Competition Policy and the Economic Approach

Foundations and Limitations

Edited by

Josef Drexl

Director, Max Planck Institute for Intellectual Property and Competition Law, Munich, Germany

Wolfgang Kerber

Professor of Economics, Philipps-Universität Marburg, Germany

Rupprecht Podszun

Senior Research Fellow, Max Planck Institute for Intellectual Property and Competition Law, Munich, Germany

Edward Elgar
Cheltenham, UK • Northampton, MA, USA

4. Current issues in antitrust analysis

Daniel L. Rubinfeld

1. INTRODUCTION

The use of empirical methods to study competitive issues, especially those relating to mergers, has been continually expanding in recent years. That growth has not come without controversy, however. In this chapter, I comment on three such issues. The first relates to market definition, the second to the relevance of market power measures in unilateral effects merger analysis, and the third to the use of merger simulation methods, again in the context of unilateral effects analysis.

Market definition has historically been seen as a necessary, indeed often crucial, first step in the analysis of mergers as well as non-merger behaviour. I will point out, however, that there are circumstances in which it is preferable to skip the definition of markets and move directly to the analysis of competitive effects. With respect to market power, there has been a view that HHIs and other measures of market concentration are not especially relevant in unilateral effects analyses.[1] I will suggest the contrary – that HHIs can be instructive, even in the unilateral effects context. Finally, there has been substantial debate about the use and misuse of merger simulation methods. I will explain why I consider merger simulation methods to be of continuing value, and I will discuss the current debate as to which simulation approach is most useful.

2. MARKET DEFINITION

The exercise of market power requires that the firm or firms involved (collectively) face a relatively inelastic demand curve for a product at 'competitive' prices. Only then can it be profitable for firms to raise price by reducing output. There is currently some controversy as to whether it is appropriate to focus initially on demand when defining relevant antitrust markets, or whether one should incorporate both supply and demand elements in the analysis. The European Union appears to be

taking the latter approach, whereas the US competition agencies have taken the former.

If market definition analysis is to be utilized, I believe that the demand-side focus of the US Horizontal Merger Guidelines offers the most sensible way to proceed. There is sufficient complexity as to how one should undertake the analysis of demand, without further complicating the analysis by considering the timeliness and sufficiency of entry on the supply side.[2]

Identifying and estimating the relevant demand elasticities can be a difficult exercise. It is thought by some that such an exercise can only be accomplished when evaluating mergers in industries that generate substantial micro-level data, such as IRI or Nielsen scanner data. However, as Baker and Rubinfeld (1999) have described in detail, this is not the case. There are numerous methods for identifying the structure of demand, some of which do not require extensive data. Moreover, even in situations in which past experience is not sufficient to allow one to identify demand econometrically, conjoint survey methods offer a potentially valuable alternative approach.

A related issue surrounds the use of the SSNIP test in the analysis of relevant product markets. According to the US Horizontal Merger Guidelines (US Department of Justice and Federal Trade Commission 2010: para. 4.1.1),

> . . .the test requires that a hypothetical profit-maximizing firm . . . that was the only present and future seller of those products ('hypothetical monopolist') likely would impose at least a 'small but significant and nontransitory' increase in price ('SSNIP'). . .

While most would agree that the SSNIP test is conceptually valuable, there are many situations in which a complete SSNIP approach is not workable, either because of data limitations or because the market is so highly differentiated that there is no clarity as to the order in which products should be added if the initial hypothetical relevant market is not sustainable. While a good deal has been written about this subject, the US Merger Guidelines are largely silent.

As we review the guidelines developed in the EU and the more recent revision of the US Merger Guidelines, we should be cognizant of the fact that even when a full implementation is not possible, the Guidelines teach us to be careful in evaluating documentary evidence or evidence obtained by surveys. Marketing studies are often informative with respect to the list of possible products that may be included in a relevant market, but it is only occasionally the case that such studies offer sufficient information about demand elasticities to be of immediate, direct use. Similarly, posing

direct questions to consumers as to whether they would switch in response to a hypothetical price increase, without the context and implicit budget constraint that is part of a conjoint study, does not usually offer the best information about demand substitution.

While market definition is essential in most merger contexts, I believe that it is not essential in the analysis of all cases involving alleged anti-competitive behaviour. Under the US antitrust laws, market definition continues to be essential in cases involving monopolization or attempted monopolization. Despite this, there remains controversy. The Merger Guidelines pose the question of whether a single, profit-maximizing firm controlling a candidate market would raise price from the competitive level by a significant amount for a non-negligible time period. In merger situations, the competitive level is usually the *prevailing level*, except, for example, if the industry is currently coordinating prices at a monopoly level. In monopolization cases in which a firm may have monopoly power, it is necessary to consider raising price from the 'competitive' and not the 'monopoly' level. Alternatively, one might consider the profit loss associated with lowering the monopoly price by a small, but significant amount. Whatever one's choice, there is no uncontroversial approach to market definition in monopolization cases. Because it is often difficult to specify the competitive price level, a full, complete Guidelines analysis of market definition is difficult.

While the Guidelines can be useful (they ask the right questions and properly focus the analysis on the market demand curve), there are situations in the analysis of restraints of trade in which a direct analysis of competitive effects is likely to be more fruitful. The fundamental problem is this: a market definition analysis requires one to draw a line between those products that are in the relevant market and those that are not. In markets with highly differentiated products, that line-drawing exercise may be difficult and in some cases force one into making more or less arbitrary choices.

Suppose, however, that a direct analysis of unilateral effects shows a clear-cut result, one which is robust to (i.e., not affected by) the line drawing exercise as to which products are in the market and which are not. In this case, direct evidence of harm may render market definition unnecessary.[3]

A recent case brought by the Federal Trade Commission, in which I served as the FTC's economic expert, provides a useful example. In *FTC v. Warner Chilcott and Barr*, the Federal Trade Commission claimed that an agreement between a branded pharmaceutical company, Warner Chilcott, and a generic company, Barr, making Barr the exclusive supplier of Warner Chilcott's branded oral contraceptive Ovcon, was anticompetitive

under Section 5 of the FTC Act.[4] I submitted an expert's report in which I testified that had the agreement gone into effect, Barr's entry into the oral contraceptive industry as the sole supplier of generic Ovcon would have reduced at least some oral contraceptive prices.

The market definition exercise with respect to the Warner Chilcott–Barr agreement would have been a difficult one; there are a wide variety of contraceptives available in the market, and there are many oral contraceptives. Given the large number of competitors and the dynamic nature of competition in the industry, the decision as to which products are sufficiently close to Ovcon to be included in the relevant market would have been a difficult one. Yet, there was little doubt that branded Ovcon and generic Ovcon were each other's closest competitors, and it was my opinion that the closeness of the two products would have led to a price reduction immediately following Barr's entry of generic Ovcon into the market.

The essential claim of the Federal Trade Commission did not necessitate a discussion of market definition. The FTC's complaint spelled out the anticompetitive harm that flowed from the supply agreement in four paragraphs:

> 58. Entry of Barr's generic Ovcon would give consumers the choice between branded Ovcon and Barr's lower-priced generic Ovcon.
> 59. Had Barr entered the United States with its generic Ovcon, many consumers would have purchased Barr's lower-priced, therapeutically-equivalent generic drug instead of Warner Chilcott's higher-priced branded drug.
> 60. The agreement not to compete, which prevents Barr's generic Ovcon entry for five years, deprives United States consumers of the choice of purchasing Barr's lower-priced generic Ovcon instead of Warner Chilcott's higher-priced branded Ovcon.
> 61. Entry of Barr's generic Ovcon would benefit consumers.

The case was eventually resolved through two consent decrees, one with Warner Chilcott and one with Barr.[5] There is little doubt in my mind that the empirical analysis of the likely anticompetitive effect of the exclusive agreement was crucial to the parties' decision to void their exclusive agreement (and for Barr to then enter as a competitor). Market definition was not required in this situation, and appropriately so.

3. MARKET POWER

Market power can be ascertained through a combination of indicators, including (i) profit margins; (ii) market shares; and (iii) barriers to entry.

A fourth alternative, overall profitability, is often not viable because it is difficult to translate accounting measures of profitability into useful economic measures (see Fisher and McGowan 1983).

An examination of barriers to entry, as proposed by the US Horizontal Merger Guidelines, is essential if one is to evaluate market power. This is another area in which further development is clearly needed. One point that is often misunderstood relates to the difference between fixed costs and sunk costs. It is sometimes thought, incorrectly, that high fixed costs necessarily provide evidence of barriers to entry. Those costs will represent a barrier only if they are sunk. Suppose, for example, that a new entrant to an industry must build an expensive new plant and supply that plant with equipment. If that plant and equipment will have a valuable alternative use if the entrant fails to find financial success, then the bulk of the expenditures are not sunk. In this case, high fixed costs do not represent a barrier to entry. The evaluation of the nature of entry costs in dynamic industries can be difficult both conceptually and practically.

What about the use of profit margins as indicators of market power? While potentially valuable, profit margins must be used with care. The potential confusion arises between the textbook use of the term and the use of the term in merger and other antitrust analysis. In my co-authored microeconomics textbook, Pindyck and Rubinfeld (2009), I define market power for pedagogic purposes as arising when there is a gap between the price of a product, P, and marginal cost, MC. The Lerner Index, (P-MC)/P, a profit margin measure, is often used as an indication of market power. The index is useful in merger analysis because it serves as an important element in a unilateral effects analysis. Industrial organization economists use the fact that in Bertrand equilibrium with differentiated products the Lerner Index is equal to the inverse of the elasticity of demand for a product facing a firm to infer the elasticity of demand for the product. If we know the demand elasticity, we can infer the marginal cost of producing the product. Alternatively, if we know the marginal cost (or we can approximate it from accounting data), we can infer the relevant elasticity of demand (see Epstein and Rubinfeld 2004a for a detailed discussion).

Ultimately, the price-cost margin does not in itself offer a useful measure of market power for antitrust purposes. As my textbook explains, many firms have relatively high price-cost margins, yet they have little or no market power in the antitrust sense. This is particularly true in high-fixed cost, low-variable cost industries, often involving high technology, where incremental costs are low and profit margins are necessarily high (to cover the fixed costs). What is particularly important, but difficult to ascertain, is whether the price-cost margins are sufficient to allow the firm to invest in R&D and to earn a risk-adjusted competitive return. In sum, profit

margins do not offer a consistently reliable measure of market power; it is more appropriate to focus on the existence of barriers of entry.

It is sometimes thought that measures of concentration are useful only with respect to the analysis of coordinated effects, and not to unilateral effects analysis. In my opinion, this is not the case. Concentration can also matter in the evaluation of unilateral effects. Other things equal, the more concentrated the industry, the greater the predicted price increases that would be generated from the merger, absent efficiencies, repositioning, and entry. My own experience with merger simulation methods supports this point. To begin, suppose that the diversion of sales to competitors associated with a hypothetical price increase is proportional to current market shares. Then, other things equal, the greater the HHI, the larger the predicted price effects associated with the merger.

Of course, other things are not always equal. When the market demand elasticity is relatively high, and/or there are a number of relatively low cross-price elasticities, mergers in concentrated industries may generate small predicted price effects. It is for this reason that merger simulation methods – the subject of the final section of this chapter – can be valuable. Merger simulation uses inputted information on market shares, own price elasticities, and cross-price elasticities to generate predicted prices.

Another controversy relates to the use of measures of market power in dynamic industries. Merger analysis should be forward looking, even if it is based on historical trends and current snapshots. In dynamic, innovative industries, in which market shares are changing rapidly over time and entry is likely, current and historical market shares are likely to provide a poor indication of future competitive effects.

The impact of this discussion is not that one should avoid the use of concentration entirely, but rather that one should put the information into proper context. If the industry under study is one in which innovation is generating new products offered by new entrants and that are likely to provide significant competitive pressure on existing products, the firms that are expected to put new products into the market place should be given greater significance than historical concentration measures would suggest.

It is essential that the antitrust authorities and courts account for the dynamics of markets, taking into consideration recent evidence concerning technology, innovation, and firms' competitive strategies. As a general rule, the authorities have done so, although there is always room for improvement, as economic evidence continues to inform the issues. Rubinfeld and Hoven (2001) provide some examples of supporting evidence. The article points out that the DoJ–FTC Intellectual Property Guidelines give serious and substantial treatment to both technology

and innovation markets. It also explains that the DoJ–FTC Horizontal Merger Guidelines offer guidance as to how to incorporate innovation and technology issues into analyses of market definition, market concentration, entry, and competitive effects. Finally, the article notes that the Antitrust Division of the US Department of Justice has utilized models of Schumpeterian competition as well as insights from the literature on innovation management and evolution in its merger work. The analysis of a proposed Lockheed–Northrop merger (which was blocked by the Antitrust Division) offers a particularly interesting example of an investigation in which the core theory was driven by considerations of dynamics and innovation.

There is an important qualifier here. The fact that a market is innovative and dynamic should not give a merger a free pass. It is appropriate to ask whether the merger will cause the new entity to have durable, lasting market power that could lead to sustainable high prices. A dominant firm in an industry with significant barriers to entry, that has had stable, high market shares, is a firm that may have had market power in the past. (One needs to ask further whether there are substantial barriers to entry, whether prices are above competitive levels, and whether the firm has the ability to exclude rivals.) If that firm is making an acquisition, it is relevant to ask whether that stability and dominance can be expected to continue in the future. Indeed, it is particularly appropriate to ask on the one hand whether the firm that is being acquired would have threatened the dominance of the acquiring firm and, on the other hand, whether other firms in the industry are likely to offer superior products or services with the potential to undermine the market power of the dominant firm.

What about network industries? Should market power be treated differently when there are network effects? My answer is yes. Network effects can create barriers to entry. Moreover, in network industries concentration brings with it both benefits and costs. It is quite possible that a dominant firm in a concentrated industry can generate substantial benefits that flow from control over a large network. One might be tempted to conclude that increased concentration is necessarily pro-competitive, since consumers benefit from access to the network. However, in some cases those benefits may be short lived. A merger that increases concentration in the network industry could substantially reduce the ability of other firms in the same industry to compete for the network. Thus, two firms of equal size may generate smaller short-run network benefits, but the two firms may compete aggressively for the network. This network competition can generate substantial long-term benefits. Indeed, network competition has the potential to be an important source of innovation in dynamic industries.

4. MERGER SIMULATION

Merger simulation is a set of quantitative techniques that are used to predict price effects of mergers in markets with differentiated goods. Applied to unilateral effects analysis, it has been used to assess the magnitude of merger-specific efficiencies (reductions in marginal costs for the merging firms) required to offset predicted price increases and to evaluate the adequacy of proposed divestitures. Simulation can also help analyse the competitive effects of product repositioning and *de novo* entry. Simulation methods are continuing to be developed and the scope of their possible application is being broadened. Yet, there has been substantial criticism of merger simulation methods and a plea for care in applying simulation only when the appropriate foundation has been laid (for example, Werden, Froeb and Scheffman 2004).

Merger simulation analysis is carried out in two stages. In the first stage, the estimation of a demand model provides own and cross-price elasticities of demand for the goods in the pre-merger market. In the second stage, one solves the first-order conditions (FOCs) for post-transaction profit maximization by the new, post-merger entity. The standard approach in current work is to assume Bertrand competition with constant marginal costs of production.[6] The post-transaction FOCs differ because they take account of both the cross-price elasticities between the two merging firms and the merger-specific efficiencies. Moreover, the demand model implies new elasticities as prices change in the new equilibrium. The solution finds the new post-transaction prices that are consistent with all of these effects.

Within the world of merger simulation, there is substantial debate concerning the choice of demand model. The more sophisticated and complex the demand model, the more likely it is that an appropriately calibrated model can give accurate predictions of the price effects of a merger. (This presumes, of course, that the merger does not change the nature of the strategic interaction among firms. If there is such a change, merger simulation is likely to be the appropriate methodology.)

However sophisticated demand estimation requires not only substantial data, but also significant calendar time. In the context of an active proposed merger, both data and time limitations can be crucial. For this reason, I find the use of less complex models often to be advantageous. If one can comfortably make the underlying assumptions that support the simpler models, useful merger simulations can be carried out relatively quickly and without the necessity of putting together a large dataset. My own sentiment lies towards simplicity, which is what provided the motivation for my joint work with Roy Epstein in producing a merger simulation methodology that can be applied simply, utilizing Microsoft Excel.[7]

To get a sense of the trade-offs involved with the various merger simulation methods, it will be useful to describe four alternative demand models: (i) The Berry, Levinsohn, and Pakes (1995) version of the random coefficients logit demand model ('BLP'); (ii) the Almost Ideal Demand System advocated by Hausman, Leonard, and Zona (1994) ('AIDS'); (iii) the antitrust logit model espoused by Werden and Froeb (1994) ('Logit')[8]; and (iv) the proportionality-calibrated AIDS model, or 'PCAIDS', developed by Epstein and Rubinfeld (2004a, 2004b). Each model should be viewed as an approximation to the 'true' underlying structure. The models differ in their data requirements, the difficulty in calibration, the flexibility in representing price elasticities, and the bottom-line predictions of price changes. BLP is the most complex and the most demanding, while PCAIDS is the least complex and the easiest to apply.[9]

A brief background discussion will provide a useful perspective on the trade-offs involved in choosing among the various demand models. The estimation of any general formulation of a demand model involving numerous products will require a large number of parameters to be estimated. The central methodological question is how to specify a simplified model that is tractable and has good predictive power. A related problem is that consumer tastes for differentiated products are likely to be heterogeneous; otherwise, we would not see differentiated offerings in the first place.

The random coefficients logit model builds on a discrete choice model of utility maximization in which the analyst specifies the utility function that underlies the demand model. This approach reduces the complexity of the most general demand model (i.e., reduces the dimensionality) by assuming that consumer demands can be described in terms of a modest number of underlying product characteristics. If demand can be characterized in terms of an appropriate set of characteristics, the random coefficients model can be estimated using either individual level or market level data.

As a practical matter, the BLP application of the random coefficients model is particularly advantageous because it can be estimated using only market level data and because it appears (to Nevo 2000 and others) to give more accurate price predictions. However, BLP suffers from the disadvantage that the demand estimation involves maximum-likelihood estimation, which can be difficult to apply, and because the success of the model depends crucially on the choice of an appropriate set of product characteristics.

The AIDS model starts with a functional form specification of the demand model, and as a consequence is less complex and demanding than the BLP model. Nevertheless, AIDS requires detailed consumer level price and revenue information, which for many consumer goods mergers are

supplied by scanner data. Because it can require the estimation of dozens of coefficients, it can be a significant econometric challenge to obtain a complete set of coefficients with plausible algebraic signs, magnitudes, and statistical reliability. Advocates of the random coefficients model find the possibility of 'wrong' signs associated with cross-price elasticities (suggesting that competing goods are complements rather than substitutes) to be very troublesome. I find this issue less disturbing than some – given the complex nature of price changes in some markets and given that demand estimation usually is restricted to a relatively short time period, an occasional 'wrong' sign does not seem problematic to me.

The antitrust logit model offers substantially greater simplicity than either the BLP or AIDS models. In its simplest form, this logit model requires only market shares, a measure of substitutability between products, and an estimate of the market demand elasticity. As a trade-off for the relative simplicity of its inputs, the logit model relies upon the relatively strong assumption that the cross-elasticities are identical across products.[10] Advocates of the random coefficients model find the antitrust logit model to be limiting, since the elasticity assumptions will not always be appropriate in mergers involving differentiated products.

The PCAIDS model offers a simplified version of AIDS that is similar in its data requirements to the basic logit model. PCAIDS requires only market shares, an estimate of the market's demand elasticity, and an estimate of the price elasticity of demand for one product involved in the merger. Like the logit model, PCAIDS assumes in its most basic form that cross-price elasticities between competing products are equal. PCAIDS and the logit model differ in their underlying demand curvature, which leads to different predictions of unilateral effects. When the assumption of identical cross-price elasticities for each product is not appropriate, both the basic logit model and PCAIDS can be generalized by introducing additional 'nesting parameters' to make the demand model more flexible.

The PCAIDS and logit models yield different estimates of price effects since elasticities change along the underlying demand curves as prices increase. Own-price elasticities increase and cross-price elasticities will also change. Even if all models are matched to the same set of pre-merger elasticities, the predicted post-merger prices will depend on the specifics of the mathematical relationships that define the demand system.

Ultimately, the issue of whether the benefits of merger simulation outweigh the costs remains an open one, as is the specification of the particular conditions under which each particular model is likely to be most effective. A number of recent studies have begun to offer some interesting answers to these questions. One particular interesting study, Craig Peters'

(2006), uses merger simulation methods to predict post-merger prices for five airline mergers.

Craig Peters suggests that merger simulation methods do not fare well. However, a careful reading of this insightful paper shows that the author's primary criticism goes to the failure of merger simulation models to account for supply-side effects and for more flexible models of firm conduct than the basic Bertrand model. However, either can be accounted for through merger simulation if a more sophisticated model is adapted. Moreover, Peters utilizes only two demand models, and so does not offer a comparative analysis of the efficacy of alternative demand models.[11]

It is worth reiterating that complexity typically comes at a cost, in terms of the calendar time needed to estimate the demand model, and in terms of the data demands. Furthermore, merger simulation may be much more effective in analyzing the price effects of mergers in industries other than airlines, where the traditional static non-cooperative oligopoly model may not offer the best characterization of competition.

5. CONCLUDING REMARKS

The use of economic analysis in antitrust analysis has been growing worldwide and the quality of that analysis has improved as well. This has been especially true with respect to the use of empirical methods. Along with the increasing sophistication of the methodologies that have been used have come a number of unsettled issues. In this chapter, I have pointed to three important areas that are ripe for further debate and discussion. First, while market definition is often a crucial and necessary first step in antitrust analysis, I have suggested that there are circumstances in which it is preferable to skip the definition of markets and move directly to the analysis of competitive effects. Second, I have explained why I believe that measures of concentration, such as HHIs, can be instructive, even when undertaking a unilateral effects analysis. Third, I consider merger simulation methods to be of substantial value, and I expect that value to grow along with the debate as to which particular methods are most appropriate (relatively general demand structures requiring very substantial datasets versus simpler demand structures necessitating less substantial datasets).

NOTES

1. The Hirschman–Herfindahl Index is calculated as the sum of the squares of the market shares of the firms in the relevant market.

2. A number of the points in this section were made in my 2007 testimony before the US Antitrust Modernization Commission.
3. This is consistent with the US Supreme Court's opinion in *FTC v. Indiana Federation of Dentists*, 476 US 447 (1986).
4. *Federal Trade Commission, v. Warner Chilcott Corporation and Barr Pharmaceuticals, Inc.*, FTC File No. 041 0034, Complaint, 7 November 2005.
5. *Federal Trade Commission, v. Warner Chilcott Corporation and Barr Pharmaceuticals, Inc.*, FTC File No. 041 0034; Final Order and Stipulated Permanent Injunction with respect to Warner Chilcott, 24 October, 2006; Final Judgment and Stipulated Permanent Injunction as to Barr Pharmaceuticals, Inc., 29 November 2007.
6. The Bertrand pricing assumption is standard in existing models because it is both analytically tractable and has been found to have empirical support. But when applying merger simulation to wholesale markets, one must think carefully before accepting the Bertrand pricing assumption. For example, a Bertrand equilibrium determined by continuously differentiable first-order conditions may not adequately describe wholesale markets where a large fraction of output is sold in a small number of 'winner take all' auctions.
7. See Epstein and Rubinfeld (2004) for a detailed description of the PCAIDS model.
8. Cf. Wilson, 'Using Experimental Economics to Understand Competition' in this volume.
9. For a useful overview of these methods, see the merger simulation chapter in Harkrider and Rubinfeld (2005).
10. The nested logit model relaxes this assumption.
11. The two models include a basic logit model and the generalized extreme value (GEV) variant of the random coefficients logit model of Bresnahan, Stern, and Trajtenberg (1997).

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