few large players. To have a minimal chance of entering successfully, a new entrant has to have scale, make a considerable upfront investment, and importantly, have a unique selling point which would motivate users to switch away from the incumbent. Indeed, a new entrant always faces the hurdle of network effects and can only succeed if it convinces a large number of market participants to switch, which is very challenging, due to the inherent coordination problem.\footnote{Coordination problem refers to the idea that switching to a competitive platform may benefit all users of a platform, but only if all of them switch, which requires a coordinated move. An individual user that decides to switch is, on the contrary, likely to worsen its position in the absence of a collective switch, as it would lose the network effects it was benefiting from so far. A collective switch is difficult to achieve, however, without coordinating the actions of users. This is because no user is willing to move while others have moved. As a consequence, it can happen that nobody switches even if it would be collectively beneficial to do so. The same logic applies to the potential switching of a large part (but not necessarily all) of users.}

The concentration of activity in one or very few venues has undeniable benefits for users, in that it reduces the overall costs of trading. This does not mean, however, that competition does not play an important role. The existence of a credible alternative and thus the threat that liquidity may shift, in whole or in part, to another venue puts pressure on the incumbent, constrains its pricing and incentivises it to propose new and improved services. While actual shifts of liquidity might be rare, the prospect of large losses to the advantage of a competitor, even with low probability, keeps incumbents constantly on their toes.

In addition to these structural features, financial markets are also dynamic. Innovation and regulatory efforts constantly reshape the established structures. For example, the regulatory reforms adopted in response to the financial crisis increased the capital requirements for banks and required a larger number of financial transactions to be cleared through a CCP, which added new momentum to the trend of making the clearing of derivatives as efficient as possible. In this context, CCPs developed models that allow margin savings across correlated OTC traded derivatives and exchange traded derivatives\footnote{Prior to the financial crisis, the distinction between exchange traded and over-the-counter ("OTC") derivatives was straightforward. Exchange traded derivatives were traded on exchanges in full transparency, while OTC derivatives were negotiated privately over the phone without the price being visible to other market participants. Exchange traded derivatives were always centrally cleared while OTC derivatives were mostly not. Due to regulatory changes, however, a large part of OTC derivatives are centrally cleared and will be traded on transparent electronic platforms under a transparency regime similar to that of the exchanges. The remaining differences at this stage are as follows: i) exchange traded derivatives are fully standardized while a large part of OTC derivatives have at least one non-standardized feature, such as the end date; ii) exchange traded derivatives are traded via an order book, where pre-trade prices are firm, while OTC derivatives, are traded through a request-for-quote (RFQ) system, request for stream system or over the phone and the pre-trade prices are not executable; iii) OTC derivatives have a larger trade size and are less liquid than exchange traded derivatives.} if they are cleared at the same CCP. This innovation may, over time, have an implication for market definitions (e.g. potential clearing markets that may include a wider product set), as well as for the assessment of the competitive constraints a new entrant can exert on the incumbent if the entrant clears a substantial number of correlated products. Similarly, regulation is bringing a large part of OTC derivatives ever closer to the exchange model.

Although markets for exchanges and CCPs are already concentrated, recent developments in regulation and technology mean that further changes in the relevant markets cannot be ruled out. The developments referred to above underline the importance of assessing any potential case on its own merits and in the specific context applicable at the time of the case. This includes taking into account all new trends in the evolution of the market, innovations like cross-margining, and regulatory developments. These factors clearly shape competitive dynamics and can thus have an impact on the delineation of the relevant markets or on the competitive assessment.

**Spotlight on a telling recent case: Deutsche Börse / London Stock Exchange**

In March 2017, the European Commission prohibited the merger between the two largest European financial infrastructure groups, best known through the stock exchanges they operate, namely Deutsche Börse and London Stock Exchange. The two groups, besides being the German and British historical national exchanges, have much wider activities in the financial infrastructure markets. They are indeed active at all levels of the value chain: from listing and trading on their stock exchanges (including for example the Italian stock exchange Borsa Italiana for London Stock Exchange), to CCP clearing, as well as settlement and post-trade services through central securities depositories.

The rationale of the merger was, according to the parties, to bring cost synergies, as well as revenue synergies notably through portfolio margining, and to create a Europe-based markets infrastructure group with a global reach. The positions of the two groups on the market would have led to the creation of the third largest stock exchange in the world in terms of stock market value and the largest in Europe, surpassing by far the next player, Euronext, which operates the stock exchanges of Paris, Amsterdam, Brussels and Lisbon. As is often the case, the large size of the merged entity is not necessarily indicative of the existence of potential competition concerns. Merger control analyses the impact of transactions on those markets at the level at which competition actually takes place. In this case, while Deutsche Börse and London Stock Exchange are at first sight the two largest European financial market operators, the activities of the two groups are to a large extent complementary, with each party generally having different strongholds.
The Deutsche Börse and London Stock Exchange groups nevertheless are the only players providing clearing services for several financial products through their respective CCPs: Eurex for Deutsche Börse, and LCH for London Stock Exchange, which is composed of a French branch (LCH SA) and a British branch (LCH Ltd). Eurex has a dominant position in clearing of triparty repos with London Stock Exchange Group being its only meaningful competitor. Conversely, London Stock Exchange holds a dominant position in clearing of non-triparty repos and bond transactions, with Eurex being the only competitor. The merger would thus have created de facto monopolies in fixed income instruments (i.e. repos and bond transactions). In addition, the creation of these monopolies would have had a knock-on effect in the downstream markets for settlement, custody and collateral management of fixed income products leading to foreclosure of the merged entity’s competitors, and in particular Euroclear, which is the twin rival of Deutsche Börse’s post-trade subsidiary Clearstream. The merger would have also removed horizontal competition for the trading and clearing of single stock equity derivatives (in particular on those based on stocks of Belgian, Dutch, and French companies), and thus lead to the foreclosure of Euronext relying on LCH SA’s clearing services.

Beyond the classic analysis of the effects of a horizontal merger, the decision also examined “bundle-to-bundle” competition in some markets. As indicated above, trading and clearing for certain types of transactions are typically sold to customers in bundles (i.e. including both services). The different elements of these bundles can be from the same company but also include some elements from third-party providers. Specifically, Deutsche Börse, because of its closed vertical silo structure, sells both trading and clearing services as one single service. By contrast, London Stock Exchange provides clearing services to customers trading on Euronext in the sense that Euronext’s bundles are composed of its own trading services and of clearing services provided by LCH SA. The combination of Deutsche Börse’s and London Stock Exchange’s clearing capabilities could thus have led to a traditional vertical foreclosure issue (i.e. increase of London Stock Exchange’s clearing prices in order to incentivise customers trading on Euronext to switch to Deutsche Börse). But it would also have created a horizontal overlap between Deutsche Börse’s and Euronext’s bundles, which would have resulted in higher clearing prices on the whole market concerned in view of the concentrated market structure and the changed incentives of the merged entity. This is because the price of Euronext’s bundle would have been (at least partially) controlled by the merged entity. In the absence of a credible alternative clearing house, and given the existence of very high entry costs, this horizontal effect would be more likely to have a negative effect on effective competition in the market than a classic foreclosure strategy. The Commission’s decision therefore distinguished this bundle-to-bundle competition issue from a standard vertical foreclosure, by capturing both the horizontal impact and the vertical impact of the merger on the market.

The Commission ultimately concluded that the merger would have impeded competition in the markets for clearing of fixed income instruments; in the downstream markets for settlement, custody and collateral management of fixed income products; and in the market for trading and clearing of certain single stock equity derivatives.

Interplay between timing of submission and viability of remedies

To address the competition concerns raised in relation to single stock equity derivatives and fixed income clearing, the parties offered to divest London Stock Exchange's France-based clearing house, LCH SA, which clears derivatives and equities traded on Euronext as well as euro-denominated (French, Italian and Spanish) bonds and repos traded on MTS (London Stock Exchange’s fixed income trading platform) and on competing trading platforms, such as, in particular, Brokertec. As a result of a sales process launched in September 2016, Euronext was selected as the proposed buyer of the divestment business as early as January 2017.

Informal high level discussions between the Commission and the parties on a possible divestiture of LCH SA started relatively early in the process, as the parties publically announced in September 2016 that they were exploring a potential sale of LCH SA to address antitrust concerns. But the remedy was only formally submitted on 6 February 2017, the day of the final deadline to submit such remedies.

The market test of the remedy, which was launched immediately after the parties’ formal submission, confirmed that the competitive harm related to the elimination of “bundle-to-bundle” competition between Eurex and Euronext (and LCH SA) in single stock equity derivatives would have been solved, as LCH SA would be divested to Euronext itself.

However, in the area of fixed income, the market test revealed two major shortcomings in the proposed remedy package concerning the ability of LCH SA to remain a viable and effective competitor in fixed income clearing once it was severed from the merged entity.

First, the market test showed that LCH SA depends heavily on the bonds and repos trade feeds that it receives from London Stock Exchange's trading platform MTS, and that this link to MTS was vital for LCH SA to remain a viable competitive force in fixed income clearing. More specifically, it showed that the merged entity would have had the ability and the incentive to cut this link post-merger in order to divert fixed income trade volumes to its own clearing houses. Customers would have continued trading fixed income products on MTS and switched to a different CCP, rather than continuing to clear at LCH SA and switch their trades to a competing trading platform.

Furthermore, the market pointed to a high implementation risk stemming from the fact that certain fixed income clearing activity could, post-merger, consolidate at LCH Ltd. This could have hindered LCH SA’s expansion, which was anticipated pre-merger when the two clearing houses belonged to the same group, and put at risk LCH SA’s activity in this area.

On this basis, the Commission informed the parties that the remedy, as initially offered, could not be accepted, as the divestment business risked becoming an “empty shell” rather than a viable competitive force in the market that would be in a position to constrain the merged entity on a lasting basis. An
improved, clear-cut remedy was therefore necessary, since another market test would not be feasible due to the very late stage of the proceedings. Given the viability issues raised by the market test, the divestment of MTS would have been a clear-cut remedy to meet the competition issues identified.

After extensive discussions, on 26 February 2017, the London Stock Exchange publicly announced its decision not to divest MTS. The following day (three weeks after the deadline to submit remedies), the parties formally submitted a modified version of the initial LCH SA remedy, including a set of additional behavioural measures. The modified remedy package was not sufficiently clear-cut for it to be accepted without launching another market test, which at that point was impossible given the legal deadline knocking on the door.

On 29 March 2017, the Commission therefore prohibited the merger.

Conclusion

The merger between Deutsche Börse and London Stock Exchange groups is the most recent and telling illustration of the specificities of the financial infrastructure industry. This case demonstrates that a complex and detailed assessment has to be conducted to catch the specificities of such industries. It showed, for example, that due to network effects, small increments in market shares can actually have a significant impact on the competitive process, and that the integration of vertically-related or complementary activities ought to be analysed through the angle of “bundle-to-bundle” competition. In terms of merger control process, the remedies offered by the merging parties not only have to address the competition concerns raised by the Commission, but also have to importantly ensure that they create a viable competitive force on a lasting basis. Additionally, the case also clearly illustrates the fact that submitting remedies at a late stage seriously limits the scope for any improvements, should these appear necessary following the market test.
Smiths Group/Morpho Detection: maintaining security through innovation

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On 18 January 2017, the Commission cleared the acquisition of US-based Morpho Detection (controlled by Safran, France) by the British Smiths Group, subject to remedies¹.

Both Smiths and Morpho Detection are global suppliers of threat detection equipment, specialising in systems that identify chemical agents, radioactive materials, contraband, and explosives, thereby helping to prevent attacks. Smiths is the overall market leader thanks to its previous generation of X-ray scanners. Smiths' and Morpho Detection's activities overlap mainly in relation to two types of advanced threat detection equipment: Explosive Detection Systems (EDS) and Explosive Trace Detection equipment (ETD).

EDS is mostly used at airports to screen hold baggage and cabin baggage. Hold baggage EDS screens the baggage checked in by passengers to be stored in the hold of the aircraft. It is also used to screen small air cargo. Cabin baggage EDS is currently a pipeline product aimed at speeding up cabin baggage screening at the passenger security controls. Although there is still uncertainty about the timing and scope of the market uptake for cabin baggage EDS, the market investigation showed that airports and regulators consider the development of this new type of equipment as a priority to improve security and passenger experience. It was therefore critical to verify that a possible termination of either Smiths' or Morpho Detection's development programme would not stall innovation in cabin baggage EDS following the transaction.

ETD equipment analyses samples to detect and identify explosives and narcotics in very small quantities. At airports, ETD devices are used for secondary screening of passengers, hold baggage and cabin baggage. In addition, ETD is used at borders or facilities susceptible to receiving security threats such as courts, prisons or other government buildings.

The market investigation revealed that the merged entity would still face competitive pressure from a sufficient number of suppliers of hold baggage EDS and of developers of cabin baggage EDS, and that innovation would continue. The detailed competitive assessment and the commitments therefore focussed on ETD.

Product market definition

The use of threat detection equipment in the air transportation sector is generally regulated around the world. In the EEA, an EU regulation establishes the technical specifications and minimum performance requirements for threat detection equipment to be used at airports and air cargo installations².

The specific regulatory environment applicable to threat detection equipment supply to airports resulted in two separate markets: a market with products used in the air transportation industry (regulated sector - EEA-wide dimension) and a market with products used in other industries (non-regulated sector - worldwide dimension).

¹ The sale of Morpho Detection, closed on 6 April 2017, was followed by the sale of the remaining part of Safran's security business, in an effort by Safran to focus on its core aerospace and defence manufacturing activities (case M.8258 - Advent International / Morpho, 19 April 2017).

Smiths claimed the existence of two relevant ETD product markets: the supply of ETD to the regulated sector and the supply of all ETD (i.e., including ETD supplied to both the regulated and the non-regulated sectors). However, the Commission did not follow the market definition proposed by Smiths, which would have implied an overlap between one market for a specific customer base and another market for all customers. The fact that end-users in the air transportation industry have to comply with well-defined regulatory requirements for ETD supported the definition of two distinct markets for the supply of ETD, one for the regulated sector and another for the non-regulated sector.

In addition, the market investigation led the Commission to define two different markets for the ETD equipment supplied to the non-regulated sector based on the ETD equipment format: (i) desktop devices, which analyse swabs taken from surfaces, such as baggage handles or a person's hands; and (ii) handheld devices, used for a manual sweep of people or baggage, due to the differences in performance and applications between the two formats.

**Market share reconstruction**

The competitive assessment required precise and reliable sales data for the specific markets defined by the Commission, but these were not publicly available, most likely because of the sensitive nature of the industry. As a result, the market share data provided by the parties (in revenue and volume) did not appear consistent with their own bidding data and with data on purchases/orders collected from customers.

Since the number of suppliers of threat detection equipment is rather limited, the Commission engaged in a full-fledged market reconstruction exercise covering all the overlapping markets – even for those markets not identified by the parties as affected markets. Altogether, the Commission collected sales data from 10 competitors (including the two parties) in addition to some five to seven additional players who declared they were not active in the relevant markets.

The market reconstruction provided reliable data on the parties’ combined market shares, and it showed that the parties were the only significant players in the worldwide market for non-regulated desktop ETD – while the parties considered it as a non-affected market.

**Bankrupt competitor**

The competitive landscape suddenly changed during the pre-notification period when Implant Sciences, the parties’ main competitor for ETD, entered into Chapter 11 proceedings before a US bankruptcy court after entering into a deal to sell its assets to L-3, another competitor of the parties.

In view of the uncertainty created by the bankruptcy of the parties’ main competitor, the formal notification was timed so as to align the case calendar with the outcome of the bankruptcy process and the subsequent merger review by the Department of Justice (DoJ). This gave the Commission the time needed to gain more clarity about L-3’s plans for Implant Sciences’ ETD business and align the Commission investigation with the timeline of the DoJ’s review of the transaction.

**Remedies: ensuring the viability of the divestment business**

The market reconstruction and the information obtained during the market investigation showed that the parties had very high market shares and were close competitors. Third parties did not have any likely, timely and sufficient entry or expansion plans. In view of this, the Commission raised serious doubts on the regulated/EEA-wide and non-regulated/worldwide markets for desktop ETD.

Smiths initially offered to divest Morpho Detection’s worldwide desktop ETD business. This would have removed the overlap in both the regulated and non-regulated desktop ETD markets.

However, distributors and competitors identified two flaws in this initial remedy. First, personnel and assets (in particular intellectual property rights) are generally shared between desktop and handheld ETD. Therefore, limiting the divestiture to personnel and assets exclusively dedicated to desktop ETD would impair the viability and competitiveness of the divested business. The scope of the business to be divested would have to encompass both desktop and handheld ETD. Second, Morpho Detection was developing a new generation of ETD based on a more innovative technology than the one currently in use. The inclusion of the pipeline technology for ETD therefore proved to be necessary to ensure the divestment business’s competitiveness in the near future.

In addition to the pipeline technology, the final remedy package also included the R&D facilities and personnel necessary to keep the divested business’s ETD offering competitive and keep pace with a rapidly evolving industry.

Finally, the standard purchaser criteria in the commitments were supplemented with an additional criterion, requiring the purchaser to have an industrial background. This ensured, among other things, that the purchaser would have the ability to develop new technologies and new applications in the security sector and would be committed to pursuing R&D efforts.

This remedy package allowed the Commission to clear the merger in phase I. Moreover, the fact that several potential buyers showed an interest in acquiring Morpho Detection’s ETD business allowed the Commission to clear the merger without an up-front buyer.

**Cooperation with DOJ**

The transaction was reviewed in several jurisdictions, and thanks to the parties’ waivers, the Commission was able to cooperate very closely with several national competition authorities. In particular, the Commission tried to align its timeline with that of...
the DOJ as much as possible, which resulted in the DOJ issuing a second request shortly before the adoption of the Commission’s decision in Phase I.

In addition, the DOJ reached similar conclusions as the Commission with regard to product and geographic market definition for ETD. Furthermore, the remedy divestiture accepted by the DOJ in their settlement was nearly identical to the commitments accepted by the Commission.

The very positive cooperation between the DOJ and the Commission also proved to be helpful during the divestiture period to find a suitable purchaser of the divestment business fulfilling the requirements of both competition authorities.

**Conclusion**

The case shows that sometimes only a market share reconstruction can provide the Commission with a full overview of the total market size and an accurate picture of the parties’ combined market shares. In particular, the market share reconstruction proved to be particularly useful and reliable considering that the markets of concern were highly concentrated markets with only a limited number of players.

The case also illustrates the key role that R&D plays in certain industries and the need to include pipeline products and other R&D assets in the remedy package to make the divestment business commercially viable, competitive in the longer term, and attractive to potential purchasers.

Finally, the case highlights the benefits of cooperation between competition authorities, both for the authorities themselves and the parties. The close cooperation with the DOJ made the review process faster and more effective, paving the way for conditional clearance in Phase I. It also ensured that the remedies accepted by the Commission and the DOJ were mutually compatible.