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I. INTRODUCTION

In recent years, there has been a trend towards a more systematic use of detailed empirical analysis in the assessment of merger cases by the European Commission.

This trend owes its roots to the Court of First Instance's judgments in the *Airtours/First Choice, Tetra Laval/Sidel,* and *General Electric/Honeywell* cases, which made it clear that any theory of competitive harm advanced by the Commission must specify the conditions that gave rise to that harm and test those conditions against observed industry characteristics and behavior. The Commission took the lessons from these judgments to heart in the reform package that was implemented in 2004 and, indeed, it has since taken more responsibility to further develop the empirical side of its merger analysis. The creation of the post of Chief Economist and the subsequent hires made by the Commission to build a dedicated unit of economists have undoubtedly played a key role in this development.

In this article, we review the main empirical analyses applied by the European Commission in recent merger cases, focusing on unilateral effects cases. In Section 2, we set out the basic framework for the analysis of unilateral effects. Section 3 reviews methods that focus on assessing the strength of the competitive constraint between the merging parties. In Section 4, we examine merger simulation approaches that seek to estimate the price impact of a merger. Section 5 provides some concluding remarks.

II. THE ASSESSMENT OF UNILATERAL EFFECTS

Unilateral effects occur if a merger results in price increases as a result of the elimination of the pre-existing competitive constraint between the merging parties. Prior to the merger, a price increase of firm A would result in some customers switching to firm B. Following the merger, the merged entity will "internalize" this constraint, possibly enabling it to increase prices to the detriment of consumers.

In many industries, the likelihood of unilateral effects can be inferred from market shares. If firms A and B both account for a high share of the total market, then in many circumstances it can be assumed that the threat of existing customers of firm A to switch to B provides a significant pre-merger constraint on firm A's pricing and that, therefore, one might be concerned about the impact of the merger on competition.

However, where products are differentiated, market shares may over- or under-estimate the competitive constraint between two firms. The competitive consequences of the merger will

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then depend on the diversion ratio between the products supplied by the merging parties, where the diversion ratio is the proportion of customers who, when switching away from product A would switch to product B as opposed to products C, D, etc. If (say) two thirds of the customers who would switch away from product A would buy product B instead, the fear for loss of competition from the merger of A and B would be much stronger than if those who switched from product A would predominantly choose products C, D, etc. If a relatively high proportion of customers of A would switch to B, A and B are said to be close competitors. Firms are more likely to be close competitors if they are relatively more similar in their various attributes to one another than to other products in the relevant market.

III. ASSESSING COMPETITIVE CONSTRAINTS

As the European Commission's horizontal merger guidelines make clear,[2] the strength of the competitive constraint between the merging parties represents a central element of the assessment of unilateral effects by the European Commission.

One way in which competitive constraints have recently been assessed in a number of important cases is by undertaking an analysis to test how the presence of firm B impacts firm A's prices. Such an analysis can, for example, be applied when the two firms are both active in a number of markets, but where other markets exist in which only one of the firms is present. This was the background behind the Commission's econometric analysis in the *Ryanair/Aer Lingus*[3] and the *StatoilHydro/ConocoPhillips*[4] cases. An alternative scenario would be one where one of the firms had recently entered a market, in which case a comparison can be made between pre- and post-entry market outcomes. This was the case in the *Lufthansa/SN Brussels Airlines*[5] case, where the assessment focused on the impact of the recent entry by a low-cost airline on fares on one of the routes on which the merging parties overlapped.

In principle, econometric analysis is well suited to assess whether two parties exert a competitive constraint on each other and whether the loss of this constraint is likely to give rise to a price increase. This is because an econometric analysis tests how the presence of firm B impacts firm A's prices, controlling for other factors influencing A's prices. For example:

> If A's prices are relatively lower whenever it faces B as a competitor, this is consistent with the view that B acts as a competitive constraint on A, preventing A from increasing prices. A merger between A and B may, in this case, be expected to give rise to unilateral price increases as it would remove the competitive constraint exerted by firm B on firm A.[6]

> By contrast, if A's prices are largely unaffected by B's presence, this suggests that B does not constrain A's behavior. In this case, a merger between A and B is unlikely to give rise to unilateral effects as a result of the loss of the competitive constraint exerted between the two parties.

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[2] Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings, in particular ¶¶ 22 and 24. Official Journal C 31, 05.02.2004, pp. 5-18.

[3] Case No COMP/M.4439 – Ryanair / Aer Lingus.

[4] Case No COMP/M.4919 – StatoilHydro/ConocoPhillips.

[5] Case No COMP/M.5335 – Lufthansa/SN Airholding.

[6] However, as pointed out in the horizontal merger guidelines, it may be that other factors would prevent the merged entity from increasing prices, such as the reaction of other rivals or the prospect of entry.

Importantly, a merger between A and B will only raise concerns if one party's prices are significantly influenced by those of the other party, both in a statistical and economic sense. A price difference is statistically significant if the analysis gives a high degree of confidence (typically a 95 percent probability or more) to conclude that the very existence of that difference is real and not caused by chance.

When undertaking an econometric analysis, many analysts initially focus on significance in the statistical sense. Importantly, though, a statistically significant price difference is not necessarily important from an economic point of view. For example, if A's price is 0.1 percent lower when B is present, this may be statistically significant but will almost always be considered as insufficient in magnitude to raise concerns. Results need to be both statistically and economically significant if they are to form a robust basis for enforcement action.

Econometric analysis can be time consuming and tends to require significant amounts of data. The reason is that only with sufficient data can the model estimate the effect of the various factors to a reasonable degree of accuracy. However, it is often possible to conduct simpler analyses that may equally yield important insights into the strength of the constraint exerted between the merging parties.

Bidding Analyses

In markets where competition between suppliers takes the form of bidding for contracts placed by customers, bidding analyses based on win/loss data can be a useful way to assess the presence of important competitive constraints between firms. A recent example of a case in which a bidding analysis was undertaken is the *Oracle/Sun*[7] case.

In particular, win/loss data can help identify the strength of the competitive constraints on each of the merging parties that are provided by each existing competitor. If one of the two merging parties exerts an important competitive constraint on the other party, the data are likely to show that one of the parties often ranks behind the other. If that is the case, this might suggest that the merger may, absent any repositioning on the part of the remaining suppliers, allow the post-merger entity to raise prices. Additionally, win/loss data can be helpful in understanding the extent to which there will remain a sufficient number of credible bidders after the merger to ensure a competitive outcome to all future contests.

IV. ESTIMATING PRICE EFFECTS

In addition to assessing the strength of the competitive constraint exerted between the merging parties, the Commission has recently shown some interest in merger simulation approaches that seek to estimate the price effect of a merger directly. While there were some European merger cases in the early 2000s in which merger simulation had been applied, the Commission did not rely on merger simulation at all for some years after the implementation of the Commission's reform package in 2004. More recently, however, there have been two decisions in which the Commission referred to merger simulation analyses: the *Kraft/Cadbury*[8] case and the *Unilever/Sara Lee Body Care*[9] case. Since the decision in the latter case is not yet public, our discussion below focuses on the *Kraft/Cadbury* case.

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[7] Case No COMP/M.5529 – Oracle/Sun Microsystems.
[8] Case No COMP/M.5644 – Kraft Foods/Cadbury.
[9] Case No COMP/M.5658 – Unilever/Sara Lee Body Care.

Merger simulations are based on a formal economic model as described in the economic literature. Once this has been specified for the industry in question, it can be used to produce estimates of price increases that a merger may generate. Merger simulation techniques are often promoted as ways to avoid the need to define markets and to avoid the pitfalls associated with the interpretation of market shares in differentiated product markets. Against this background, an interesting question is whether the merger simulation as carried out in the *Kraft/Cadbury* case lived up to this promise. As we will see below, this was not, in fact, the case.

An important input into any merger simulation model is the demand that firms face in a particular industry. In the *Unilever/Sara Lee Body Care* and the *Kraft/Cadbury* cases, which both involve fast-moving consumer goods ("FMCG") industries, the demand was estimated on the basis of an econometric analysis. As discussed above, such analyses require extensive datasets, which in FMCG industries are typically readily available in the form of retail scanner data. A key purpose of estimating demand is to estimate the "elasticity of demand," i.e. the extent to which demand is sensitive to price. The modeling framework that is typically used in this context is that customers base their purchasing decisions on a number of factors including price and the characteristics of each product.[10] Customers are then assumed to maximize their "utility," either by selecting one of the products that are available or by not making a purchase.

When analyzing demand, products that appear closer substitutes are often grouped into so-called "nests." This is done to keep the analysis manageable while at the same time taking account of possible differences in the degree of substitutability between different groups of products. Within the modeling framework, using such "nests" will result in customers being more likely to switch to a closer substitute in response to a price increase of one of the products. The decision what "nests" to define needs to be based on pre-existing information (e.g. market research). Since the results of a merger simulation can be quite sensitive to the choice of nests, it is important to ensure that the choice of nest is consistent with other information that is available.

In the *Kraft/Cadbury* case, each of countlines, tablets, and pralines were defined as a separate "nest" in the merger simulation. Countlines, tablets, and pralines were also each considered to be a separate relevant market. Importantly, the relevant markets in that case thus corresponded to a separate "nest" in the merger simulation.

The critical simplifying assumption that is made when using "nests" is that switching between products within each nest is assumed to take place in proportion to market shares.[11] Since "nests" correspond to "markets" in this case, substitution within each market has been assumed to take place in proportion to market shares.

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[10] For example, product characteristics taken into account in the merger simulation in the Kraft/Cadbury case included weight, indications as to whether the product contained or could be classified as liqueur, white chocolate, crunchy chocolate, cookie, mint, fruit, caramel, nuts, truffle chocolate, honey, solid tablets, single, and whether it was a retailer brand.

[11] To illustrate this, consider the demand for cars. Assume that six brands are considered, grouped into a "high-end" nest (e.g. Mercedes, BMW, and Audi) and in a "low-end" nest (e.g. Volkswagen, Opel, and Fiat). In response to a price increase of Mercedes, customers are more likely to switch to BMW or Audi than to one of the low-end brands. Suppose that 90 percent of Mercedes customers will switch to either BMW or Audi. Given the assumption that switching within each nest takes place according to market shares, the distribution of these customers over BMW and Audi is then determined by the relative shares of BMW and Audi within the high-end nest.

However, as noted above, substitution between products may not take place in proportion to market shares when products are differentiated. In such markets, certain products may be closer substitutes to each other than to other products. By assuming substitution within each relevant market to take place in proportion to market shares, the merger simulation in the *Kraft/Cadbury* case ignored issues relating to the closeness of competition within each relevant market. As a result, the simulation was essentially based on market shares. But since the fact that market shares may over- or under-estimate the competitive constraint between two firms is a key reason for undertaking empirical analyses of the impact of mergers, it is hard to see what value the merger simulation adds in this particular case.[12]

Of course, one could argue that the merger simulation carried out by the parties was based on a broader market than the Commission ultimately defined.[13] However, if the Commission defines markets that are inconsistent with the assumed market in the merger simulation, the Commission's market definition and the simulation model cannot both be correct. If the Commission is to rely on simulations in merger control, it is clearly important to ensure that such simulations are consistent with the way the relevant markets are defined.[14]

In any event, merger simulation remains a tool with important limitations. The results of merger simulation models depend to a large extent on the assumptions that go into them and can indeed be extremely sensitive to these. Moreover, merger simulation models, which are entirely static in nature, tend to always predict a price increase in the absence of efficiencies. By contrast, real-life markets may be characterized by entry, innovation, product repositioning, etc., all of which may defeat a hypothetical price increase but none of which are captured by merger simulation models. In view of these limitations, it remains to be seen whether the two cases in which merger simulation were recently applied will portend a broader trend in favor of the European Commission applying such models.

V. CONCLUDING REMARKS

In this short article, we have reviewed the key empirical techniques that the European Commission has applied in its merger decisions in recent years. The trend towards a greater use of empirical techniques in merger cases is to be welcomed. If appropriately applied and interpreted, econometric and other sophisticated empirical analyses should lead to more robust decisions.

It is worth noting that, so far, the European Commission has not engaged in "short-cut" methods to estimating the likely competitive effects of a merger, such as Upward Pricing Pressure ("UPP"). However, the U.K. Competition Commission ("CC") recently used a formulation of the

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[12] Indeed, the main reason behind the Commission's clearance decision in the Kraft/Cadbury case appears to have been the Commission's own analysis of the (lack of) closeness of competition between the merging parties, which was not based on merger simulation. For example, the Commission's analysis showed that Kraft's brands did not exert a significant competitive constraint on Cadbury's tablet brands. The Commission also found that promotion efforts by Kraft did not trigger a response from Cadbury.

[13] Indeed, the Parties argued that the relevant market comprised at least all chocolate confectionery.

[14] Another reason why consistency is required is that the Commission's discussion of the simulation results in the Kraft/Cadbury case focused on the "weighted average price increase." Since a calculation of an average requires specifying the set of products over which the average is calculated, a weighted average price increase can only be calculated over some market. The Commission decision does not explicitly state over what market the weighted average price increase has been calculated.

UPP test to assess the merging parties' incentives to raise prices in the *Zipcar/Streetcar* merger.[15] Interestingly, the CC concluded in that case that the prospect of entry would likely defeat the "moderate incentive to increase prices" that it found on the basis of its UPP analysis within a few years.

Indeed, it is important to always be aware of the limitations of sophisticated economic analyses when applying them. Econometric analyses and merger simulation models produce results that may appear very precise but that can, in fact, be heavily driven by the assumptions that go into the model. In addition, results of static analyses such as merger simulation models always have to be appraised in the light of the dynamic nature of competition that characterizes most real-life markets. Sophisticated empirical analyses are powerful tools, but their analysis and interpretation should never lose sight of the broader picture.

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[15] UK Competition Commission report of 22 December 2010, *see* http://www.competition-commission.org.uk/inquiries/ref2010/zipcar_streetcar/pdf/final_report.pdf.