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## Merger Control

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## From Structure to Effects: the Economics of Merger Control

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Over the past 30 years, the US Merger Guidelines have been revised many times, primarily to reflect changes in actual practice. Throughout, however, they have maintained their central focus on a two-part structural analysis by first using the concepts of the “hypothetical monopolist” to define the “relevant market”, then measuring the effect of the merger on concentration in that market. This follows the traditional paradigm in industrial organisation, according to which structure (eg, concentration) affects behaviour (eg, price discrimination, collusion, etc), which in turn affects performance (eg, prices, innovation, etc), so that the effect of a merger on performance can be predicted at least roughly from its effect on structure. This has always been something of a leap of faith, resting on only very general support from empirical findings on either the relationship between concentration and performance or the effect of mergers on prices. Based on those findings, using concentration alone it is difficult to predict even the direction of the effect of a proposed merger on prices, much less, the size of that effect.

The guidelines had two purposes. The first was to provide external guidance to potential merging parties to let them assess, with only the information available to the parties and at reasonable cost, whether their merger was likely to raise concerns at the agencies. A second and quite separate purpose was to provide an internal guide or roadmap for the agency attorneys and economists that, while not necessarily complete, would impose consistency and transparency on their analyses. The guidelines have served us well, by increasing both the consistency and predictability of agency responses. Nevertheless, as the structural analysis described in the guidelines has evolved into an ever more precise but also more complex and even arcane form, the merger review process has become ever more time consuming and costly.

Over the past 10 years (since *Staples*), however, the focus of merger analysis (perhaps initially among economists, but now also among attorneys) has moved from the kind of detailed structural

analysis laid out in the guidelines to a much more direct and quantitative analysis of the effect of a merger on performance. As a result, the current guidelines are, at the least, incomplete as a guide either to parties contemplating a merger or as a description of the actual analysis of mergers at the agencies.

Among economists, the superiority of effects analysis over structural analysis has never been the issue. The shift in focus from structure to effects has occurred for at least three reasons, each of which we discuss in more detail, with examples, below. First, an increasing number of mergers appear to be occurring in industries where prices are negotiated individually. In these industries, the “market definition” process and other structural exercises are largely irrelevant, while an effects analysis using bid data is both relatively easy and compelling. Analysing the effects of a merger in this context does not require a structural model as each contract constitutes a separate market. A merger in a bid market will only affect prices if the merging parties would have been the first and second lowest bidders for the contract. The second reason for the shift toward effects analysis is the explosion in the amount of data available in machine-readable form. Scanner data, as well as bid data, provide a wealth of information that can now be analysed in less time (and at a smaller cost) given the increases in computer processing speed. The third is the advances in both the theory and implementation of economic models of the effects of mergers on prices.

### The current structural analysis

In gauging the competitive effects of horizontal mergers, competition authorities and practitioners in several jurisdictions first define the relevant market by asking whether a “hypothetical monopolist” that was the only supplier of a product in an area could profitably impose a small but significant and non-transitory increase in price (the SSNIP test), and then inquiring whether the merger would increase concentration significantly among the suppliers in that market. This approach to evaluating horizontal mergers

requires collecting and analysing large amounts of empirical data on various elements of market structure: the number and size distribution of firms used to compute Herfindhal-Hirschman indexes (HHI) or other measures of concentration; factors relating to barriers to entry such as economies of scale and scope, sunk costs, capital requirements, and capacity utilisation; entry and exit of firms; geographic size, growth, and product characteristics of the relevant markets; availability and degree of substitutability between different products; imports and foreign competition; existence of countervailing buyer power, as well as other quantitative and qualitative information on the competitive dynamics between firms in the industry, including the merging entities themselves.

The data and information collection and provision requirements impose heavy costs on both the competition authorities and the transacting parties. Moreover, the guidelines approach does not necessarily eliminate the imprecision and subjective judgements entailed in evaluating the competitive effects of a merger. When disagreements arise, it results in costly and protracted litigation. One area where this frequently takes place relates to defining the ‘relevant product market’. Merging parties tend to define the relevant market broadly while competition authorities define it narrowly. Although computations of price correlations between products, and price and cross-elasticities of demand may assist in resolving some differences, it needs to be ensured that the computed measures are reasonably stable and not arrived at through selective presentation or ‘mining’ of data.

The guidelines’ approach to evaluating the competitive effects of a horizontal merger raises other issues as well. For one, it is not really applicable to increasingly frequent situations of mergers occurring in “bid markets”. Competition in such markets takes place in the form of bidding for individual contracts to supply goods and services specifically tailored to the client’s needs. Computing and conducting market share analysis in these types of cases would be irrelevant to establishing market power because, based on economic analysis, each contract constitutes a separate market.

A second problem with the predictions of structural analyses is that they are only as good as the oligopoly models that they use, yet we seldom, if ever, know what the appropriate

model is in any particular case. The HHI, for example, is an appropriate index of competition in a Cournot oligopoly model where firms produce homogeneous products with different but constant costs. While the HHI may be the single most appropriate screening index for potential merging parties to calculate in their assessment of the potential antitrust implications of their merger, using the HHI to predict the price effect of mergers first requires establishing empirically that prices in the proposed market are significantly and positively related to the HHI over time or across geographic markets.

### **Differentiated products**

One major innovation in effects analysis has been the attempt to simulate the effects of mergers in industries producing differentiated products, where the standard Cournot model is inapplicable. The methodology attempts to model the equilibrium price both pre- and post-merger in order to assess the anti-competitive outcome of a merger. The analysis is conducted in several stages. Once the own price and cross-price elasticities of the major products of the merging parties and those of other competitors in the industry are estimated, an assumed demand system is calibrated using those elasticity estimates, the equations describing the Bertrand equilibrium is used to solve for the marginal costs for the merging and non-merging firms, and the effect of the merger on prices and welfare is simulated. (A leading academic exponent of merger simulation in industries with differentiated products is Professor Luke Froeb, and perhaps the best way to understand and utilise these models is to see Gregory J Werden and Luke M Froeb, “Unilateral Competitive Effects of Horizontal Mergers” in *Handbook of Antitrust Economics* 43, edited by Paulo Buccirossi, Cambridge: The MIT Press, 2008.)

To the extent that this methodology provides a reliable estimate of the competitive effects of a merger, it can reduce or even eliminate debates over which products are to be included or excluded in defining the relevant market. The data requirements, however, can be very large and burdensome, the estimates of own and cross-elasticities can be biased, inconsistent, unstable and at times implausible. Nevertheless, this type of analysis represents a significant advance in our ability to assess mergers among producers of differentiated products.

There are shorter, less data-intensive procedures that allow a “back-of-the-envelope” estimate of mergers involving differentiated products. Stylised simulation models have been developed that substitute a priori restrictions on demand parameters in exchange for extensive reductions in the size of the data inputs necessary to make predictions. (See, for example, Carl Shapiro, “Mergers in Differentiated Products”, *Antitrust*, spring 1996, p23-30, and Gregory Werden and Luke Froeb, “Simulation as an Alternative to Structural Merger Policy in Differentiated Products Industries”, in *The Economics of the Antitrust Process*, edited by Malcom Coate and Andrew Kleit, Boston: Kluwer Academic Press, 1996.)

### **Merger simulation based on empirical estimates of the effect of structure on prices**

In many cases, the relationship between structure and prices can be estimated directly. As opposed to the multistage process described above of estimating demand elasticities and inputting them into a specific oligopoly model, this kind of “reduced form” modelling is parsimonious in both data and assumptions, and is much easier for non-economists to understand. In the first stage, time-series and cross-section data are often pooled to estimate the equilibrium relationship between structure and prices, and the coefficients are then used to predict the effect of the merger on prices in each relevant market. This requires, of course, that the historical data contain enough variation in structure and prices, either over time or across geographic regions, for the analyst to be able to isolate that relationship.

A leading example of this is the analysis carried out by the FTC in their opposition to the merger between Staples and Office Depot, and the analytical approach adopted in that case has been a “progeny” for similar analysis conducted by both the competition authorities and the merging parties in several subsequent matters. Indeed, “doing a Staples” has become a term used to describe this type of analysis by practitioners with experience in this field.

In *Staples*, the econometric analysis of scanner data demonstrated that prices charged by each of the three office supply superstores were lower when they faced competition from one or two of the other office supply superstores. For example, on average, Staples’ prices in markets where it was

the only office supply superstore were 11.6 per cent higher than in markets where it faced Office Depot. (See Serdar Dalkir and Frederick Warren-Boulton (1997), “Prices, Market Definition, and the Effects of Merger: Staples-Office Depot”, *The Antitrust Revolution: Economics, Competition and Policy*, 4th edition, edited by John E Kwoka Jr and Lawrence J White, New York: Oxford University Press, 2004.) Moreover, the published advertisements showed that the stores often offered the same or similar basket of office supplies in different locations at the same time, but at very different prices, depending on whether a rival office supply superstore was present in that local market.

*Staples* was also the first case in which financial market data on stock prices was also presented in court. Financial market investors vote (or bet) with their dollars on whether a merger will raise or lower prices. If investors expect that the merger will lead to higher prices that will benefit rivals of the merging parties, they will bid up the share values of those rivals. Conversely, when investors expect the efficiencies from a merger to be so large that the merger will lead to lower market prices, the share values of the rivals will fall. Thus, examining what happens to the share prices of rivals as the probability of the merger goes up (eg, a merger is announced) or down (eg, an agency moves to block the merger) can be used to predict price effects, especially when significant merger-related efficiencies are alleged.

In *Staples*, the expert for the FTC analysed the effects of the proposed merger on the share price of OfficeMax and concluded that, if consummated, the merger would raise the value of OfficeMax’s shares by 12 per cent. Thus, the financial community was betting that the proposed merger would raise the prices charged by all office supply superstores. The US\$200 million estimated increase in the value of OfficeMax was consistent with a 6.7 per cent price increase for office supplies in markets where OfficeMax competed with both Staples and Office Depot, a price increase that was very close to the price increase predicted from the econometric analysis and price comparisons across markets. (See Frederick R Warren-Boulton and Serdar Dalkir, “Staples and Office Depot: An Event Probability Case Study”, *Review of Industrial Organization* 19 (December 2001).)

### Estimating the effects of mergers in markets where prices are product or customer specific

A large number of mergers of antitrust interest appear to be occurring in industries where prices are individually negotiated by customers. As noted above, in such cases each customer becomes a separate relevant market from an economic perspective, making the standard process of market definition unnecessary, but also providing an easy and direct way to estimate the price effects of a merger. Prominent examples include Oracle's acquisition of PeopleSoft, which the US Department of Justice sought to block. Although DoJ was eventually overruled at trial, the same type of analysis also applies to a host of markets, including auctions, bid and procurement markets and geographic markets involving products with significant transportation costs.

The intuition should be clear to anyone who has attended a standard auction in which the auctioneer continues to call out higher prices until only one bidder is left. Several characteristics are immediately apparent. First, the bidder with the highest valuation wins the bidding but pays an amount just above the valuation of the second-highest bidder. Second, collusion or a merger will only affect the final bid or price paid by buyers if it involves the two parties who would have ranked first and second in the valuations. A merger or agreement between the parties with the highest and third-highest or the second and third-highest will not affect the amount of the winning bid. Third, the expected value of the price increase from a merger between those two parties can be expected to equal the difference between the valuations of the second and third-ranked bidders.

This analysis translates directly into determining the effect of a merger on prices paid by customers in markets where prices are negotiated individually. Analogous to the auction, at least in the absence of collusion, the lowest incremental cost supplier wins at a price equal to the cost of the second-lowest firm. Mergers will only raise prices to consumers in instances where the merging parties are their first and second-ranked choices, in which case the price increase will equal the cost differential between the second and third-lowest cost potential supplier.

One corollary of this analysis is that efficiencies are only passed through to customers in competitions where the merged firm is the second-

lowest cost firm in each specific instance. Thus, mergers in bid markets tend to result in higher prices for some customers of the merging parties, but will also force rivals to charge lower prices where one of the merging firms is the second-lowest cost firm, and the merger has reduced its marginal costs.

Especially where the analysis is being carried out by an economist for the merging parties, one major advantage of this approach is that the price effect from the merger incorporating both market power and efficiencies can thus be estimated using only data from the merging parties. In a typical example involving two large national suppliers of relatively homogeneous products, MiCRA estimated delivered prices for a number of products of each of the merging parties at approximately 150 locations, as a function of marginal costs and distances to the closest, second-closest and third-closest competitors. The estimated coefficients were then used to predict price increases where the merging parties had the closest and second-closest plants, and price decreases where one of the merging parties had the second-closest plant and the merger would result in lower marginal costs at that plant.

Estimating the effect of a merger on prices can be even easier in markets where prices are determined through a first-price sealed bid process, as in most government procurement, and complete data on bid prices is available. In this case, the expected effect of a merger is simply the difference between the bid prices of the merging parties when and only when they are the lowest and second-lowest bidders, sometimes referred as the amount of "money left on the table" in the past by the merging parties.

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Developments in industrial organisation economics, increased availability of machine-readable data, improved desktop computational capabilities and the increasing number of mergers involving markets where prices are negotiated individually have all contributed to the evolution of merger analysis from a structural analysis to an effects-based approach. While not completely eliminating the need for a structural analysis, at least as background, an effects-based analysis can (in some cases greatly) reduce arguments and subjectivity encountered when defining the geographic and product characteristics of the relevant market, and

the associated regulatory burden of collecting, and providing large quantities of data and other extraneous information.

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MiCRA is a Washington, DC-based economics consulting firm specialising in applied microeconomics, industrial organisation and econometrics. We provide high-quality economic analysis, expert testimony, litigation support and economic research to law firms, corporations, government agencies and trade associations in the United States and abroad, including Canada, the European Union and South America. Our practice areas include antitrust liability and damage analysis, regulatory economics and intellectual property issues. Recently we have expanded our practice to provide policy and technical advice to developing countries through donor-funded projects.

Our firm was founded by several US Department of Justice antitrust division economists, including Frederick Warren-Boulton (former chief economist and deputy assistant attorney general for antitrust analysis), Ken Baseman, Steve Silberman and David Eisenstadt. We have provided expert testimony in several prominent antitrust cases including *US v Microsoft* (for DoJ and the States), *FTC v Staples* (for the FTC), *LePage's v 3M* (for plaintiffs), *In Re: Vitamins Antitrust Litigation* (for defence) and *US v AT&T* (for DoJ). We have also been retained by private parties in several industries (eg, cement and ocean shipping) to counter allegations of price fixing in the European Union. In addition, we have assisted merging parties by analysing the competitive effects of their global acquisitions across multiple jurisdictions, including Luxottica Group SpA's acquisition of Oakley Inc, Reed Elsevier's acquisition of Harcourt General, Hewlett-Packard's acquisition of COMPAQ, and Brahma Beer's acquisition of Antarctica in Brazil.



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R Shyam Khemani recently joined the Washington, DC-based economics consulting firm MiCRA as a principal. Prior to joining MiCRA, he was adviser of competition policy in the financial & private sector development vice-presidency of the World Bank Group, Washington, DC. He has advised governments and business in over two dozen industrial and developing countries on various competition, regulation, micro-industrial economics and international trade issues.

Between 2000-2002 he resided in Paris, where he served as director, LECG European operations and was involved in policy and case specific issues in different jurisdictions, including the European Union. Previously he worked with the Canadian Competition Bureau, where he was chief economist and director of economics and international affairs, and earlier, adviser on merger policy. He has been engaged in merger analysis of a wide range of cases: transformers, petroleum refining, industrial chemicals, steel, newspapers and courier services, among others.

He is a member of the advisory board of the Bureau of National Affairs' Antitrust and Trade Regulation Report, co-director of the International Bar Association's Global Forum on Competition, and serves on various working groups of the American Bar Association, the International Chambers of Commerce, and the International Competition Network. He has served on the Faculty of Business Administration and Commerce at the University of British Columbia, and several other Canadian universities.

Dr Khemani has published monographs and articles in various journals (eg, *Journal of Industrial Economics*, *International Journal of Industrial Organization*, *Antitrust Bulletin*, *Applied Economics* and *Policy Options*), and co-edited books on competition policy. ■



### Frederick R Warren-Boulton

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Frederick R Warren-Boulton has extensive academic, government, and private sector experience in antitrust and regulatory economics. He has testified and published extensively on these issues and is an internationally recognised expert in the economics of vertical restraints. As a consultant, Dr Warren-Boulton provided economic analysis and expert economic testimony in numerous matters, including his testimony for DOJ in *US v AT&T*, for the FTC in *Staples* and for the States and DOJ in *Microsoft*.

From 1983 to 1989, Dr Warren-Boulton served as chief economist of the Antitrust Division, US Department of Justice, where he became the first deputy assistant attorney general for economic analysis. As chief economist, he supervised the analysis of economic issues in all matters coming before the Division. He also contributed to the formulation of Division policy such as the 1984 Merger Guidelines, the Vertical Restraint Guidelines, and the antitrust provisions of the Sentencing Guidelines and to the Division's legislative initiatives on resale price maintenance, revisions of the antitrust statutes, and oil pipeline deregulation.

Before joining DOJ, Dr Warren-Boulton was associate professor of Economics at Washington University (St Louis) and resident scholar at the Center for the Study of American Business. Before co-founding MiCRA, he was resident scholar at the American Enterprise Institute, senior vice president of ICF Consulting Associates, research professor of Psychology at The American University, and visiting lecturer at Princeton University (1991). He received his BA from Yale University and his MA, MPA and PhD from Princeton University. ■



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Renée M Duplantis is an economist at the Washington, DC-based economics consulting firm MiCRA. During her five years at MiCRA, she has worked principally for private parties and government agencies analysing the competitive effects of proposed acquisitions, including Luxottica Group SpA's recent acquisition of Oakley Inc. She has also estimated damages and economic liability in price-fixing cases for clients in the US, Japan and the European Union. She received her Bachelor's degree from the University of Louisiana at Monroe, her Masters degree from Duke University, and is currently ABD at Northeastern University, where she expects to complete the requirements for her PhD in May 2009. Her dissertation focuses on evaluating alternative econometric models for estimating the price effects of mergers. ■