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ECONOMIC EVIDENCE IN MERGER ANALYSIS

-- European Union --

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1.   Introduction

1.   Since the early days of 1989 Merger Regulation, the use of economic analysis in European merger control has increased tremendously. A critical impetus in that direction was the creation of the Chief economist team in 2003, which was followed by the change of the substantive merger test in 2004 (from creation or strengthening of dominance to significant impediment to effective competition), the adoption of guidelines for horizontal mergers in 2004 and for non-horizontal mergers in 2008. Today, the Chief Economist team at DG Competition is composed of more than 20 PhD economists. These specialised economists contribute to merger investigations both by developing and evaluating relevant theories of harm and by assessing and generating empirical evidence (ranging from relatively simple to complex economic analysis depending on the case) alongside regular case handlers (some of which also are economists).

2.   This discussion paper illustrates this increased role for economic analysis in European merger control and is organised as follows. First, it highlights the role of economics from a conceptual point of view, drawing on a few cases to illustrate the importance of understanding the specifics of the market concerned and developing a coherent and well-articulated theory of harm. Second, it details the increased role of economics in generating evidence through a variety of techniques, from the simplest to the most sophisticated ones, and highlighting some of the related data issues. Finally, it discusses some of DG Competition's recent learning regarding the efficient gathering of economic data and evidence.

2.   Increased role of economics from a conceptual point of view

3.   The increased role of economic analysis may first call to mind the sophisticated econometric analysis and models on which DG Competition now routinely relies. Indeed, empirical analysis is key to assessing merger effects as analyzing data is often the most efficient and immediate way to validate or refute contradictory claims and opinions made by parties with opposite interests. This in turns helps reduce the likelihood of type I (false conviction) or type II (false acquittal) errors.

4.   Yet, it is important to underscore that the use of economics in merger control is not limited to conducting (sometimes sophisticated) empirical analysis. In fact, economics is now closely embedded within merger control as it provides the essential conceptual framework to analyse the functioning of the markets and to assess merger effects. The adoption of the horizontal and non-horizontal mergers guidelines provide evidence that DG Competition has placed sound economic thinking at the heart of competition enforcement. Following the merger guidelines, the analysis of merger effects needs to be placed within a coherent economic framework that accurately reflects the market specificities.

5.   This section first emphasizes the necessity to understand the competitive interactions in the market concerned, which is illustrated with a few recent cases in which network effects played an important role. It then underlines the need to consider coherent theories of harm relying on sound economic thinking and evidence, with illustrations drawing on the analysis of coordinated effects and vertical mergers.

2.1   Understanding the functioning of the market: an illustration

6.   Not all markets are alike. Industries vary for example with respect to the ease of entry, the presence of capacity constraints, product differentiation, negotiations with customers, the degree of innovation or the presence of network effects. Although market shares or other simple measures may provide a starting point for an analysis, these are not in themselves rich enough to capture all these differences. To assess the effects of a merger, it is thus first essential to have a good grasp of how competition is functioning in a particular market.

7.   The importance of understanding the specificities of the market can be illustrated with a recent case, the Oracle/Sun Microsystem merger.[1] The merger focused on the database market, in which Oracle enjoyed a leading position and Sun was present with MySQL. MySQL was offered via a dual licensing model: MySQL Community Server was available for free under an open source license while MySQL Enterprise was offered under subscription. In this industry, network effects are important, meaning that the value of a database for its users increases with its number of users. Indeed, a higher number of users make it more attractive for service providers to acquire expertise in the database and for software providers to integrate the database within their own products, leading to a higher range of applications for the database.

8.   In the context of such network effects, any change in the licensing and development policies of MySQL could have a strong impact on its value for customers and decrease the constraint it exerts on Oracle. The question as to whether Oracle would have an incentive to change MySQL's licensing model depends on many factors, such as the ease of entry and the extent to which software developers would support forks of MySQL or other open source solutions. The purpose here is not to discuss these factors, but simply to underscore the importance of understanding the underlying economics of the market, and in this case in particular the role of network effects,[2] to assess the possible effects of the merger.

2.2   *Economic contribution to the analysis of coordinated effects: an illustration*

9.   The contribution of economics in terms of conceptual framework can be illustrated in the context of coordinated effects. In the Impala judgment of 10 July 2008 (overturning the CFI decision on the Sony/BMG merger), the ECJ endorsed the economic model of tacit coordination, effectively asking the Commission to go beyond a checklist approach and developing a coherent narrative on how coordination would operate.

10.   The Commission's ABF/GBI decision adopted shortly thereafter (and which focused mainly on the compressed yeast business in Spain and Portugal) is in line with the standard established by the Court in this respect. In ABF/GBI, the Commission assessed whether the transaction would likely lead to coordinated effects by making (tacit or explicit) collusion more likely, more stable or more effective.[3]

11.   In ABF/GBI, the Commission tried to understand how coordination would actually work in practice within a game theoretic framework. That implied understanding what the collusive mechanism

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[1]   For more details on this case, see Damien Neven and Miguel de la Mano, "Economics at DG Comp, 2009-2010", *Review of Industrial Organization*, 2010, vo. 37, n. 4, p.309.

[2]   The Google/DoubleClick merger is another case in which the Commission assessed network effects (in the context of intermediation services for online advertising). In this case, the Commission concluded that these were not such that the transaction would lead to a likely tipping effect that would marginalize rival ad networks. (For more details on this case, see e.g. Raphaël De Coninck and Penelope Papandropoulos, "The non-horizontal merger guidelines in practice", *Concurrences*, 2008-3). Another merger in which network effects played an important role is Travelport/Worldspan. Both Travelport (through Galileo) and Worldspan provided "Global Distribution Systems" (GDS), i.e. platforms for travel agents to access airline flight information and book tickets (alongside two competing platforms, Amadeus and Sabre). GDSs are double-sided platforms: airlines benefit from accessing a larger travel-agents base through a GDS, while the value of a GDS for travel agents depends on the breadth of its airline coverage. Because of the importance of network effects induced by travel agent participation, GDSs competed strongly to acquire travel agents by charging them very low (sometimes even negative) prices, and it was considered that the merged entity would likely continue to have a strong incentive to compete for travel agents. For more details on this case, see e.g. Damien Neven and Svend Albaek, "Economics at DG Comp, 2007-2008", *Review of Industrial Organization*, 2008, vo. 33, n. 3, p. 231.

[3]   For more details on this case, see e.g. Damien Neven and Miguel de la Mano, "Economics at DG Comp, 2008-2009", *Review of Industrial Organization*, 2009, vo. 35, n. 4, p.317.

would likely be, and in particular the variables on which the colluding partners would agree and the mechanism for detecting, and retaliating against, deviations from a collusive understanding. In particular, the evidence suggested that price increases were the likely focal point of tacit coordination between competitor Lesaffre and the merging parties. Holding significant excess capacity, all three main players would likely be in a position to react in timely fashion to punish deviations from the collusive behavior. In addition, distributors, who regularly reported switching and price information to suppliers, played a decisive role in facilitating the monitoring of any deviations. Within this context, market data (such as the evolution of prices, costs and trade flows) helped understand the dynamics of the industry (both upstream and downstream), which was important to establish the (tacit) collusion mechanism within a coherent economic framework of repeated interactions.

2.3 *Economic contribution to the analysis of vertical mergers: an illustration*

12.   Any assessment of vertical mergers also has to be made in reference to a coherent economic framework. The non-horizontal merger guidelines provide such a framework, in which both possible pro- and anti-competitive effects of vertical mergers are acknowledged. The emphasis of the guidelines is on the net effect of such mergers on consumers, departing from a rigidly sequential analysis of anti-competitive effects and efficiencies in favour of an integrated approach of effects.

13.   The TomTom/Tele Atlas merger provides a good illustration of how the non-horizontal merger guidelines have been applied in practice.[4] TomTom, a leading supplier of Portable Navigation Devices (hereafter "PNDs") in Europe, integrated backward by acquiring its providers of navigable digital map databases, Tele Atlas. Input foreclosure concerns were investigated in-depth in this case as navigable digital databases constitute an essential input for the production of PNDs and only one competitor, Navteq, supplied navigable digital map with a similar level of precision, attributes and geographical coverage as Tele Atlas.

14.   In order to determine whether an input foreclosure strategy would be profitable, the merged entity faces a trade-off between the profits lost on the upstream market and the profits gained in the downstream market. Using econometric estimates of downstream elasticities[5] and industry data on prices, margins and sales, the Commission assessed whether the sales that TomTom could capture downstream by raising its rivals' costs would be sufficient to compensate for the lost sales upstream if it engaged in input foreclosure. In particular, the Commission identified the critical price increase by the remaining upstream supplier (Navteq) that would make a foreclosure strategy profitable for the integrated company. In this case, given in particular the small share of the map cost in the PND price and the relatively limited cross-price elasticities downstream, the critical price increase appeared unrealistically high, in particular as it might trigger entry. This provided one piece of evidence that suggested that the transaction was unlikely to lead to anticompetitive effects, which was supported by other qualitative and quantitative evidence.[6]

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[4]   For more details and further illustrations, see e.g. Raphaël De Coninck, "The Application of The Non-Horizontal Merger Guidelines", *Antitrust Bulletin,* forthcoming.

[5]   The downstream elasticities were estimated with a nested logit demand system. For more detail on the demand system estimation in this case, see Raphaël De Coninck "Economic Analysis in Vertical Mergers", *Competition Policy Newsletter*, 2008-3.

[6]   Depending on the circumstances of the case and data availability, a range of economic evidence can be relied upon in vertical mergers. For example, the Commission has used modelling relying on specific functional demand forms, with estimates of elasticities (e.g. in TomTom/Tele Atlas) or proxies thereof (e.g. Itema/Barco). Although simple vertical arithmetic faces the difficulty of comparing the critical values with actual ones, it may also be informative in combination with other evidence or at an early stage of the investigation (e.g. IPIC/MANFerrostaal). Finally, qualitative evidence may also provide useful information

15.   In this respect, the assessment of efficiencies in this case is also informative. In TomTom/Tele Atlas, the Commission acknowledged that the transaction would allow the merged entity to internalize the double mark-ups resulting from both parties setting their prices independently pre-merger, thereby allowing the merged entity to profitably expand output on the downstream market. The Commission found it unlikely that the same effects could be obtained without the transaction, e.g. through the use of non-linear pricing. In particular, the Commission reviewed existing contracts between map databases providers and PND manufacturers, and concluded that the observed volume discounts were too limited to substantially eliminate double marginalization (in particular given that the marginal cost of a map database is close to zero). In addition, the Commission found that the proposed operation would likely improve map quality beyond what could be achieved through contractual means absent the merger.

3.   Types of economic evidence

16.   In addition to contribution of economics to the conceptual framework for European merger control, the use of economics in mergers has also significantly increased over the last few years as a way to provide evidence, both for the Commission and the various parties involved in the proceedings. This section reviews some of the main empirical techniques that are routinely used by DG Competition in merger reviews, depending on data availability.

3.1   *Descriptive analysis of commonly available data*

17.   Descriptive statistics are often the first step of any data analysis. In addition, descriptive analysis may provide some evidence regarding the functioning of the market and complement the qualitative evidence gathered during the investigation. In particular, simple data analysis can often confirm, contradict or qualify the facts and views put forward by the parties and market participants. Market data also complements the quantitative evidence by improving the understanding and interpretation of such evidence.

18.   This section describes the types of data, both from industry sources and from companies themselves, which have proved useful for the Commission's assessment in recent merger cases. Although this section focuses on the descriptive analysis of such data, the same data is also used for the more sophisticated analysis described in the following sections.

3.1.1   *Descriptive analysis of industry data*

19.   A variety of sources collects industry data, ranging from trade statistics to collections of individual price transactions depending on the markets concerned. Such data generally has the advantage of being readily available to the parties and presented in a consistent way, and thus constitute a natural source for descriptive statistics of the industry in which a merger takes place. The following paragraphs focus, for illustrative purposes, on the type of descriptive analysis carried out with industry data in consumer goods, highlighting in particular the use of retail scanner data and consumer panel data.

Retail scanner data

20.   In consumer goods, scanner data at the retail level is often available. Market research companies such as Nielsen or Gfk gather transaction data in a representative sample of stores. In such datasets, unit and sales volumes are usually available at disaggregated product (typically SKU) and frequency (e.g.

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to dispel concerns at an early stage or to call for further investigation (in WPP/TNS for example, possible input foreclosure concerns were dispelled in the first phase of the investigation in part due to the ease of entry and expansion of competitors in the upstream market for television audience measurement services).

weekly) levels (and sometimes by store, distribution channel or region), together with a description of the main product characteristics. The product classifications used in these datasets may provide first proxies of the segmentations deemed relevant in the industry. In addition, such data is particularly useful to easily obtain reliable market statistics. It may for example provide information on the price positioning of the parties' brands compared to their competitors or on the evolution of prices and quantities. This allows to quickly verify claims by the parties and other market participants (e.g. with respect to a specific segmentation), which is particularly useful while operating under tight time constraints (in particular when a specific issue was not anticipated at the beginning of the investigation but raised later on).

21.   The following paragraphs provide three illustrations of descriptive analysis of retail scanner data carried out in recent cases.

22.   First, the Pernod Ricard/V&S merger is an example in which Nielsen data was useful to study the price positioning of the parties' brands. The transaction concerned the acquisition by alcoholic beverages company Pernod Ricard of V&S, a Swedish state-owned wine and spirits company whose flagship brand was Absolut vodka. A descriptive analysis of prices of the different brands suggested the existence of a few clusters of vodka brands positioned at different price levels, which suggested that price positioning was an important characteristic for the assessment of closeness of competition in the vodka market, which was confirmed in internal survey documents.

23.   Second, the Kraft/Cadbury merger also shows how a descriptive analysis of the evolution of sales can be informative for the competitive assessment. Both Kraft and Cadbury were strong players in the chocolate confectionary business in Europe, with positions differing according to the Member State (which were considered as different geographic markets). In the UK for example, where Cadbury had a high share of the market, Nielsen data indicated that Cadbury Dairy Milk had recently lost significant market shares over a number of weeks, while Mars Galaxy gained corresponding market shares during this period. On the contrary, Kraft's brands such as Toblerone did not see significant changes during these periods. This suggested that the intensity of competition between Cadbury Dairy Milk and Mars Galaxy (both British heritage chocolates) was stronger than between Cadbury Dairy Milk and e.g. Toblerone (which is a continental-style chocolate packaged in a signature triangular shape). In France, a descriptive analysis of the Nielsen retail data showed that Cadbury's brand, Poulain (mainly black chocolate tablets) significantly decreased its prices in 2008. Following this change however, no change in price, sales or promotions/advertising was observed for Kraft's leading brand, Milka (to the difference of private labels, whose sales were affected by the decrease in Poulain's price). This suggested that Poulain (mainly black chocolate tablets) may not exert a significant competitive constraint on Milka (mainly milk chocolate tablets).

24.   Third, the recent Unilever/SaraLee merger provides another example in which a descriptive analysis of Nielsen retail data was useful in checking the arguments put forward by the parties. The transaction concerned the acquisition by Unilever of Sara Lee's body and laundry care business. Concerns were raised for deodorants in a number of countries, mostly due to the combination of Sara Lee's Sanex brand with Unilever's Dove and Rexona brands. In this case, the parties argued that private labels in Spain were a growing force which strongly constrained Unilever and Sara Lee's deodorant brands. An analysis of the evolution of market shares confirmed that private labels were growing, but showed that these were gaining shares from smaller brands while Unilever and Sara Lee's brands were not affected. This suggested that, contrary to the parties' claims, the competitive constraint exerted on the parties by private labels remained limited.

Consumer panel data

25.   In addition to retail scanner data, consumer panel data are sometimes also available for consumer goods from market research companies such as Gfk/Europanel and Nielsen. Such datasets can usefully complement retail scanner data, as they allow identifying the purchasing behavior of specific consumers over time and include demographic information about the households in the panel.[7] As far as descriptive analysis is concerned, such datasets may be useful to analyze switching data obtained by comparing household purchasing patterns over time. In particular the proportion of sales that brand A gained from brand B (and inversely) may provide a useful indication of how closely these two brands compete. As part of their subscriptions with market research companies, the parties or other market participants sometimes commission switching analysis for their normal business purposes. It is often useful to review such analysis when it is available, and complement it with additional analysis based on this data if required for the purpose of the investigation. Since the analysis does not relate the observed switches to price changes however, the derived substitution patterns must be interpreted with care and cross-checked with other evidence.

26.   The Unilever/SaraLee merger provides an example of the descriptive use of consumer panel data. In this case, household purchasing patterns suggested that there was a significant amount of switching between Unilever and Sara Lee's deodorant brands, which is consistent with other pieces of evidence indicating that these brands exerted a significant competitive constraint on each other. Therefore, if e.g. the price of one of the parties' deodorant brand increased, a significant number of customers switching to another brand would be recaptured by the combined entity, making such an increase more likely to be profitable. The decision underlines that the switching evidence based on the consumer panel data should be interpreted cautiously, since the observed switching patterns do not necessarily correspond to actual substitution between brands (as evidenced by observed "switching" between male and female deodorants as deodorants are bought for different members of the household, which constitutes the unit of observation in the dataset).

3.1.2   Descriptive analysis of company data

27.   In addition to the analysis of industry data, or when such data is not available, the Commission typically uses company data to produce reliable market descriptive statistics. As explained above, descriptive data analysis is a useful means to check the coherence of the arguments put forward by market participants.

Transaction-level data

28.   It is now typical for companies' accounting systems to store transaction-level data. Such data can for example be used to investigate how the prices and volumes of the parties evolved over the last few years or how comparable their prices and costs are. In addition, comparisons of wholesale margins and prices across time, products and/or regions may be informative with respect to the competitive constraints exerted on the parties. For example, arguments made by the parties about increased worldwide competition may be put in contrast with the evolution of wholesale prices and margins. Comparisons of prices and margins in markets where the parties have different positions may also be informative of the degree of competition between the parties. Of course, such analysis can only constitute a first indication, as a number of factors may explain the observed patterns; in addition, the interpretation of accounting data, and in particular cost allocations among products, should always be cautious.

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[7]   Consumer panel data may also have a coverage of retail outlets that differs from retail scanner databases (e.g. specific distribution channels may not be covered in some retail scanner databases, but be represented in household scanner databases).

29.   A recent case in which company data was analyzed to complement retail data was Friesland/Campina, a merger between the two leading Dutch dairy co-operatives to create one of the top three dairy companies in the world.[8] In this case, the Commission reviewed the evolution of wholesale prices and volumes for fresh dairy products at the customer level to assess the closeness of competition between the parties. This evidence suggested that the parties responded to each others' pricing for specific customers, which was consistent with the other pieces of evidence suggesting that the parties exerted a significant competitive constraint on each other.

30.   In addition, sales data at the customer level or contract databases may be useful to assess whether the parties' products focus on similar customer groups. For example, in IBM/Telelogic, it was found that while Telelogic's business focused on the Military and Aerospace industry sector, IBM generated most of its revenues in the Finance/Banking/Insurance, Government, and Information Systems industry sectors. Data on customers won and lost may provide information on the degree of competition in the market, and the frequency at which and the extent to which the merging firms are gaining sales from each other. For instance, in IBM/Telelogic, an analysis of all the instances where each party either won a new contract or lost a potential contract suggested that the parties were not particularly close competitors. The evolution of prices, margins or discounts at contract renewal may also be indicative of the degree of competition in the market. In Google/Double Click for instance, there was evidence that the prices were significantly falling when contracts were renewed, which, together with evidence of frequent customer switching, questioned DoubleClick's ability to exert significant market power.[9]

Bidding data

31.   Depending on market specificities and data availability, an analysis of bidding data may provide valuable information with regard to the competitive constraint exerted by the parties on each other. Although econometric analysis of bidding data may be carried out in certain cases (as detailed below), descriptive statistics will always be a first step in the analysis. A descriptive analysis of bidding data can take several forms according to the scope of the data provided and the availability of a sufficient number of observations (i.e. a large enough sample of contracts/bids). These may include the number of bids in which the parties to a merger competed against each other, the value of these bids, the volumes involved by these bids, the extent to which the parties were the only two bidders, the number of times the merging parties were the runner-up in each other's won bids or the number of times the parties won / lost contracts or bids from each other. These descriptive statistics should provide a good overview of the frequency and strength of interaction between the parties. The analysis can also be refined to evaluate whether there are types of contracts, types of customers or geographic areas where the parties seem to compete more often. More generally, such descriptive statistics can identify which are the other rivals that constitute a credible alternative.

32.   There are many examples of descriptive analysis of bidding data. A simple way to gather information regarding closeness of competition is to assess how often parties meet each other in specific tenders, and who their competitors in these tenders were. For example, in Panasonic/Sanyo, the analysis of tender participation suggested that the parties exert a significant competitive constraint against each other in some, but not in other, battery markets. In particular, Panasonic's tender database of European customers suggested that Panasonic faced Sanyo as its only competitor in 40% of tenders for nickel-metal hydride (NiMH) batteries. On the contrary, for Li-Ion batteries, several other important competitors were identified for nearly all tenders in which the parties took part. The market investigation also indicated that

[8]   For more details on this case, see e.g. Damien Neven and Miguel de la Mano, "Economics at DG Comp, 2008-2009", *Review of Industrial Organization*, 2009, vo. 35, n. 4, p.317.

[9]   For more details on the Google/DoubleClick case, see e.g. Raphaël De Coninck and Penelope Papandropoulos, "The non-horizontal merger guidelines in practice", *Concurrences*, 2008-3.

the Li-ion market is a very dynamic market and that both Sony and Samsung had been undertaking significant investment into capacity increases. Both the qualitative and quantitative evidence therefore suggested that although the transaction was likely to significantly impede competition for NiMH batteries, this was not the case for Li-ion batteries.

33.   A descriptive analysis of tender participation was also carried out in the Cisco/Tandberg merger, which concerned videoconferencing solutions. Cisco's opportunities datasets indicated that the parties competed frequently for high-end video conferencing products (dedicated-room solutions) often referred to as "telepresence". Tandberg competed with Cisco for a large number of deals in this segment, to an extent similar to Polycom and less than HP, while other competitors seemed insignificant. Tandberg also appeared as the sole competitor in a non-negligible number of deals. While the dataset had a number of limitations, including a high number of missing observations and the fact that tenders covered a range of different products, these observations appeared consistent with the results of the market test.

34.   An analysis of prices offered in the tender may also be informative as to the competitive constraint exerted by the parties on each other. The Syniverse/BSG case provides an illustration of a descriptive analysis of bidding prices. The activities of Syniverse and of the BSG Group's wireless business overlapped in the market for GSM roaming data clearing services. With these services, data clearing houses provide for the exchange of roaming data between Mobile Network Operators, allowing for the billing of roaming services provided to end-users. In this case, the descriptive analysis of bidding prices indicated that BSG's average (and median) effective price was not significantly different whether Syniverse participated in the tender or not. This analysis was complemented with additional qualitative and quantitative analysis, as described below.

35.   In addition, systematic databases recording information on the competitive constraints faced during contract negotiation may also provide useful information. In the Oracle/Sun Microsystems merger for instance, two databases were available. The first database analyzed was the so-called CRM dataset (Customer Relationship Management) which recorded information on sales opportunities (including the name of the primary competitor). The second database was the so-called HQApps dataset, which recorded internal communications on situations where sales people requested authorization to grant large discounts (i.e. more than 70% off the list price requires approval from the corporate approvals team, known as "HQ Apps"). In such instances, sales people had to explain the reasons for such an effort on a given contract or for a given customer. These explanations often involved naming the rivals against which Oracle was competing. The parties used these datasets to argue that MySQL was rarely quoted, either as a competitor in sales opportunities or as a reason for granting extra discounts. The Commission cast some doubts on these conclusions in view of the incompleteness of the CRM data and inconsistencies with Sun's own data. The Commission's analysis of the HQ Apps data provided evidence that contrary to the parties' claims, MySQL exerted a competitive constraint on Oracle in a significant number of cases.

36.   Finally, it is essential to emphasize that the data used in the type of analysis described above needs to be representative. Ideally, the data should be cross-checked with other sources, including if possible customers. This was the case e.g. in the Syniverse/BSG case, in which customers also provided information on how often the parties were selected as the two preferred bidders in the tenders. This information indicated that although the parties often participated to the same tenders alongside other competitors, they were very rarely ranked as the first and runner-up bidders, which confirmed that the parties were unlikely to exert strong competitive constraints on each other.

Descriptive event analysis (illustration with company data)

37.   Descriptive data analysis provides a straightforward way to interpret the implication of specific events that may have affected the market. Depending on data availability, such an analysis can be carried

out with industry data, company data, or a combination of both. In particular, the various sources of data mentioned above permit to see how variables such as prices, volumes, costs and margins have evolved in response to particular events, such as new brand entry, new product launch, specific innovations, special promotions and advertising campaign, supply disruptions, etc. These events are often informative for understanding the dynamics of the industry and competitive constraints, in conjunction with qualitative evidence and possibly more advanced quantitative analysis.

38.   The Lufthansa/SN Holding merger, which concerned the acquisition of Belgian-based airline SN Brussels by Lufthansa, provides an example of an event analysis with company data. In this case, the Commission analyzed disaggregated fare data obtained from the parties to assess the competitive constraint exerted by easyJet on Lufthansa and Brussels Airlines on certain routes. A descriptive analysis of this data indicated that easyJet's entry in 2007 was associated with a decrease in the parties' fares for non time-sensitive passengers, but not for time-sensitive passengers. Such an analysis, which was complemented with qualitative and quantitative analysis, including a more formal econometric analysis and a passenger survey, provided useful information as to the competitive constraint exerted on the parties in the different passenger segments.

39.   Finally, it should be highlighted that all the pieces of descriptive analysis mentioned above can only be, by themselves, suggestive as they do not investigate all the plausible reasons for the observed changes. They therefore need to be complemented by qualitative evidence, and possibly more detailed empirical analysis, as detailed below.

3.2   *Market definition techniques*

40.   The hypothetical monopolist test assesses whether a market contains sufficient substitutes to prevent the exercise of market power, and hence generally provides the relevant framework for defining antitrust markets. Specifically, the test assesses whether a profit-maximizing monopolist on a candidate market would likely impose at least a small but significant and non-transitory increase in price ("SSNIP"). Both qualitative and quantitative evidence are assessed within this framework for the purpose of market definition. In particular, and as far as qualitative evidence is concerned, it is often useful to gauge which alternatives customer would consider suitable as a starting point for the market definition exercise.

41.   As far as a precise quantitative implementation of the test is concerned, estimating whether a hypothetical monopolist would increase prices by at least 5 or 10% requires information on elasticities that is not always available. There are instances however when these elasticities can be computed, and it is then particularly useful to perform the hypothetical monopolist test to check the consistency of these estimates with other pieces of evidence in the file.

42.   In Unilever/Sara Lee for instance, SSNIP tests of the gender segments (male/non-male deodorants) were run to see whether these can be separated in an antitrust sense. For example in the test of the male segments, the objective was to find the effect of a 5% increase (SSNIP) in the prices of all male products on the total variable profit of the male segment. This exercise was straightforward in this case since the Commission had estimated a demand system to recover elasticity parameters and had built a simulation model. Using the model's implied marginal costs, the implied margins were calculated for all products at the pre- and post-SSNIP prices. The post SSNIP quantities were found by solving the estimated demand equation at the increased price level. Finally, the margins and quantities were used to calculate the implied total variable profits before and after the price increase. These simulations showed that the profits of a hypothetical monopolist of the male (non-male) deodorant segment would increase if the prices of all male (non-male) deodorants increased by 5%. Hence, this test indicated that male and non-male deodorants could be considered as different antitrust markets, which was consistent with a range of evidence gathered during the market investigation.

43.   Critical loss may be informative when exact information on elasticities is not available. In the context of market definition, critical loss analysis measures the minimum sales volumes that a hypothetical monopolist would need to lose to make a 5-10% price increase unprofitable. This critical loss is then compared to the actual loss that the hypothetical monopolist would incur in response to the same price increase to determine whether such a price increase would be profitable. If the actual loss is smaller than the critical loss, the price increase would be profitable for the hypothetical monopolist, which would be indicative of a relevant antitrust market. However, reliably determining the actual loss requires detailed information on switching patterns, which may not be available.[10] An alternative, when limited data (or time) is available, is to study the evolution of prices, e.g. with correlation and stationarity analysis.[11]

44.   Correlation analysis is a simple measure sometimes used to describe the evolution of prices in the market definition context. The idea is that prices of products in the same market tend to move closely. In order to assess the degree of correlation, one usually refers to a benchmark, which allows comparing the correlation for the candidate product with the correlation between products that are thought to be in the same market. However, an important caveat is that it is not uncommon for products' prices to be correlated even though they are not substitutes, which could for example be due to common demand or cost shocks. A relatively low price correlation is also possible for products that are in the same market, for example when price co-movement is not simultaneous. Ultimately, correlation is a very preliminary piece of evidence, which always needs to be put in context and complemented by additional evidence.

45.   The Arsenal/DSP merger provides an example where price correlation was used as part of the competitive assessment. In this case, the parties argued that the geographic market for benzoic acid was not limited to Europe but was worldwide. However, it appeared that over the last three years, the parties' prices in Europe had a very low correlation with prices in Asia, while their prices were highly correlated among European countries (the benchmark). This suggested that the parties may face different competitive constraints in Europe and Asia. This constituted one piece of evidence that led to the conclusion that the market for benzoic acid was not worldwide, alongside other pieces of evidence, both qualitative (e.g. the importance of tariffs and the very low presence of Chinese suppliers in Europe due to their lower quality perception) and quantitative (in particular, stationarity analysis). In addition, the lack of additional imports following unexpected plant shutdowns in April 2007 is an example of event-study which further informed market definition in this case.

46.   In the context of market definition, stationarity analysis can be used to examine whether the relative price of two products evolve over time around a constant value. The underlying idea is that if two products are close competitors, their relative price should tend to revert to a long-term average value. Many of the limitations of correlation analysis also apply to stationarity analysis, so it is also important to be cautious about its interpretation. In particular, the relative prices of products that are not substitutes may happen to be stationary, so that a finding of stationarity is consistent with two products being in the same market, but does not in itself establish that this is the case. Hence, it is always important to complement such analysis with qualitative evidence, such as internal documents and surveys.

47.   The Arjowiggins/M-real Zanders Reflex case, which concerned the acquisition by Arjowiggings of a paper plant in Germany, provides an example of the use of stationarity analysis for geographic market

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[10]   On the difficulty of assessing the actual loss, see e.g. Andrea Amelio, Miguel de la Mano and Manuel Godinho de Matos, "Ineos/Kerling merger: an example of quantitative analysis in support of a clearance decision", *Comptition Policy Newsletter*, 2008-1. In addition, the assumptions used for the critical loss may also be subject to debate (see e.g. Lufthansa/SN holding, KLM/Martinair).

[11]   More details on these methods and on the two illustrative cases mentioned are provided in Daniel Donath, "The use of pricing analysis for market definition purposes: the Arjowiggins/M-real Zanders Reflex and Arsenal/DSP mergers", *Competition Policy Newsletter*, 2009-1.

definition. The key market reviewed in the transaction was carbonless paper and a question of interest was whether the geographic market was wider than Germany. The parties claimed that the geographic market was European, due to relatively limited transport cost, within-Europe trade and centralised manufacturing. However, the Commission found that there was in general no stable long-run relationship between the German prices and the prices in other Member States, which did not provide support for the parties' arguments that the market was European-wide. This observation was consistent with the very different positions of the parties across countries and with observations from past cartel behaviour in the industry (where price increases were fixed separately and varied across countries).

3.3   UPP-type exercises

48.   The degree of substitution between the merging parties' brands plays a central role for assessing unilateral effects, as the incentive for the merged entity to raise prices post-merger is directly linked with how closely the parties competed pre-merger. Depending on data availability, different sources may be used to provide a measure of substitution between the parties' brands.

49.   As detailed in the horizontal merger guidelines, the diversion ratio from product A to product B measures the proportion of the sales of product A lost due to a price increase of A that are captured by product B. When precise diversion ratio estimates are not available, internal document or survey evidence may be useful for assessing the degree of substitution between the parties' brands. Data on sales won and lost between competitors may also be used for this purpose. However, it is then important to understand as much as possible the reasons for these customer switches. Indeed, analyzing win/loss data without relating them to price changes may not provide an accurate assessment of the degree of substitution between brands for a given price increase. Diversion ratios proportional to market shares may sometimes be used in the absence of other evidence; in such cases, the reliability of the analysis will critically depend on whether such an assumption on substitution patterns appears plausible in the market studied.

50.   One of the pieces of evidence that can be used on the basis of diversion ratio is the upward pricing measures developed by Farrel and Shapiro.[12] In essence, by combining the diversion ratio with information on margins, such measures focus on the profit that is internalised by the merger due to the elimination of competition between the parties and hence capture the change in pricing incentives. The Commission uses such measures as an additional piece of evidence to identify some potentially anticompetitive mergers. The Commission has also received submissions of UPP analysis by the parties' economic experts in some past and ongoing cases, which are considered according to the principles detailed in the following paragraph.

51.   The informative value of such measures critically depends on the reliability of the inputed data, in particular the diversion ratio measure used in the analysis. In addition, it is also important to underscore that such measures are only one part of the assessment, and that they need to be reviewed in the context of other pieces of evidence. In particular, the UPP is not applied in a mechanistic way as its interpretation may depend on the specifics of the market concerned. For example, gross margins may be higher in industries with high innovation, leading to higher UPP measures everything else constant; however, such measures may not reflect the key factors of competition in such industries. Finally, although it should be underlined that UPP does not by itself provide information on the magnitude of price changes (information on pass-through is required for that purpose), it may be useful in providing an indication of the level of efficiencies required to offset the incentives to increase prices.

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[12]   Joseph Farrell and Carl Shapiro, "Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition," *The B.E. Journal of Theoretical Economics*, 2010, Vol. 10, 1 (Policies perspectives), Article 9.

3.4   *Demand estimation and merger simulation*

52.   Price elasticities are an important parameter in the assessment of mergers, as they provide direct evidence on substitution patterns and can also be used as an input to simulate the merger price effects. Depending on data availability, *own-* and *cross-price elasticities* can be estimated relatively precisely using econometric analysis.[13] This section first discusses how elasticities were estimated in recent cases, and then illustrates how these estimates were used to simulate the price effects of mergers.

53.   The Unilever/SaraLee merger provides an example of an econometric estimation of demand (for deodorants). In this case, the Commission estimated a nested logit demand system, i.e. a discrete choice model where consumer decisions to purchase products depend on both the price and the characteristics of the products.[14] Specifications with both one-level nests (male/non-male deodorants) and two-level nests (where subnets are defined according to whether or not the deodorant is described as skin-friendly) were estimated. The nest structure allows the degree of substitutability between products belonging to the same nest to be stronger than the substitutability between products in different nests. This means that a particular consumer who chooses a particular product (e.g. a Rexona for men deodorant) is more likely to choose from products with the same gender proposition (male, in the example) if there is a rise in the price of the first choice product.

54.   A nested logit demand system offers more flexibility than the standard logit model since the independence of irrelevant alternatives assumption (according to which switching between products takes places in proportion to market shares) only has to hold within a nest. At the same time, a nested logit demand system has the practical advantage that the number of parameters to estimate is limited (compared e.g. to the Almost Ideal Demand System discussed in the next paragraph). Still, one must keep in mind that such a model imposes significant structure on the estimated parameters. As a consequence, this model may fail to fit the data well and only provides a rather basic measure of closeness of competition between products present in the same nest, as it assumes that switching is proportional to market shares within a nest. It is thus important that the nesting assumptions capture the most important dimensions of product differentiation; increasing the number of parameters to be estimated, as e.g. with the two-level nest specifications, provides some flexibility in this respect.[15]

55.   The Friesland/Campina merger provides an example of an Almost Ideal Demand System (AIDS) estimation for a variety of dairy products. The AIDS model is derived from the consumer's expenditure minimization problem and demand elasticities are in principle not restricted.[16] AIDS provides more flexibility, and hence may fit the data better and provide a more direct answer to the closeness of competition between the merging parties' products than (nested) logit models. However, this comes at a cost since more parameters need to be estimated and it is not uncommon to find imprecise parameter estimates and negative cross-price elasticities.

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[13]   The *own price elasticity* of a particular product gives the percentage change in the product's sales volumes as a response to a one percent increase in its price. The *cross-price elasticity* of the product with respect to another product gives the percentage change in the sales volumes of the first product as a response to a one percent increase in the other product's price.

[14]   For more details on nested logit demand estimation, see Steven Berry, "Estimating Discrete-Choice Models of Product Differentiation", *The RAND Journal of Economics,* 1994, vol. 25, n. 2, p. 242.

[15]   In Unilever/SaraLee for example, the Commission increased the flexibility of the standard one-level nested logit model by estimating a two-level nest structure, and by allowing some of the estimated parameters to be nest-specific.

[16]   For more details on AIDS, see Angus Deaton and John Muellbauer, **"An Almost Ideal Demand System"**, *The American Economic Review*, 1980, vol. 70, n. 3, p. 312.

56.   In Friesland/Campina, the results of the AIDS model estimation with scanner data were reported in the statement of objections. The parties' economists were then given access to the data, code and detailed description of the Commission's estimation. In their response to the statement of objections, the parties pointed out that the Commission's estimation did not appropriately account for the inventory behaviour that characterises the purchase of long-life dairy products in the Netherlands. In light of the purchasing patterns in this market, and given time constraints and the complexity to account for such behaviour with a dynamic model of demand, this econometric estimation was not given weight in the final decision. The Commission also improved its original AIDS estimation for fresh-flavoured dairy drinks by accounting for habit persistence (by allowing previous decisions to be influenced by past decisions). Although the improved estimation led to more robust results for these products, the results however were inconclusive for the purpose of assessing the likelihood of unilateral effects. Nevertheless the descriptive data analysis and extensive qualitative evidence in the file were sufficient to conclude that the merger would lead to unilateral effects and the merger was conditionally cleared after appropriate remedies were submitted.

57.   In Unilever/SaraLee, the Commission combined the estimated nested logit demand described above with standard supply-side assumptions (i.e. static Bertrand competition) to simulate the price effects of the merger.[17] On this basis, the Commission found overall market price increases between 2 and 5% depending on the country (in the absence of efficiencies), with generally higher price increases for non-male deodorants due to the parties' stronger position in that market.

58.   It is well known however that the predicted price increases depend on the chosen functional form of demand. In the context of merger simulation, it is particularly interesting to look at compensating efficiencies, i.e. efficiencies that need to be achieved to offset anticompetitive effects. This was done for example in the Unilever/SaraLee case, which reported the percentage decreases in the post-merger marginal costs necessary to avoid a price increase after the merger. The average required efficiencies were around 20% in Belgium and the Netherlands, and 5-10% in Spain and the UK. More generally, the Unilever/SaraLee decision also emphasized the robustness of the estimates, and the consistency of the merger simulations results with other pieces of qualitative and quantitative evidence.

3.5   *Direct evaluation of the competitive constraints*

59.   In some instances, it may be possible to evaluate the direct competitive constraint that the parties exert on each other. This is the case when one can compare outcomes in market configurations that are similar, except that in some configurations the parties compete against each other while in others they do not. Although such an analysis does not in itself provide an estimation of the merger effects, this provides directly relevant information on the intensity of competition between the parties. In addition, this approach has the advantage of not relying on assumptions regarding the nature of competition in the industry (unlike structural simulation models).

60.   The econometric analysis carried out by the Commission in the attempted Ryanair/Aer Lingus merger provides an illustration of a direct estimation of the constraints exerted by the parties on each

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[17]   An alternative methodology to a merger simulation with an econometrically estimated demand consists in simulating the price effect of the merger by calibrating demand with cost data. Results based on estimation, when the available data allows it, are typically superior to calibration results, as the latter are not subject to econometric testing and rely on the accuracy of a limited number of parameter values. In Unilever/SaraLee, calibration was used to provide an additional robustness check of the simulated price increases. Other recent cases in which the merger price effects were simulated (by the Commission or the parties) using cost data include EDF/British Energy, BHP/RioTinto and Kraft/Cadbury.

other.[18] The idea is to analyze whether the price charged by one of the parties on a given route depends on the presence of the other party on that route. Because of unobserved factors affecting prices charged across routes, fixed-effect regressions with panel data were preferred to cross-section regressions across routes at one point in time. In other words, the Commission estimated the impact of the presence of one party on the other party's fares by exploiting the variation in market structure at individual routes over time. This approach was conclusive in showing that Ryanair exerted a competitive constraint on Aer Lingus. In particular, the base specifications indicated that Ryanair's presence on a route was associated with Aer Lingus charging approximately 5-8% lower fares.[19] This effect was found to be stronger than for other flag or non-flag carriers. This suggested that the merged entity would have an incentive to set higher fares for Aer Lingus as most of the customers lost would be captured by Ryanair. Although very useful, such analysis is necessarily incomplete. For example, it does not address the loss in potential competition between the merging parties, nor competition on factors other than price, such as frequencies, advertising or ancillary services. The econometric analysis was therefore complemented with a wealth of additional evidence, including a passenger survey. [20]

61.   Another context in which competitive constraints can be estimated directly concerns markets where products are sold through (formal or informal) bidding-like negotiation. In such cases, data may exist or be gathered on the offers and characteristics of the bids. If the dataset is sufficiently large, an econometric evaluation of the bids/contracts can provide more quantitative information on the competitive interaction between the merging firms. For example, on can estimate the impact of the participation of one party in a tender on the other party's prices (alternatively, discounts or margins) in that tender, controlling for other factors affecting the variable of interest.

62.   In Syniverse/BSG for example, the descriptive analysis of bidding prices was complemented with an econometric estimation of the relationship between the BSG's price and Syniverse's participation in a tender.[21] Specifically, the price offered by BSG was modelled as a function of Syniverse's participation in the tender and of other potentially relevant variables, such as the identity of the incumbent, the length of the contract, the size of the customer, whether the tender also covered financial clearing services, and time fixed effects. The results of the econometric analysis confirmed that the participation of Syniverse to a tender was not associated with lower prices offered by BSG (the coefficient for the participation of Syniverse in a tender was positive and not significant). Based on this bidding analysis and the qualitative evidence gathered during the investigation (in particular regarding entry), this "3 to 2" merger was cleared in phase II without remedies.

63.   In Cisco/Tandberg, the parties also submitted an econometric analysis of bidding data to show that the presence of one party had no impact on the price charged by the other. However, none of the competitor's participation had a significant effect on the parties' prices and the results of this analysis were

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[18]   For more details on the economic evidence in this case, see Miguel de la Mano, Enrico Pesaresi and Oliver Stehmann, "Econometric and survey evidence in the competitive assessment of the Ryanair-Aer Lingus merger", *Competition Policy Newsletter*, 2007-3.

[19]   There was not enough variation in the data to estimate impact of Aer Lingus' presence on a route on Ryanair's fares.

[20]   The Statoil/Conoco merger provides another illustration of a direct estimation of the competitive constraints exerted by the parties on each other in the retail fuel market in Norway and Sweden. In this case, the Commission estimated whether prices differed significantly when the parties operated fuel stations in the vicinity of each other.

[21]   The symmetric analysis, comparing Syniverse's prices according to whether BSG did or did not participate to the tender, could not be carried out because of the very low number of tenders in which Syniverse participated but BSG did not.

not judged sufficiently robust to be relied upon. This illustrates that while bidding analysis may be very informative to assess the competitive constraints exerted by the parties on each other, the reliability of the analysis critically depends on the quality of the data and methodology employed.

4.   Ensuring an efficient process for generating economic evidence

64.   The time and resources of the various parties involved in antitrust enforcement and merger control are necessarily limited. In particular, DG Competition is required, as an administrative authority, to take a decision within an appropriate or statutory time limit. This fact underscores the importance of ensuring that economic analysis meets certain minimum standards at the outset, and of facilitating the efficient gathering and exchange of relevant evidence, in particular any underlying quantitative data. Similarly, it is important for the decision-maker to base its decisions on all reliable and relevant evidence available during the administrative procedure, whether quantitative or qualitative.

65.   With this respect, it is worth distinguishing between two dimensions in the evaluation of economic analysis. First, the decision maker needs to assess the intrinsic quality of the economic evidence from a technical perspective- i.e. whether it has been generated and presented to adequate professional standards. For instance, is the hypothesis clearly formulated and related to the facts of the case? Are the economic models consistent with the main characteristics of the industry? Does the modelling approach find support in the literature? Are the empirical methods and data suitable for the analysis? Are the results correctly interpreted and sufficiently robust?

66.   Second, the decision-maker needs to determine how much weight to assign to the economic analysis. This depends importantly on its relevance with respect to the main issues at stake. For example, is the evidence a direct test of the theory of harm? Or does it merely provide useful circumstantial evidence? Other considerations include the potential for error when relying on certain types of evidence, and the congruence and consistency of the economic analysis with other evidentiary elements (such as customer responses and documentary evidence).

67.   When alternative economic studies produce contradictory conclusions, their relative merits should be carefully investigated; the right approach cannot be to discard them as if they were incorrect or unscientific. Indeed, those apparent contradictions may result from differences in the data, differences in the approach to economic modelling or in the assumptions used to interpret the data, differences in the empirical techniques and methodologies, or may be the result of unintentional mistakes. Understanding the sources of such differences often provides important insights, thus reducing the likelihood of type I (false conviction) or type II (false acquittal) errors. For experts on either side to be accountable, economic analysis needs to be framed in such a way that decision-makers can evaluate its quality and relevance.

68.   Against this background, DG Competition has published draft Best Practices on the submission of economic evidence (hereafter Best Practices) as part of its effort to enhance transparency and predictability in antitrust proceedings. First, the Best Practices provide recommendations regarding the content and presentation of economic or econometric analysis, in order "to facilitate its assessment and the replication of any empirical results by DG Competition and/or other parties". In particular, the Best Practices present recommendations concerning the main elements of economic analysis, namely the formulation of the relevant question, the data, the methodology, the presentation of the results and the robustness of the analysis. Second, they provide guidance to respond to the Commission's requests for quantitative data "to ensure that timely and relevant input for the investigation can be provided".

69.   In addition to the substantive recommendations presented in the Best Practices regarding the quality standards for economic analysis, the Best Practices also address a number of practical issues. In particular, the Best Practices highlight the importance of early interaction with the parties' economists to

ensure an efficient gathering of data and evidence. Second, replicability of the analysis is essential, and there is a strong emphasis on the cross-examination of economic evidence to ensure that it withstands scrutiny. Finally, it is important to underscore that the Best Practices are meant to apply to all the parties concerned, including DG Competition.

70.   The Best Practices are a codification of DG Competition's practice since at least Ryanair/Aer Lingus, in particular concerning the interaction with the parties at various stages of the data gathering process and the development and cross examination of the various pieces of evidence. In its judgment of 6 July 2010, the General Court upheld the Commission's prohibition decision in the Ryanair/Aer Lingus merger case and validated this procedure. In this respect, it is important to stress that the Court did not shy away from a detailed review of the economic evidence (within the Commission's margin of discretion), which appears clearly in the judgment's detailed discussion of the econometric analysis carried out in this case. Further, the Court validated the process followed by the Commission in dealing with the various pieces of econometric evidence in this case, and the interaction with the parties in confronting such evidence.

5.   Conclusion

71.   This discussion paper reviewed a number of recent merger cases to illustrate the role of economic evidence in European merger control. This review makes it clear that economic analysis plays a central role in the assessment of merger effects, both from a conceptual point of view and for the generation of evidence. In its competitive assessment of complex mergers, and depending on data availability, the Commission typically relies on a variety of data and empirical techniques, ranging from descriptive statistics to merger simulation with demand estimation or direct evaluations of competitive constraints, in order to complement the qualitative evidence gathered in the market investigation. In this respect, DG Competition's Best Practices provide important guidance to ensure that the generation of economic data and evidence is as efficient as possible.