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New Tools for Competitive Effects: Do We Really Know What Works Best?

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I. INTRODUCTION

Competition agencies around the world are charged with the task of identifying and challenging mergers and acquisitions that are likely to substantially lessen competition. Agencies have over the years relied upon a wide range of information and economic theories to investigate the likely competitive effects of proposed transactions. Furthermore, the types of information and the economic models and tools employed by agency staff have evolved over time, largely in response to developments in economic theory and legal thinking. Developments in oligopoly theory on the one hand, and econometric methods for analyzing price and quantity data on the other, have shaped the theories of harm articulated by the agencies and the empirical tools used to investigate those theories. Many of these developments are reflected in merger guidelines issued by competition agencies in order to assist merging parties and antitrust practitioners generally.

Over the last few years, there has been a lively debate among antitrust practitioners and the academic community about the appropriate tools for analyzing unilateral effects in a merger investigation.[2] The debate was fueled in part by the 2008 publication of a working paper by Joseph Farrell and Carl Shapiro that proposed a new method for analyzing the competitive effects of mergers in differentiated products industries.[3] Acknowledging the enormous challenges faced by competition agencies, Farrell & Shapiro proposed a measure of upward pricing measure ("UPP") as a simple screen for likely unilateral effects in a merger between rivals in a differentiated products industry. Contributors to the debate have discussed the relative strengths and weaknesses of UPP versus other empirical tools for identifying anticompetitive mergers, including so-called natural experiments, merger simulation,[4] diversion ratios, and critical loss

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[2] For a few examples of this debate *see* the papers published in 12(1) ANTITRUST CHRON., (Winter 2009) and *Symposium on the 2010 Merger Guidelines*, (10)1 ANTITRUST SOURCE, October 2010.

[3] J. Farrell & C. Shapiro, *Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition*, 10(1) B.E. J. THEORETICAL ECON. POL'Y & PERSPECTIVES, Article 9, (2010). The original 2008 Farrell & Shapiro working paper *is available at* http://www.econ.berkeley.edu/~farrell/ftp/Unilateral73.pdf.

[4] I use merger simulation in this article to refer to formal structural models of demand and supply that can be used to quantify how a merger would change incentives to increase price and used to predict what equilibrium prices would be post-merger.

analysis for competitive effects. In this article, I do not intend to weigh in on this debate.[5] Instead, I will attempt to summarize efforts to evaluate empirically the relative strengths and weaknesses of the empirical techniques used to analyze theories of unilateral effects.

To assess the performance of the various empirical tools available to competition agencies I consider results from recent empirical research that evaluates the success of empirical models used to predict price changes following a transaction. The results from this research would seem to be especially important to inform the ongoing debate about which empirical technique is best able to identify anticompetitive transactions. As discussed in more detail below, there is a small but growing body of empirical work that provides some evidence on how best to identify mergers likely to be anticompetitive. I will also briefly discuss a second strand of research that considers whether the empirical tools for identifying anticompetitive mergers can accurately predict agency enforcement decisions.

II. MERGER GUIDELINES INCORPORATE NEW ECONOMIC TOOLS

The intensity of the ongoing debate about the best economic methods for predicting the price effects of a merger reflects the fact that merger guidelines in some jurisdictions are being updated to adopt the new economic models and empirical tools.[6] For example, many of the empirical techniques for identifying anticompetitive mergers are discussed explicitly in recently revised merger guidelines in the United States and the United Kingdom and are being considered in other jurisdictions as well. The revisions adopted in the new guidelines reflect a shift away from structural presumptions and now explicitly incorporate a focus on analyzing competitive effects directly.

The recently revised U.S. Horizontal Merger Guidelines ("HMGs") state that, while the agencies normally identify a relevant market, the analysis need not start with market definition. The HMGs also note that some of the tools used to assess competitive effects do not require market definition and specifically discuss empirical methods such as merger simulation models, upward pricing pressure, and natural experiments, among others.[7]

The new U.K. Merger Assessment Guidelines also explicitly discuss methodologies that would seem to include a UPP approach to evaluating a merger. The U.K. guidelines state that the analytic approach to assessing whether there is a substantial lessening of competition includes two related components: market definition and competitive effects. The U.K. guidelines are careful to indicate that these two components do not represent distinct analyses and will, in fact, overlap in their analysis. However, Paragraph 5.4.9 describes the factors taken into account in assessing horizontal unilateral effects and these factors include the components of Farrell & Shapiro's UPP methodology, such as margins and diversion ratios.[8]

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[5] Several co-authors and I shared our perspectives on the discussion in an earlier paper. *See* E.M. Bailey, G.K. Leonard, G.S. Olley, & L. Wu, *Merger Screens: Market Share-Based Approaches versus 'Upward Pricing Pressure'*, 9(31) ANTITRUST SOURCE, (February 2010).

[6] However, discussions around revisions to the U.S. merger guidelines suggest that many of the techniques being incorporated explicitly into the U.S. guidelines have already been in use by U.S. competition agencies.

[7] *See* http://www.justice.gov/atr/public/guidelines/hmg-2010.html.

[8] *See* http://www.competition-commission.org.uk/about_us/our_organisation/workstreams/analysis/pdf/100916_merger_assessment_guidelines.pdf.

Following on the heels of changes in the U.S. and the U.K. merger guidelines, the Canadian Competition Bureau ("Bureau") on February 25, 2011 announced its plans to revise the Canadian Merger Enforcement Guidelines ("MEGs"). Among other planned revisions, the Bureau noted specifically that it is exploring revisions that would "provide more detailed guidance on how the Bureau assesses the unilateral effects of a merger, particularly in light of current economic thinking."[9] We will have to wait until the draft revised MEGs are published later this year to see how current economic thinking is incorporated into the new MEGs. However, some clues are available in a discussion paper published by the Competition Bureau in the fall of 2010, prior to a series of public consultations about the merits of revising the MEGs. Specifically, the Bureau asked in the discussion paper for commentary on whether it should include more detail on merger simulation, demand estimation, upward pricing pressure, or diversion ratio analysis in its discussion of unilateral effects.[10]

III. WHICH EMPIRICAL TECHNIQUES WORK BEST?

The debate about which economic tools are most appropriate for identifying anticompetitive mergers is likely to be resolved only by analyzing empirically the outcomes of cleared mergers, including whether mergers lead to anticompetitive effects. The best approach will almost surely depend on a number of factors, including the stage of an investigation, overall facts of the case, and data available for empirical analysis. In this section I discuss results from various efforts to evaluate the accuracy of alternative economic models in predicting the effect of mergers. The research discussed below focuses on two broad questions about the success of the merger review process. The first is an analysis of how accurately alternative empirical techniques predict the competitive effects of a merger. The second asks a slightly different question—namely, whether certain techniques predict agency enforcement actions better than others.

A. Retrospective Studies

In recent years there have been a number of studies that evaluate the competitive effects of historical mergers.[11] This line of research faces several challenges. First, as various authors have noted, retrospective merger studies are limited to consummated mergers that have been cleared by the competition agencies. Furthermore, the mergers analyzed in these studies do not represent a random sample from all consummated mergers. Instead, the studies tend to focus on marginal mergers, or close calls, which may not be typical of all transactions reviewed and cleared by competition agencies.[12] Second, post-merger prices can be difficult to measure accurately. Finally, the appropriate comparison involves comparing prices post-merger to what prices would have been, absent the transaction. Perhaps as a result of these challenges, there is only limited empirical evidence on the competitive effects of mergers.[13] Carlton highlights some

[9] *See* http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03350.html.

[10] *See* http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03296.html.

[11] For two recent surveys *see* M.C. Weinberg, *The Price Effects of Horizontal Mergers*, 4(2) J. COMPETITION L. & ECON, pp. 433-447 (2008), and G. Hunter, G.K. Leonard, & G.S. Olley, *Merger Retrospective Studies: A Review*, ANTITRUST, pp. 34-41 (2008). For another perspective, *see* T.O. Barnett, *Current Issues in Merger Enforcement: Thoughts on Theory, Litigation Practice, and Retrospectives*, (June 26, 2008), *available at* http://www.justice.gov/atr/public/speeches/234537.htm.

[12] For additional discussion, *see Id.*, Hunter et. al, at 34-41. Retrospective merger studies also focus on industries for which price data are readily available.

[13] *See* O.C. Ashenfelter, D. Hosken, & M. Weinberg, *Generating Evidence to Guide Merger Enforcement*, 5(1) GLOBAL COMPETITION POL'Y, 5(1), Spring 2009, which surveys some of the recent empirical work on retrospective merger

of the difficulties in evaluating the effectiveness of merger policy and suggests that it is critical to combine analysis of data from pre- and post-merger markets with data on predictions of competitive effects from the competition agencies.[14]

Ashenfelter and Hosken address some of the challenges discussed above by suggesting methods for calculating price increases following a merger.[15] They evaluate the price effects for five recent consumer products mergers and find that in four out of the five mergers, prices increased relative to what likely would have occurred absent the merger.[16]

In addition to measuring the effects of mergers on prices, several recent papers have attempted to compare predictions from merger simulation models to actual price changes following a merger. Peters examines five mergers in the airline industry and finds that the merger simulation models do not accurately predict actual price changes.[17] The author demonstrates that different assumptions about the demand structure lead to very different predictions for the price effects of the mergers.[18] Furthermore, Peters argues that the differences between observed price changes and predicted price changes are likely explained by actual firm behavior deviating from the behavior assumed in the economic models.

Weinberg and Hosken present results from an analysis of two mergers and show that commonly used oligopoly models lead to mixed results.[19] They find that in one merger the simulation results overestimated actual price changes but, in the other, price predictions were close to actual prices changes. However, Weinberg and Hosken state that the simulation results taken by them would have led to the wrong conclusions about the competitive effects of the mergers. Weinberg presents results from another study that compares the predictions of merger simulation models to actual price changes.[20] He finds, using standard assumptions about equilibrium behavior and demand models, that the simulation models underestimated actual price effects.

One possible explanation for why merger simulation models have trouble fitting actual price changes following a transaction is that the demand system is not flexible enough to accurately capture substitution patterns between competing products. A recent paper by Knittel and Metaxoglou uses an alternative demand system to those considered by Weinberg and

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analysis. They also discuss how this evidence might be used to evaluate alternative tools for predicting the competitive effects of mergers.

[14] D. W. Carlton, *Why We Need to Measure the Effect of Merger Policy and How to Do It*, 5(1) COMPETITION POL'Y INT'L, (Spring 2009).

[15] O.C. Ashenfelter & D. Hosken, *The Effect of Mergers on Consumer Prices: Evidence from Five Selected Case Studies*, NBER working paper No. 13859 (March 2008). *Available at* http://www.nber.org/papers/w13859.pdf.

[16] *Id.* Ashenfelter & Hosken use difference-in-differences estimators to control for other confounding factors that might have changed at the time of the merger and affected prices.

[17] C. Peters, *Evaluating the Performance of Merger Simulations: Evidence from the U.S. Airline Industry*, 49(2) J. L & ECON., pp. 627–649 (2006).

[18] Peters (*Id.*), and the two papers discussed below (*infra* notes 19 and 20), also attempt to control for other confounding factors that might have caused prices to change. As Weinberg & Hosken (*infra* note 19) state, the goal is to approximate the "counterfactual change in prices had the merger not occurred."

[19] M.C. Weinberg & D. Hosken, *Using Mergers to Test a Model of Oligopoly*, working paper, (September 2009). The authors note that there has been very little research to evaluate the predictive ability of alternative empirical tools used in merger review. *Available at* http://sites.google.com/site/matthewcweinberg.

[20] M.C. Weinberg, *More Evidence on the Performance of Merger Simulations*, working paper, (December 2010). *Available at* http://sites.google.com/site/matthewcweinberg.

Hosken and Peters.[21] The demand system used by Knittel and Metaxoglou allows for very general substitution patterns but is complex and computationally demanding to estimate. However, the authors show that the computational challenges associated with more complex demand systems can lead to substantial differences in the estimates of post-merger prices changes between different implementations of the more complex demand model.

B. Predicting Competition Agency Enforcement Decisions

In a series of recent papers, Malcolm Coate and various co-authors describe research conducted using a large sample of historical U.S. Federal Trade Commission ("FTC") merger investigations. The focus of much of this work has been on using alternative models to predict actual FTC enforcement decisions. However, while the dataset is confidential, descriptions of the information available suggest that the dataset could be an important resource for exploring the strengths and weaknesses of economic tools used to predict the competitive effects of a merger.

Coate reports results from an assessment of how well UPP-based models predict actual FTC enforcement decisions in a sample of historical investigations.[22] The primary focus of the paper is on evaluating two modifications to the Farrell and Shapiro UPP specification. However, the study is an important step towards understanding empirically how informative a UPP-based screen would be by analyzing prior transactions that were investigated by the FTC. The data set described in Coate includes "306 horizontal markets" in which the FTC undertook detailed investigations, 212 of which were characterized as differentiated products markets where UPP might be an appropriate screen. Of these, Coate reports that 77 were studied on the basis of concerns about coordinated effects and 75 were studied on the basis of concerns related to unilateral effects.[23]

The question addressed in the paper is whether a UPP screen could be used to distinguish between transactions investigated for unilateral effects and those investigated for coordinated effects concerns. To implement the UPP screens on the historical transactions, Coate followed suggestions in Farrell & Shapiro and used market shares to calculate the diversion ratio. In addition, because margins were not available consistently across all transactions, Coate evaluated UPP using a range of margins (between 30 and 70 percent).

Coate concludes that the Farrell & Shapiro UPP screen would flag a unilateral effects concern in almost all cases, including those investigated on the basis of concerns about coordinated effects.[24] It would also be interesting to know how well a UPP screen would predict the decision to undertake an investigation, and to know how the implications of a UPP screen would compare to some of the other tools described above. Given the large number of differentiated products transactions included in the sample used by Coate, I would guess that at least a few involved a formal structural merger simulation analysis. If so, an informative exercise would be to compare the predicted price effects from the simulations to the implications of the UPP screen and subsequent enforcement decisions.

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[21] C. R. Knittel & K. Metaxoglou, *Challenges in Merger Simulation Analysis*, forthcoming in *Papers & Proceedings*, AMER. ECON. REV., (2011).

[22] Malcolm B. Coate, *The Enhanced Upward Pressure on Price Screen: Merging Markets into the UPP Methodology*, (2010) *available at* http://ssrn.com/abstract=1559399.

[23] *Id.* at 17.

[24] *Id.* Coate argues that the modified UPP screens perform somewhat better than the Farrell & Shapiro UPP screen.

In another recent paper, Coate again uses historical FTC data to compare the predictions of alternative empirical methodologies for assessing the competitive effects of mergers.[25] In this paper, Coate describes a data set consisting of 184 unilateral effects investigations from 1993 to 2009. Eighty-nine of these involved two-to-one mergers and, therefore, the empirical analysis focuses largely on the remaining 95.[26] Coate uses these data to examine how well alternative empirical tools for assessing unilateral effects predict actual FTC enforcement decisions.[27]

Coate finds that a model that focuses solely on the number of significant rivals performs relatively well in predicting the FTC's decision on whether to challenge a transaction. Furthermore, the success rate improves if additional information on entry is incorporated into the model. Coate also considers three other classes of unilateral effects models: (i) models based on post-merger market share; (ii) models based on the change in the HHI; and (iii) models based on UPP.[28] Coate states all of these models have less success predicting enforcement decisions than a model based on the number of significant rivals.

The data sets assembled for this research potentially hold a great deal of promise for understanding how accurately different empirical techniques would predict the competitive effects of mergers. The results described in the two Coate papers discussed above inform the debate about the merits of UPP and alternative merger screens and demonstrate that, as expected, the FTC relies on multiple facts and economic analyses when investigating a transaction. It will take time to develop sufficient evidence to properly evaluate the strengths and weaknesses of different economic approaches to assessing competitive effects. I would encourage economists and agency staff at all competition agencies to actively develop and maintain similar databases in order to support future research into the efficacy of enforcement decisions. The information collected by Coate could be combined with price data post-transaction to conduct sophisticated analyses of cleared mergers and provide valuable insight into how well the alternative methodologies perform in predicting post-merger price increases.

IV. CONCLUSION AND SUGGESTIONS FOR A PATH FORWARD

My review of the literature suggests that at this point there is only limited empirical evidence on the relative merits of alternative methodologies that are used or that have been proposed for analyzing the competitive effects of mergers. As various authors have argued, we need to conduct additional research to determine the most appropriate tools for predicting the competitive effects of mergers. Common sense suggests that the empirical technique most helpful for a particular merger review will depend on the facts of the case and the data available to competition agencies and practitioners. However, additional empirical research analyzing historical transactions will provide needed insight into the most appropriate ways to tailor existing tools so they yield predictions that are as accurate as possible.

Additional experience trying to predict the price effects of cleared transactions will surely help refine existing tools for assessing the competitive effects of mergers. It will be important in

[25] Malcolm B. Coate, *Counting Rivals or Measuring Share: Modeling Unilateral Effects for Merger Analysis*, *available at* http://ssrn.com/abstract=1722846.

[26] *Id.* at 23.

[27] *Id.* Coate reports that 59 of the 95 transactions analyzed were challenged.

[28] *Id.* Coate reports that he evaluated several alternative UPP-based screens, including the one proposed by Farrell & Shapiro (*supra* note 3), and that all produced similar results. *See* Coate (supra note 25), footnote 40, page 25.

future research to put the alternative empirical models to the test to evaluate carefully which methods predict the competitive effects of a merger most accurately. One suggestion that would help inform the discussion about UPP and its use as a screen would be to calculate the UPP index for mergers that were analyzed in the retrospective merger studies discussed above. Results from that research would in principle allow for an assessment of the performance of a UPP-based screen and whether UPP predicted actual price changes.

In addition, the results from the merger simulation studies discussed above suggest that much additional work is required to develop reliable structural merger simulation models. One approach, as noted by Weinberg & Hosken and others, would be to combine structural oligopoly models with an analysis of natural experiments in order to test the ability of structural simulation models to predict the price effects associated with changes in industry structure such as entry or exit. This approach has been used with some success in earlier papers, such as Hausman & Leonard.[29] Additional work along these lines likely would lead to improvements in the ability of structural models to predict the competitive effects of mergers.

Finally, Assistant Attorney General Christine Varney suggested in January 2010 that there is "a growing body of evidence that measures of upward pricing pressure, which focus on diversion ratios, and price-cost margins, can be highly informative in assessing the likelihood of unilateral pricing effects."[30] Perhaps economists at the U.S. Department of Justice and/or the FTC are evaluating internally whether UPP measures are leading to sound enforcement decisions. If so, it would be very helpful to antitrust practitioners outside the agencies if some of this research could be published or summarized publicly. These results would contribute to the debate about how informative UPP screens would be relative the alternative empirical tools available to competition agencies.

[29] J.S. Hausman & G.K Leonard, *The Competitive Effects of a New Product Introduction: A Case Study*, 50(3) J. INDUS. ECON. ,pp. 237–263 (2002).

[30] C.A. Varney, Remarks as Prepared for the Horizontal Merger Guidelines Review Project's Final Workshop, (January 26, 2010), *available at* http://www.justice.gov/atr/public/speeches/254577.htm.