

**DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS  
COMPETITION COMMITTEE**

**ROUNDTABLE ON IMPACT EVALUATION OF MERGER DECISIONS**

**-- Note by the Delegation of the United States --**

*This note is submitted by the delegation of the United States to the Competition Committee FOR DISCUSSION at its forthcoming meeting to be held on 29-30 June 2011.*

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## ROUNDTABLE ON IMPACT EVALUATION OF MERGER DECISIONS

### -- Note by the United States --

1. This paper responds to the Chair's letter of 24 March 2011, inviting submissions for the Competition Committee's upcoming roundtable on how to evaluate the impact of merger decisions. The U.S. Federal Trade Commission ("FTC") and Antitrust Division of the U.S. Department of Justice ("DOJ") (collectively, "the Agencies") are pleased to provide our perspective on this issue. FTC and DOJ staff have conducted a number of retrospective analyses of merger decisions and have reviewed merger retrospectives conducted by experts/others unaffiliated with the Agencies. This paper first discusses the motivations behind designing retrospective merger studies. The second section delves into the process of conducting such studies and focuses on specific methodological choices and considerations. The paper then summarizes the general findings of merger retrospective studies regarding the effectiveness of common tools of prospective merger analysis. The concluding section discusses the value of impact evaluation studies from a policy perspective.

#### 1. Why perform merger retrospectives?

2. Merger review can present difficult challenges. In a relatively short period of time, with limited information, antitrust authorities must forecast how a change in market structure will affect competition in a market. To facilitate this process, over time the Agencies developed methodologies to expedite merger review, like those described most recently in the U.S. DOJ/FTC's 2010 *Horizontal Merger Guidelines*. How can a competition agency improve its methodologies or, more generally, assess its effectiveness? For example, how does the agency learn if it is being aggressive enough, or too aggressive, in challenging mergers? When a merger proceeds with some conditions attached, how can the agency evaluate whether the relief maintained competition effectively? Evaluating the impact of previous merger enforcement decisions, and the accuracy of predictions made in the course of reaching those decisions, helps answer these questions and improve future enforcement. The Agencies have also used a retrospective study as evidence in a law enforcement challenge to a consummated merger.

3. The first task in conducting an ex-post merger review is to develop a clear objective for the study. Because an ex-post merger review is a case study – an examination of how *one* merger affects a *specific* market at a particular point in time – drawing general conclusions from any single study can be difficult. However, for particularly important or controversial merger enforcement decisions, simply determining the outcome of that merger (did prices rise or fall? did entry occur?) can justify the resources required to conduct such a study. More broadly, multiple retrospective case studies may permit more general inferences about the effectiveness of merger policy with regard to certain types of mergers. To begin to build a basis from which to generalize, competition agencies may consider conducting multiple studies in the same (or similar) industries. For example, in 2002 the FTC studied the price effects of four consummated hospital mergers.<sup>1</sup> While these studies represented a small fraction of all hospital mergers

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<sup>1</sup> See Timothy J. Muris, Everything Old is New Again: Health Care and Competition in the 21st Century, Prepared Remarks Before the Seventh Annual Competition in Health Care Forum (Nov. 7, 2002), available at <http://www.ftc.gov/speeches/muris/murishealthcarespeech0211.pdf>, and a special volume of the *International Journal of the Economics of Business* published in February 2011 containing the four hospital merger studies.

that took place during the time period studied, their findings offer evidence on whether the mergers allowed by U.S. competition agencies and courts resulted in increased prices.

4. Retrospective merger studies can also analyze the effectiveness of tools used in prospective merger enforcement. For example, Peters (2006) compares the effectiveness of various forecasting methodologies in predicting the impact of airline mergers.<sup>2</sup> In terms of evaluating policy tools, the 1999 staff report by the FTC's Bureau of Competition, "A Study of the Commission's Divestiture Process," was designed to analyze the effectiveness of remedies.<sup>3</sup> While the report concluded that the FTC's merger remedies had successfully maintained competition in most instances, it also offered recommendations to enhance the success of future remedies.

5. The presence of a competition agency in a jurisdiction raises an important sample selection issue, insofar as the only mergers available to study are those that were proposed by the merging parties and either (a) not challenged by the agency, or (b) unsuccessfully challenged. By contrast, the "ex-post merger" world is not observed for mergers not proposed (for fear of a costly challenge from a competition agency) or for mergers successfully challenged by the competition agency. Hence, retrospective studies can only determine how mergers affect competition in the presence of a competition agency conducting prospective merger review.

6. Evaluating the effectiveness of merger policy, however, requires determining whether the competition agency is being too stringent (challenging some mergers that would tend to have procompetitive effects) or too lax (refraining from challenging some mergers that have anticompetitive effects).<sup>4</sup> When evaluating the impact of merger enforcement decisions, most studies focus on two types of "marginal" mergers.<sup>5</sup> First are the "close call" mergers – i.e. where the merger faced serious opposition but was not ultimately challenged, and proceeded with minimal (if any) conditions attached. Second, at least in the U.S., are mergers that the competition agency challenged but where the agency failed to obtain the requested relief. Because both types of mergers plausibly could result in price increases or other anticompetitive outcomes, studying these mergers can reveal whether government merger enforcement decisions sufficiently identify likely consumer harm.

## 2. Methodologies for evaluating the impact of mergers

7. Estimating the impact of a merger presents a number of methodological issues. The most basic, but nonetheless challenging, issue is choosing the effect to measure. Most studies choose to estimate the merger's effect on price. The non-price effects of a merger – such as product quality, variety, or innovation (research and development) – are no less important to consumer welfare, and should play an important role in the decision-making of a competition agency. However, non-price effects present more

<sup>2</sup> Craig Peters, *Evaluating the Performance of Merger Simulations: Evidence from the U.S. Airline Industry*, 49 J.L. & ECON. 627 (2006).

<sup>3</sup> Federal Trade Commission, A STUDY OF THE COMMISSION'S DIVESTITURE PROCESS (1999), available at <http://www.ftc.gov/opa/1999/08/divestreport.shtm>.

<sup>4</sup> Akin to Type I and Type II errors, respectively.

<sup>5</sup> This set of mergers is very different than the average merger among the set of all consummated mergers. The Agencies clear the overwhelming majority of reportable mergers without a substantial merger investigation – in most years since 1991, over 95 percent of mergers did not receive a second request for information from the Agencies. See the Agencies' ANNUAL REPORTS TO CONGRESS PURSUANT TO THE HART-SCOTT-RODINO ANTITRUST IMPROVEMENTS ACT OF 1976, available at <http://www.ftc.gov/bc/anncompreports.shtm>. In addition, a large number of non-reportable mergers do not receive substantial investigation.

challenging issues of measurement and as such are studied less often.<sup>6</sup> The remainder of this paper focuses on price effects, but the analysis can generally be extended to non-price effects as well.

8. Choosing which price to study presents additional complications. Merging firms often produce a number of competing products, and each type of product may be available in a number of different sizes – for instance, a soft drink available in single-serving cans as well as multiple-serving bottles. Another issue is whether to measure the wholesale price – which the merging firms may control more directly, and as such would be central to market definition in the Agencies’ *Horizontal Merger Guidelines* – or the retail price, which may be more easily available and could account more properly for any impact on consumer welfare.<sup>7</sup> Yet retail pricing data (obtained from a sample rather than a census of retailers) may be incomplete, while wholesale pricing data may not reflect volume discounts. These and other tradeoffs must be carefully evaluated in each instance, and often present problems specific to the merger at hand.

9. After deciding how to measure price, the next issue is finding a benchmark to which observed post-merger prices can be compared.<sup>8</sup> The benchmark aims to estimate what the market price would have been “but for” the merger. Various methodologies can be used to produce such estimates. However, they involve analyses of varying degrees of complexity – and often require nontrivial assumptions about how the world would have looked had the merger not been consummated. Perhaps the simplest estimate of such a counterfactual price uses the pre-merger price. However, the difference in price before and after the merger accurately estimates the merger’s impact only if demand and/or cost factors vary little over time. While such an assumption can be difficult to justify, it may be the best available option in cases where data is limited.

10. More sophisticated estimates attempt to control for various demand conditions and cost shocks that affect price. One approach is to estimate the relationship between market price and all of the relevant supply and demand factors.<sup>9</sup> For example, before determining the price impact of a merger in the airline industry, one would want to know how jet fuel costs have changed (supply) and how seasonality affects the mix of business and leisure travelers (demand). Only after controlling for these factors can a study properly estimate a merger’s impact on price. Some merger retrospectives model the relationship between price and its various determinants as follows:

$$(1) \quad p_t^M = \alpha^M + \sum_{n=1}^N \gamma_n F_{nt} + \beta \text{PostMerger}_t + \varepsilon_t^M$$

<sup>6</sup> Examples of studies analyzing non-price effects of mergers include Gregory J. Werden, Andrew S. Joskow & Richard L. Johnson, *The Effects of Mergers on Price and Output: Two Case Studies from the Airline Industry*, 12 *MANAGERIAL & DECISION ECON.* 341 (1991); Steven Berry & Joel Waldfogel, *Do Mergers Increase Product Variety? Evidence from Radio Broadcasting*, 116 *Q.J. OF ECONOMICS* 1009 (2001); Andrew Sweeting, *The Effects of Mergers on Product Positioning: Evidence from the Music Radio Industry*, 41 *RAND J. OF ECONOMICS* 372 (2010); and Patrick S. Romano & David J. Balan, *A Retrospective Analysis of the Clinical Quality Effects of the Acquisition of Highland Park Hospital by Evanston Northwestern Healthcare*, 18 *INT’L J. ECON. OF BUSINESS* 45 (2011).

<sup>7</sup> See Daniel Hosken, Daniel O’Brien, David Scheffman & Michael Vita, *Demand System Estimation and Its Application to Horizontal Merger Analysis*, in *ECONOMETRICS: LEGAL, PRACTICAL & TECHNICAL ISSUES* (ABA Sec. of Antitrust Law, 2005).

<sup>8</sup> For further detail, refer to Orley Ashenfelter, Daniel Hosken & Matthew Weinberg, *Generating Evidence to Guide Merger Enforcement*, 5 *COMPETITION POL’Y INT’L* 57 (2009).

<sup>9</sup> This approach is referred to as a “reduced form” regression, because it specifies the net relationship between price and various market factors without estimating the underlying structural parameters of the supply and demand curves in the market.

11. In equation (1),  $p_t^M$  represents the price in the merger market ( $M$ ) at time  $t$ . This price is determined by a market-specific, time-invariant factor  $\alpha^M$ , a number ( $N$ ) of supply and demand factors that shift over time  $F_{nt}$ , and an idiosyncratic error term  $\varepsilon_t^M$ . The indicator variable  $PostMerger_t$  allows for prices to differ (by the amount  $\beta$ ) for reasons related only to the merger – assuming that all of the relevant demand and cost factors are observable and included in the regression.<sup>10</sup> However, omitting any relevant supply or demand factor invalidates this approach because it would mistakenly attribute to the merger some price movement determined in part by changing market conditions.

12. Identifying all relevant market conditions can be difficult. A common alternative is known as the “difference-in-differences” method. This approach identifies an alternative, “control” market and estimates the merger effect as the difference between any price change in the market where the merger occurred and the price change in the control market. That is, if the price in the merger-affected market increases by three percent, but only increases by two percent in a properly defined control market, one could arguably infer that the additional one percent price increase was due to the merger.<sup>11</sup>

13. Similar to equation (1), the difference-in-differences approach posits that the price in the control market is determined by:

$$(2) \quad p_t^C = \alpha^C + \sum_{n=1}^N \gamma_n F_{nt} + \varepsilon_t^C$$

14. The difference-in-differences approach makes two critical assumptions. First, it assumes that these demand and cost factors,  $F_{nt}$ , are identical across the control and merger markets. Second, it assumes that these factors impact pricing in the exact same way,  $\gamma_n$ , in each market. With those assumptions, subtracting equation (2) from equation (1) yields:

$$(3) \quad p_t^M - p_t^C = (\alpha^M - \alpha^C) + \beta PostMerger_t + (\varepsilon_t^M - \varepsilon_t^C)$$

15. Subtracting the two equations eliminates the time-varying cost and demand factors and requires much less data to estimate the merger effect. The merger effect can be estimated in equation (3) using data only on prices, precisely because (by assumption) the same set of supply and demand factors impact pricing in the merger market and control market in the same manner, throughout the period of study. Of course, other factors may need to be controlled for in equation (3) – for instance, a brief supply outage during the time period of concern may affect only one of the markets – but this difference-in-differences approach can be much less data intensive than controlling for all of the supply and demand factors  $F_{nt}$  in equation (1).

16. However, this simplicity requires stringent assumptions. An ideal control market must be sufficiently similar to the merger market so that demand and cost conditions are the same, yet sufficiently different from the merger market so that the merger had no impact on prices. In the example of hospitals, an ideal control market would contain neither (or at most one) of the merging firms while treating a patient

<sup>10</sup> For an example of this type of approach, see Hayley Chouinard & Jeffrey M. Perloff, *Gasoline Price Differences: Taxes, Pollution Regulations, Mergers, Market Power, and Market Conditions*, 7 B.E. J. ECON. ANALYSIS & POL'Y (2007), available at <http://www.bepress.com/cgi/viewcontent.cgi?article=1599&context=bejeap>.

<sup>11</sup> An additional assumption to be considered is whether the price changes should be measured in percentage terms (i.e. relative changes) or units of currency (i.e. absolute changes).

population of similar demographics and similar medical needs. In some instances, no market will simultaneously satisfy both criteria to a credible degree. Comparing results across multiple control markets may help assuage concerns that any individual control market fails along one or more dimension.<sup>12</sup>

17. Plausible control markets are often nearby geographic markets in which one of the merging firms does not compete. In evaluating airline mergers, for example, Kim and Singal (1993) compare price changes in airline markets (city-pairs) where a merger reduced the number of competitors to price changes in markets of a similar distance and similar supply and demand conditions.<sup>13</sup> Likewise, Taylor and Hosken (2007) compare gasoline price changes after a merger in Louisville, Kentucky to those in Chicago, Illinois, the nearest city requiring the same type of gasoline and least likely to have been affected by the merger.<sup>14</sup>

18. Finally, ex-post merger analysis must make tradeoffs in selecting a time window in which to measure pre- and post-merger prices. A longer window ensures that enough time has elapsed for prices to settle into their new, post-merger equilibrium level. Longer windows may also be required to measure accurately the effects of merger-specific efficiencies, which the merging firms may not realize immediately after they consummate the transaction.<sup>15</sup> However, shorter windows reduce the number of confounding factors that may also impact price. Due to the importance of the event window, it is often good practice (when feasible) to determine how sensitive the estimated merger effects are to small changes in the time window. This can be done by examining how much estimated price effects change when different time windows are used.

### 3. Findings of existing merger retrospectives

19. To date, most merger retrospectives have been performed on a relatively small number of industries: railroads, banking, airlines, petroleum, and hospitals. The common link between these industries is that they are (or were) regulated in ways that permit some amount of price competition while generating a substantial amount of publicly-available price (and in some cases quantity) data. A recent search of the literature discovered 73 merger retrospectives published between 1985 and 2010, 42 of which related to these five industries.<sup>16</sup>

20. Most merger impact evaluation studies find that the mergers studied – which were likely “marginal mergers” – tended to lead to price increases.<sup>17,18</sup> However, three important caveats apply. First,

<sup>12</sup> See David Schmidt & John Simpson, *Differences-in-Differences Analysis in Antitrust: A Cautionary Note*, 75 ANTITRUST L.J. 623 (2008).

<sup>13</sup> See E. Han Kim & Vijay Singal, *Mergers and Market Power: Evidence from the U.S. Airline Industry*, 83 AM. ECON. REV. 549 (1993).

<sup>14</sup> See Christopher Taylor & Daniel Hosken, *The Economic Effects of the Marathon-Ashland Joint Venture: The Importance of Industry Supply Shocks and Vertical Market Structure*, 55 J. INDUS. ECON. 419 (2007).

<sup>15</sup> See Fabio Panetta & Dario Focarelli, *Are Mergers Beneficial to Consumers? Evidence from the Italian Market for Bank Deposits*, 93 AM. ECON. REV. 1152 (2003).

<sup>16</sup> See the presentation by Lanier Benkard during the panel on merger retrospectives at the FTC’s Third Annual Microeconomics Conference, available at [http://www.ftc.gov/be/workshops/microeconomics/2010/docs/benkard\\_slide.pdf](http://www.ftc.gov/be/workshops/microeconomics/2010/docs/benkard_slide.pdf).

<sup>17</sup> For recent surveys see Graeme Hunter, Gregory K. Leonard & G. Steven Olley, *Merger Retrospective Studies: A Review*, 23 ANTITRUST 34 (2008); Matthew Weinberg, *The Price Effects of Horizontal Mergers*, 4 J. COMP. L. & ECON., 433 (2007); and Paul Pautler, *Evidence on Mergers and Acquisitions*, 48 ANTITRUST BULL. 119 (2003).

<sup>18</sup> The sample selection issue discussed earlier implies that the set of mergers studied will consist of “marginal” mergers (from an enforcement perspective), rather than the “average” (or typical) merger.

of the merger retrospectives in the petroleum industry, a substantially smaller proportion (about half) found statistically significant price increases. This anomaly may be due to the FTC's enforcement in this industry, which appears stricter than in others.<sup>19</sup> In addition, the nature of petroleum price movements over time makes these studies relatively more sensitive to certain modeling assumptions. Second, it may be difficult to generalize from this limited number of industries to merger policy as a whole – over the last 30 years, tens of thousands of mergers have taken place, while fewer than 100 have been studied. Third, most of these studies estimate the short-run price effects of mergers. This limitation may be important. Panetta and Focarelli (2003) find that Italian banking mergers are associated with short-run price increases but long-run price decreases, and postulate that merger-specific efficiencies may take longer to manifest than merger-related increases in market power.<sup>20</sup>

21. Merger retrospectives also provide evidence on the effectiveness of prospective merger enforcement tools, such as merger simulation methods.<sup>21</sup> To date, there appear to be only three papers that compare the estimates generated by merger simulation methods to directly estimated price effects of consummated mergers.<sup>22</sup> This nascent literature provides mixed evidence, including both false positives (simulations indicate a merger would be anticompetitive, but the retrospective estimate does not) and false negatives (estimated effects suggest prices increased, but simulations did not predict them). Even when the simulated and estimated effects point in the same direction, sometimes the rank order differs considerably, i.e. the most anticompetitive simulated merger turns out to have the smallest estimated effect, and vice-versa.

22. Similarly, the effectiveness of other tools of merger enforcement has been analyzed by ex-post merger studies. For instance, the review of the four consummated hospital mergers discussed earlier found that the Elzinga-Hogarty analysis of patient flow data did not accurately define the geographic boundaries of hospital markets. In addition, these studies showed that nonprofit hospitals increase prices they charge insurers when they gain market power.<sup>23</sup>

23. Very few studies have analyzed the effectiveness of U.S. merger remedies. The sole paper on this topic that employed an econometric model of the counterfactual world for a specific merger concluded that the divestitures successfully maintained the premerger level of competition.<sup>24</sup> In addition, the 1999 FTC Bureau of Competition staff report, “A Study of the Commission’s Divestiture Process,” reached similar conclusions for a broader set of mergers, based on qualitative evidence from interviews with market participants.<sup>25</sup>

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<sup>19</sup> See Federal Trade Commission, HORIZONTAL MERGER INVESTIGATION DATA, FISCAL YEARS 1996-2007 (2008), available at <http://www.ftc.gov/opa/2008/12/horizmerger.shtm>.

<sup>20</sup> See *supra* note 15. Although this particular study does not relate directly to the U.S. experience, the importance of its findings merits a mention.

<sup>21</sup> For a discussion of merger simulation methods, see Gregory J. Werden & Luke M. Froeb, *The Effects of Mergers in Differentiated Products Industries: Logit Demand and Merger Policy*, 10 J.L. ECON. & ORG. 407 (1994).

<sup>22</sup> See Peters, *supra* note 2; Matthew Weinberg & Daniel Hosken, *Using Mergers to Test a Model of Oligopoly* (Working Paper, 2008); Matthew Weinberg, *More Evidence on the Performance of Merger Simulations*, AM. ECON. REV. PAPERS & PROC. (forthcoming).

<sup>23</sup> See *supra* note 1 and Orley Ashenfelter, Daniel Hosken, Michael Vita & Matthew Weinberg, *Retrospective Analysis of Hospital Mergers*, 18 INT’L J. ECON. OF BUSINESS 5 (2011).

<sup>24</sup> Steve Tenn & John Yun, *The Success of Divestitures in Merger Enforcement: Evidence from the J&J-Pfizer Transaction*, 29 INT’L J. INDUS. ORG. 273 (2011).

<sup>25</sup> See *supra* note 3.

#### 4. Merger retrospectives and policy

24. While the policy-relevant benefits of merger retrospectives have been discussed at length, the costs of doing them have received less attention. For research projects, the largest cost to the competition agency is the staff time devoted to data analysis, and in some cases, data collection. Government agencies sometimes make data publicly available at little (if any) cost. In most cases, however, market data must be purchased from commercial providers or collected by the staff conducting the study. Analysis of data, either qualitative or quantitative, typically requires the most significant expenditure of staff time. While the research questions in merger retrospectives may seem straightforward, implementing the study can be time-consuming. It is not uncommon to spend up to a year conducting a study, given the number of robustness and specification checks required to become confident in the result.

25. By contrast, sometimes the Agencies conduct merger retrospective studies as part of a law enforcement investigation, as with the FTC's study of consummated hospital mergers discussed above. While there may be little to no pecuniary cost in acquiring the data, considerable staff time may be required to draft and enforce appropriately-tailored subpoenas to the relevant industry participants. In addition, complying with these subpoenas (and responding to any further requests for information) is costly for the industry. While the staff time spent on the analysis itself may not differ from the time required to conduct a research project, substantial additional time may be necessary to distill the results so that they may be understood by a court that has had minimal exposure to antitrust theory and practice.

26. The policy impact of merger retrospectives most likely varies significantly. The Agencies' recently revised 2010 *Horizontal Merger Guidelines* explicitly endorse their usefulness, at least for consummated mergers: "Evidence of observed post-merger price increases or other changes adverse to customers is given substantial weight."<sup>26</sup> Both the FTC and DOJ have challenged consummated mergers based in part on evidence of a price increase immediately after the transaction.<sup>27</sup>

27. Merger retrospectives may help inform prospective merger analysis. Ultimately, however, every merger is specific to its facts. A merger's impact on prices and consumer welfare cannot be predicted simply from the results of a previous retrospective study. While merger retrospectives may constitute a useful piece of the puzzle in predicting the impact of similar mergers, there is no substitute for investigational inquiries and economic modeling in individual investigations.

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<sup>26</sup> U.S. Department of Justice and Federal Trade Commission, HORIZONTAL MERGER GUIDELINES, at 3.

<sup>27</sup> See the DOJ's investigation of Microsemi's acquisition of Semicoa (*available at <http://www.justice.gov/atr/cases/microsemi.htm>*) and the FTC's investigation of Evanston Northwestern Hospital's acquisition of Highland Park Hospital (*available at <http://www.ftc.gov/opa/2008/04/evanston.shtm>*); see also Deborah Haas-Wilson & Christopher Garmon, *Hospital Mergers and Competitive Effects: Two Retrospective Analyses*, 18 INT'L J. ECON. OF BUSINESS 17 (2011).