

The use of natural experiments in merger analysis

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Natural experiments have the potential to test economic theories that purport to predict the competitive effects of a proposed transaction. This article provides a review of natural experiment and other examples of direct effects' evidence identified in Federal Trade Commission (FTC) merger investigations. Using reviews of staff analyses, it is possible to identify a number of quantitative and qualitative experiments supportive of unilateral effects, coordinated interaction or continued competition theories. The court decisions in *Staples*, *Oracle*, and *Whole Foods* play a role in structuring the review in unilateral effects investigations, and Judge Posner's commentary on performance analysis is relevant in coordinated interaction cases. Other experiments show either no structure–performance relationship in a market or undermine a key characteristic of Guidelines analysis and imply that the merger in question is not anticompetitive. This natural experiment evidence, supplemented with validated customer complaints and hot document findings suggestive of experiments lost to time, is able to successfully predict the outcome of almost two thirds of the FTC merger challenge decisions. While structural analysis remains important when effects' evidence is unavailable, testing theoretical models with direct effects' evidence seems possible for the bulk of the FTC's merger investigations. Empirical fact is more likely than theoretical analysis to improve the market review process.

JEL codes: K21 and L40

I. Introduction

In the USA, the Hart-Scott-Rodino Act requires firms to file all substantial acquisitions with the government, and if served with a 'second request' by either the Federal Trade Commission (FTC) or the Antitrust Division of the Department of Justice (DOJ), provide sufficient information to enable a competitive review of the merger prior to the consummation of the transaction.

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Published by Oxford University Press 2012. This work is written by a US Government employee and is in the public domain in the US.

For fiscal years 2002 to 2011, a total of 13,833 filings were made upon which the government could issue a second request; the FTC issued 226 requests and the DOJ issued 227.¹ Most of the transactions involved horizontal mergers and thus were reviewed under the Merger Guidelines. At both the FTC and DOJ, staff review a broad collection of evidence from internal documents, industry stakeholders, and when relevant, government and other third-party observers. Some investigations are truncated when it turns out that the information used to justify the second request was not accurate and other investigations end when the proposed acquisition is abandoned by the merging parties prior to the merger challenge decision. For the 2002 to 2011 period, 93 horizontal transactions were challenged by the FTC, with five litigated and another seven abandoned prior to litigation. The remaining 81 matters settled.²

The Merger Guidelines establish a two-stage analytical process, with the agency expected to first define the relevant market(s) and then evaluate the likely effects of the merger within the market(s) based on the totality of the evidence.³ A case study style analysis is expected to measure the Herfindahl index, address theories of concern (eg unilateral effects or coordinated interaction), evaluate ease of entry, and balance any likely anticompetitive effects against the relevant efficiencies stemming from the merger to predict the overall impact of the merger on the relevant market or markets.

The 2010 Merger Guidelines highlight the importance of direct effects' evidence on the merger review process.⁴ 'Natural experiments', defined as historical events that link changes in competitive conditions to changes in market performance, represent the strongest type of evidence, because these

¹ Hart-Scott-Rodino Annual Report, Fiscal Year 2011 (2012) <<http://www.ftc.gov/os/2012/06/2011hsrreport.pdf>> accessed 4 December 2012. A 'second request' is a formal demand for specific business information relevant to the competitive concerns stemming from the acquisition. The merging parties must provide the information and observe the required waiting periods prior to consummating the merger. To block a transaction, the government must obtain an injunction from a federal court.

² Another 33 horizontal investigations were closed without enforcement action, while the remaining second requests were not considered a relevant horizontal matter (33), closed on a quick look (29), or withdrawn prior to the merger challenge decision (38). Horizontal investigations could involve multiple markets of concern, although most investigations (97 from 2002 to 2011) focus on one-to-three markets; 9 address over 20 relevant markets. Data for the DOJ would probably be comparable, but exact figures are difficult to obtain without access to the list of their second requests.

³ The 2010 Guidelines advanced the idea of evaluating the competitive effect independently of the market, but this approach remains highly controversial [Malcolm B Coate and Joseph J Simons, In Defense of Market Definition' (2011) Antitrust Bull (forthcoming), available at SSRN <<http://ssrn.com/abstract=1967208>> accessed 4 December 2012; Malcolm B Coate and Jeffrey H Fischer, 'Market Definition: Still Needed After all These Years' (2012), available at SSRN: <<http://ssrn.com/abstract=2155861>>]. The FTC chose not to apply the analysis in *In re Evanston Nw Healthcare Corp*, Dkt 9315 (FTC 6 August 2007) <<http://www.ftc.gov/os/adiprod9315/070806opinion.pdf>> accessed 4 December 2012.

⁴ U. S. Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines*, 19 August 2010, <<http://www.ftc.gov/os/2010/08/100819hmg.pdf>> accessed 4 December 2012, 3–7. The Guidelines do not clearly differentiate between evidence that serves to parameterize a Guidelines analysis (eg firm measures of market share or documents noting head-to-head competition) and direct effects' evidence (evidence predictive of the merger's effect on competition, basically natural experiments on performance, validated customer concerns, or hot documents). This article will make the distinction and focus the analysis on natural experiments, along with the more general concept of direct effects' evidence.

factors involve the study of the impact of specific shocks (changes in either structure or firm conduct) on the market.⁵ A reasonable argument can be made that evidence on validated customer complaints or hot documents (defined as internal documents of the parties that predict the merger will likely lead to anticompetitive effects) represent learning from a collection of not so memorable natural experiments observed through the business experience of the relevant informant.⁶ Confirmation of a Guidelines-based prediction of a likely anticompetitive effect with natural experiment or other relevant effects' evidence enhances the likelihood that the results of the merger investigation meet the legal burden necessary to justify a court injunction to block the merger.⁷ It is clearly foreseeable for merger analysis to evolve beyond structural review and apply a penultimate testing analysis in which theories of competition are evaluated with direct effects' evidence. This article explores the extent to which this effects' evidence has been found in the historical record.

The second section provides a brief overview of 355 case studies and finds natural experiments exist at comparable rates across the two theories of concern and the three relevant time periods. Not surprisingly, customer concerns are more likely when unilateral theories (eg monopoly) are observed. Natural experiments suggestive of competitive concerns in some of the 211 unilateral effects studies are discussed in the third section. Analytical structures exhibited in the *Staples*, *Oracle*, and *Whole Foods* litigations are used to organize the data. Few, if any, of the natural experiment analyses in the sample match these court studies for complexity, although some of the qualitative analyses observed in the staff files have the potential to be developed into quantitative studies. Qualitative analyses appear most convincing when based on observations on the impact of entry into a clearly defined and highly concentrated market. Coordinated Interaction (collusion) case studies are addressed in fourth section. Natural experiments, undertaken in some

⁵ Malcolm B Coate and Jeffrey H Fischer, 'Why Can't We All Just Get Along: Structural Modeling and Natural Experiments in Merger Analysis' (2012) 8 ECJ 41–70, defines a natural experiment as an exogenous shock to the policy variable that allows the establishment of some type of a link between the policy and the outcome variable. The authors note in evaluating the impact of the experiment, scientists 'must identify the control variables, design the hypothesis to account for the possible relationships between the policy, control, and outcome variables, and observe the impact of the policy variable on the outcome variable'. David Scheffman, Malcolm Coate and Louis Silvia ['Twenty Years of Merger Guidelines Enforcement at the FTC: An Economic Perspective' (2003) 71 ALJ 277–318 (at 285)] report natural experiments are one of the modern era's innovations in the economic analysis of mergers.

⁶ For an econometric analysis of the impact of evidence findings on the merger challenge decision, see Malcolm B Coate, 'Alive and Kicking, Collusion Theory in Merger Analysis at the Federal Trade Commission' (2008) 4 Competition Policy Int'l 3–32 and 'Unilateral Effects under the Guidelines: Models, Merits, and Merger Policy' International Journal of the Economics of Business, forthcoming <<http://ssrn.com/abstract=1263474>> accessed 4 December 2012.

⁷ See *U S v Baker Hughes Inc*, 731 F Supp 3 (DDC 1990), aff'd 908 F2d 981 (DC Cir 1990). In *Baker Hughes*, the appellate court noted that market concentration could establish a presumption of a competitive concern that the defendant could rebut with a wide range of relevant evidence. The plaintiff retained the burden of proof and thus would need something more than a pure structural allegation. Direct effects' evidence could serve as this factor. Evidence would also be helpful to an economic expert in meeting the burden imposed by *Daubert*. See *Daubert v Merrell Dow Pharmaceuticals, Inc*, 509 US 579 (1993) and Malcolm B Coate and Jeffrey H Fischer, 'Daubert, Science, and Modern Game Theory: Implications for Merger Analysis' (2012) 20 Sup Ct Econ Rev 1–50.

of the 144 reviewed collusion matters, are separated into two classifications, one for experiments suggestive of a current lack of competition and the other for experiments that imply that a merger is likely to lead to some type of anticompetitive regime shift in the competitive process. Again, quantitative studies are rare, although structural or regime shift models for a case-specific concentration–performance relationship may be identifiable when market-level data is available. Alternatively, qualitative analyses similar to that used in price fixing cases may serve to substantiate a competitive concern. The fifth section explores natural experiments that suggest a post-merger competitive environment will be maintained. These experiments may be observed in any of the 355 case studies. Two methodologies exist, one in which the evidence is organized to show no relationship between a proxy for market structure and a performance index and a second in which the data shows historical facts sufficient to preclude the finding of a necessary condition for a Guidelines-based competitive concern exist. Both quantitative and qualitative evidence are found in the files, with some of the experiments resulting from failed attempts to prove a competitive concern. The sixth section provides a summary of the data that shows how often (i) natural experiments and then (ii) any type of direct effects’ evidence are found, first in a sample of challenged FTC matters and then in a sample of closed investigations. Overall, the study shows relatively more natural experiments are reported in collusion challenges than in unilateral effects challenges, but validated customer complaints and hot documents are more likely to be noted in the unilateral effects challenges. An appendix further explores the data to search for regularities associated with merger challenges when no direct effects’ evidence exists. Not surprisingly, three-to-two mergers are regularly challenged, while the results for four-to-three mergers are more mixed. Merger challenges are unlikely when five or more pre-merger rivals exist. The seventh section concludes.

II. An overview of the FTC data

To explore the use of natural experiments and other types of evidence at the FTC, it is necessary to assemble relevant information from a sample of staff merger analyses. The comprehensive database collected for the Merger Transparency Project and summarized in the FTC’s Horizontal Merger Investigation Data (2008) report forms the core of the sample, with additional research undertaken to collect natural experiment information, as well as extend the sample back to the end of December 1992 and forward to December 2011.⁸ A total of 244 mergers are reviewed, with information collected for 355 market-based case studies.

⁸ Federal Trade Commission, *Horizontal Merger Investigation Data, Fiscal Years 1996-2007* (2008) <<http://www2.ftc.gov/os/2008/12/081201hsrmergerdata.pdf>> accessed 4 December 2012. Although FTC litigation in *Staples* and *Whole Foods* play a prominent role in organizing the presentation, both cases are excluded from the internal tabulations, because the number of relevant markets reviewed in each matter exceeded the limit of three

Each staff analysis applied the principles of the Merger Guidelines to evaluate the likely effects of a proposed merger on competition in a specific relevant market. Following these Guidelines precepts, the study organized the relevant information into two broad classifications; one for unilateral effects issues (211 studies) and the other firm coordinated interaction concerns (144 studies). The attorney and economist merger reports were reviewed for evidence sufficient to identify natural experiments relevant to the competitive analysis of the merger (these experiments may suggest either a competitive concern or continued post-merger rivalry). Experiments were generally recorded in the competitive effects sections of the staff analyses and detail some link between a change in the number or relevance of significant competitors (or another structural index) and some proxy for competitive performance.⁹ Additional information on validated customer concern and hot documents, as defined in the FTC's Horizontal Merger Investigation Data (2008) report, was also obtained, when necessary. Finally, data on the outcome of the investigation, ease of entry and structural variables (eg such as the count of number of significant rivals) was noted.¹⁰

Prior to studying the data, it is important to determine if the direct effects' evidence occurred over the entire sample period. To address this question, Table 1 summarizes the data, first for the markets evaluated with a unilateral effects analysis and then for the markets analysed with a collusion model. The data is subdivided into three time periods, the first runs from the start of the sample to the arrival of Chairman Pitofsky in late March 1995, the second

set by the research design. These multi-market overlaps were subject to limited review in the original Transparency study due to the concern that the details associated with each overlap would not be fully reviewed in the files given the need to complete an HSR investigation under the exogenous time constraints. *Oracle*, a DOJ matter, is obviously not even in the FTC sample. See *FTC v Staples* 970 F Supp 1066 (DDC 1997), *FTC v Whole Foods Mkt, Inc.* 520 F Supp 2d 1, rev'd 548 F 3rd 1028 (DC Cir 2008), and *US v Oracle*, 331 F Supp. 2nd 1098 (N D Cal 2004).

⁹ Natural experiment evidence was discussed as relevant to the analysis of competitive concern, but was not necessarily highlighted as the key consideration in the review. Economists tended to recognize the importance of this evidence [Scheffman and others (n 5) 285], as did lawyers actively developing evidence for litigation (see *Staples* and *Whole Foods*, *ibid*).

¹⁰ For the basic details on how this evidence was collected, see Horizontal Merger Investigation Data [Federal Trade Commission, *Horizontal Merger Investigation Data, Fiscal Years 1996-2007* (2008) <<http://www2.ftc.gov/os/2008/12/081201hsrmergerdata.pdf>> accessed 4 December 2012]. Data collection for this article extended the review backward and forward in time to complete the sample. Moreover, the review expanded the analysis from the attorney memos that formed the core of the database in the public transparency data to also cover the Bureau of Economics findings. Evidence findings by either Bureau were coded as relevant, unless otherwise stated. Market definitions and the associated structural proxies were based on the analysis most compatible with the Merger Guidelines, while the attorney codings for theory of concern were used by default. (These attorney codings were more consistent over time, as economists tended to adopt unilateral concerns as their dominant theory.) More information on the natural experiment codings is available in Malcolm B Coate, 'Economic Models in Merger Analysis: A Case Study of the Merger Guidelines' (2006) 2 Rev Law Econ 53-84 <<http://www.degruyter.com/view/j/rle.2006.2.1/rle.2006.2.1.1042/rle.2006.2.1.1042.xml?format=INT>> accessed 4 December 2012; Coate (n 6) (2008) and forthcoming. Each finding was checked and updated as required. Moreover, the project uses data associated with customer support for the transactions along with 'cold documents' (documents that memorialize a credible finding that the merger is unlikely to affect the competitive process). Information on customer support is defined in a manner comparable to customer complaints, and the analysis of cold documents (in principle and in one actual scenario) track the review imposed on hot documents.

Table 1. Reports of evidence in FTC merger cases over time

	Pre-Pitofsky era	Pre-data release	Post-data release
Unilateral theory			
Natural experiments	9	21	20
Customer concerns	12	49	51
Hot documents	5	12	1
Any effects' evidence	20	65	55
Total markets	36	94	81
Collusion theory			
Natural experiments	7	22	10
Customer concerns	4	19	9
Hot documents	1	12	4
Any effects' evidence	10	31	16
Total markets	30	72	42

captures the period from the start of the Pitofsky era through the first full FTC data release associated with the Transparency project (April 1995 through December 2003), and the third covers the remainder of the relevant time period. Information for three forms of direct effects' evidence (natural experiments, validated customer concerns, and hot documents) associated with less than competitive performance is given; as is a summary index. This index counts the number of investigations that exhibit at least one form of this evidence.¹¹ Using the total counts of markets studied to norm the data, the percentage of natural experiments in each cell is remarkably stable for the data set, with only the collusion cases in the 1995–2003 period showing a nominally higher ratio (30.6 per cent, but this difference is not statistically significant). Looking at the statistics for any evidence shows these findings are more likely in unilateral than collusion cases (t -statistic 5.1, but no differences exist within the unilateral or collusion sample). This result is not surprising given the substantial number of monopolization cases (two-to-one mergers) included in the unilateral effects sample that tended to generate valid customer concerns. A more detailed comparison of the data is offered in the sixth section, when the results are adjusted for the outcome of the merger investigation and additional insights are generated.

III. Natural experiments in unilateral effects cases

Natural experiments observed in unilateral effects cases are remarkably straightforward. Because a unilateral concern posits that at least one of the

¹¹ Comparable data exists for effects' evidence associated with continued competition exists and is integrated into the later discussion of Tables 2–5.

merging firms is likely to be able to materially raise the quality-adjusted price after a merger, natural experiments focus on historical evidence linking the number (and possibly the relative size) of rivals to a firm's key performance variables (usually prices or margins, but quality measures could also be relevant). Three methodologies [structure–performance analysis (*Staples*), bid analysis (*Oracle*), and entry analysis (*Whole Foods*)] are well established and quantitative evidence is derived through the use of econometric techniques to link the ownership structure of rivals to the some index for competitive vigour. Although these basic methodologies have been applied to FTC investigations, data limitations significantly complicate or even preclude the use of quantitative techniques in a number of situations.¹² However, this has not stopped the FTC staff from making use of qualitative analysis to define less formal relationships between numbers of significant rivals and firm-level performance. The three styles of unilateral experiments are discussed below.

Structure–performance analysis (Staples studies)

One approach to empirical analysis involves the collection of cross-sectional and possibly, time-series data to explore the relationship between some measure of market structure (often, the number of rivals) and a performance variable (usually the firm's price). *Staples* can be seen as an example of such a study, because a broad cross-sectional, time-series data set was collected to explore the relationship between the number of office superstore rivals and firm-level prices. Using fixed effects, a detailed FTC study linked the identities of the office superstore competitors, along with their number of outlets, to price, while at the same time, attempting to control for the identities (and number of outlets) of other large retailers (eg Walmart).¹³

The court did not accept the staff's formal econometric analysis. Instead, Judge Hogan relied on a much simpler implicit cross-sectional analysis that showed prices depended on the number of office superstore competitors.¹⁴ As Ashenfelter and others¹⁵ note, this type of analysis ignores the importance of

¹² In this sample, only five of the matters challenged by the FTC ended in litigation and thus time and resource constraints may have limited the collection of data in particular matters.

¹³ Although it is often alleged that the experimental finding of a structure–price link is sufficient to prove a competitive concern [Federal Trade Commission and U.S. Department of Justice, *Commentary on the Horizontal Merger Guidelines* (2006) <<http://www.ftc.gov/os/2006/03/CommentaryontheHorizontalMergerGuidelinesMarch2006.pdf>> at 10] without the need for market definition, it is important to note that the *Staples* study also found no relationship between the presence of other large retailers and the price index. To the extent that this evidence is accepted as relevant to market definition, the *Staples* study presents two different tests (one for market definition and the other for competitive effects) in one equation. Standing alone, a structure–price link does not suffice to establish a competitive concern in the absence of market definition.

¹⁴ *Staples*, above n 8 at 1075–77, at 1082. The formal econometric analysis used fixed effects to control for local considerations and thus the price effect was identified by entry into and exit from local markets.

¹⁵ Orley Ashenfelter, David Ashmore, Jonathan B Baker, Suzanne Gleason and Daniel S Hosken, 'Empirical Methods in Merger Analysis: Econometric Analysis of Pricing in *FTC v. Staples*' (2006) 13 *Int'l J Econ Business* 265–79 at 267.

market-specific controls to ensure that the relationship between rivals and price is not a spurious correlation. A cross-sectional regression analysis could address this issue if a collection of control variables (eg density of stores, local income, wage rate, etc) are included in the model. Had these additional variables been used in the evaluation, the court's analysis would have offered stronger support for a competitive concern.

Further analysis could explore the potential for an identification problem.¹⁶ Evidence suggesting that the choice of store locations is exogenous to the profitability of any specific location would be helpful in interpreting the structure/price effect as directly causative. For example, firms may strongly prefer to enter geographic markets relatively close to their pre-existing warehouse locations and therefore, entry decisions would not systematically respond to high prices in local markets. Alternatively, entry may be tied to market size and not short run profitability. Overall, any evidence that tends to limit local feedback effects from high profits (prices) to a specific market structure (few rivals) would tend to suggest that the simple econometric study identified a relevant effect.¹⁷ In some situations, market definition will aid in this identification problem by excluding other explanations for the statistical results (in particular those that require a different market definition).¹⁸

Data sufficient for a *Staples* analysis is usually unavailable to the merger analyst and thus the FTC is forced to review more qualitative experiments inspired by the basic idea of linking a count of the number of competitors to a market performance variable. In four matters, the FTC staff evaluated information associated with a historical structural change followed by a price increase. For example, a previous merger could have led to a price increase, or a random shock could have marginalized (or eliminated) a rival, again leading to a price increase. This type of evidence is then used to support the conclusion that the merger in question is likely to substantially lessen competition.

In six other market analyses, information on analogous markets was collected to study the link between the number of rivals and firm performance. In one matter, the analysis tracked time series data for a related market, while in the other five market analyses, the evidence was cross-sectional in nature, with either (i) a comparable merger in another market linked to poor performance or (ii) data from different local geographic markets reviewed to support the relationship between the number of competitors and poor performance. In general, the core analysis identified a collection of similar markets with

¹⁶ Peter Kennedy, *A Guide to Econometrics* (MIT Press 1998) 159, defines identification as knowing when your effect is what you say it is.

¹⁷ Identification is discussed in more detail in Coate and Fischer (n 5).

¹⁸ Although theorists are correct that direct evidence of a competitive effect eliminates the need for a market analysis, this presupposes that the theorists have a credible identification strategy in place to obtain the effects' evidence in the first place. To the extent that the market definition plays a role in the identification strategy, then market analysis must be used as part of the competitive effects analysis.

different numbers of competitors and noted how specific fact patterns support an equilibrium link between the number of rivals (or some other measure of market concentration) and an outcome variable such as price or margins. Depending on the market in question, a more detailed analysis might have been able to quantify the price effects and if sufficient information exists, statistically test for a relevant structural relationship.

Summing up, the classic Staples-style analysis requires data on a collection of comparable markets (usually different geographic markets offering the same basic product or service) with sufficient information to identify an equilibrium relationship between some index for market structure and firm-level market performance.¹⁹ The same basic procedure can be used to underpin qualitative analyses, where the available evidence is based more on experience than numerical tabulations. And in some cases, qualitative evidence limited to just one market may be useful, when a well-identified event (usually a merger, but possibly some other structural shock) is reported to directly affect a firm's performance.

Bid analysis (Oracle studies)

The *Oracle* matter took a different empirical approach, addressing prices charged to particular customers, a line of analysis made possible when firms negotiate with specific customers over the transaction price. In an attempt to substantiate a unilateral concern, the DOJ expert modelled discounts off list price offered by Oracle to win specific bids as a function of the closest competitor identified in the firm's business documents. The two leading competitors appeared to force Oracle to reduce price and thus were considered significant rivals, while the fringe firms, that had no effect on the Oracle pricing, were not. The magnitude on the coefficient for the target company, PeopleSoft was seen as an estimate of the unilateral effect. The basic presentation of the statistical model is available in McAfee's direct testimony.²⁰

Here, the court rejected the analysis because the study was only seen as establishing the proposition that the two merging firms competed.²¹ However, the court did not reject the use of bidding studies, leaving the impression that a well-done empirical analysis would be accepted as relevant. Although the court highlighted the need to evaluate bids won by other competitors, the identification problem was also an issue. A clear identification strategy to

¹⁹ Another example of Staples-style analysis can be found in Peter Davis, 'The Effect of Local Competition on Admission Prices in the U. S. Motion Picture Exhibition Market' (2005) 48 J L & Econ 677–708. Davis models competition in motion picture exhibition markets and allows for impact of competition from both other theaters owned by the firm and other theaters owned by rivals. Thus, it is possible to simulate a merger by some combination of (i) closing rival theatres or (ii) reflagging rival theatres as those of the acquiring entity.

²⁰ Direct Testimony of Professor McAfee in *US v Oracle*, 24 June 2004 <<http://www.mcafee.cc/Papers/PDF/OracleTestimony.pdf>> at 10–13.

²¹ *Oracle*, above n 8 at 1169.

differentiate between situations in which all the significant competitors can bid and cases in which at least one rival is precluded from bidding due to an exogenous shock (the natural experiment) would be needed in a bid study. By comparing situations with three credible bidders to those with two credible bidders, the analysis could estimate the effect of a merger that eliminated one rival.

As with the *Staples* methodology, the data necessary for bidding analyses is rarely available in FTC cases, and the staff has made do with qualitative analyses designed to explore the impact of the number of bidders on the pricing policy of key rivals. In two matters, bidding evidence was collected to show that head-to-head competition between the merging parties led to lower prices. Although one analysis fell short of an econometric model, the results could be seen as quantitative. Relevant repositioning evidence, broadly construed, was available in five other cases for qualitative analysis. In these cases, a firm adjusted its quality-weighted portfolio of products and this change had a competitive impact on the performance of its merger partner. In effect, this evidence suggests that the loss of competition from a merger will matter, because the merger is likely to lead to a readjustment of product portfolios to reduce the level of competition between the merging parties. This evidence seems compatible with the standard claim that merger partners A and B compete (or are closest competitors), but here, the experiment links an historical change in conduct by one firm (the experiment) to a specific effect on the market performance of the other firm, while to some degree, controlling for other changes in the marketplace.²² The analyses generally require well-specified markets in which a few rivals interact to sell products to a collection of customers in search of differentiated goods. Although the model seems easiest to apply to industrial goods, evidence linking repositioning in a consumer market to changes in a rival's performance is also found.

In conclusion, *Oracle*-based bidding analysis may be relevant when firms compete head-to-head for customer accounts. To the extent that these market interactions can be identified with empirical data, the changes in the market environment might isolate a natural experiment that affects the competitive process. Other, more qualitative, analyses of competitive interactions may highlight the effects of specific tactics employed by one of the merging parties on the competitive process. Linking these tactics to the competitive activity of the firm's merger partner may be sufficient to identify an experiment relevant to the anticompetitive concern associated with the transaction.

²² In comparison, standard case analysis simply observes that the two firms offer competitive products for a range of customers, with no evidence to show that the offers are related to explicit changes in business strategy. Individual instances of competition are useful in showing the extent of the rivalry process (ie the merging parties are close competitors or the diversion ratios are high), but this case-specific information does not, by itself, show the loss of a rival is likely to be anticompetitive.

Entry analysis (Whole Foods studies)

In the *Whole Foods* matter, the FTC was unable to collect sufficient data compatible with local market equilibriums to enable a full structure–performance study and thus was forced to focus on a few entry events that changed the local market structure of specific geographic markets. Here, the idea was to identify the competitive effect of entry on the incumbent and then use this information to simulate the effect of the merger. The core study identified an impact for the entry of another premium, natural, organic, supermarket (PNOS) on the margins of the incumbent PNOS competitor, while showing the entry of normal supermarkets did not affect PNOS margins. The plaintiff interpreted this data as substantiating both the narrow market definition and the competitive concern stemming from the merger; the defendant focused on other data and argued for a broad market. Details on the entry experiments evaluated by the staff are presented in Leonard and Wu.²³

The relevant courts split on this entry analysis. The district court rejected the plaintiff's evidence suggestive of a narrow market and accepted the simpler critical loss evaluation offered by the defendants.²⁴ At the Appellate level, Judge Tatel's concurrence with the decision to reverse the district court ruling found that the FTC study, in combination with the rest of the market definition evidence, was sufficient to establish a monopoly concern in need of close evaluation.²⁵ Thus, based on the FTC's relaxed standard of proof for a preliminary injunction, the merger should have been enjoined pending a full legal review. In effect, the econometric analysis obtained a weak endorsement from the reviewing authority.

Both court decisions miss the key complication with the entry analysis.²⁶ In contrast to an equilibrium cross-sectional study, the *Whole Foods* entry analysis lacks a method to control for the endogeneity of entry with respect to both competition in the narrow PNOS market and the broader food retailing market. Given only information on a few local markets and no theory with which to limit the possible interpretation of the data, it appears impossible to identify the effect of entry on competition. Possibly, *Whole Foods* just expanded into a niche of the broad food retailing market currently served by a less efficient competitor (*Wild Oats*). Naturally, this entry depresses the margin earned by *Wild Oats*, as two players compete to sell PNOS products. Over time, either the niche expands so both firms can survive or the less efficient

²³ Gregory K Leonard and Lawrence Wu, 'Assessing the Competitive Effects of a Merger: Empirical Analysis of Price Differences Across Markets and Natural Experiments' (2007) 22 *Antitrust* 96–101. One key problem involves differentiating between the effect of entry that adds a new product to the market and merger-based exit that usually changes the ownership on a set of assets. If the product under review is relatively homogeneous or the acquiring firm intends to close the target company, the entry analogy is more useful.

²⁴ *Whole Foods Mkt*, above n 8 at 26.

²⁵ *ibid*, Tatel concurrence.

²⁶ For a more detailed discussion, see Coate and Fischer (n 5) 67–69.

rival (Wild Oats) exits. And, not surprisingly, entrants into other niches have no real effect on the profitability of the PNOS niche. Alternatively, if PNOS represents a market, entry is likely to have the same empirical effects. Without either (i) additional data to allow for a richer test or (ii) additional structure for the entry experiment, the Whole Foods entry study appears highly problematic. For example, additional data might allow the estimation of the long-run equilibrium effects of entry or exogenous evidence on market definition might allow the analyst to exclude the possibility of a broad market from the analysis.

Once the market is isolated, another problem exists. Entry depresses price when it undermines a unilateral price increase or when it shifts the supply curve out.²⁷ Thus, both effects should be accounted for in the analysis. Evidence that implies marginal costs are both comparable and constant over the relevant range would tend to preclude viewing entry as leading to a shift in the supply curve and therefore focus the experiment on the impact on competition. Likewise, with constant firm-level marginal cost, entry that more closely duplicates the products of the merging firms tends to focus the effect on competition and not exogenous supply conditions.

Detailed empirical evidence on the pattern of entries into the markets under review are rarely available, hence the bulk of the entry studies undertaken by the FTC staff are less ambitious than that observed in *Whole Foods*. Qualitative entry analysis is usually much more focused than the *Whole Foods* study, because the staff defines a relevant market and then reviews the facts associated with entry (or exit) into that market to try to predict the competitive effect. In some cases, the analysis can be further simplified, because the products are relatively homogeneous and produced at constant marginal costs (entry experiments are regularly evaluated in the pharmaceutical industry, where medical effectiveness often suggests that market competition is limited to firms selling products with the same type of active ingredient). Thus, entry should only have an effect on competition, and then, only reducing price when the market exhibits monopoly power. With this structure added to an entry experiment, the impact of entry serves as a rough approximation for the competitive benefit of the added firm. A merger that eliminates the competitor serves to reverse the entry and injure competition.

Entry evidence is identified in 11 mergers to virtual monopoly, another 9 mergers to dominant firm, and 6 mergers that involved premerger entry into a duopoly. In all the situations, the entry was shown to make the market more competitive and thus the loss of a competitor via merger was considered to reduce the level of competition. It is useful to note how important the market

²⁷ Paul A Johnson, 'Entry and Exit Event Analysis' in Wayne Dale Collins (ed), *Issues in Competition Law and Policy* (American Bar Association 2008) 1385–1404. Currently available at SSRN <<http://ssrn.com/abstract=1115861>> accessed 4 December 2012. As Johnson notes, entry into a market can (i) affect competition and (ii) expand market supply (and thereby compete price down). Expansions of supply can depress price, but not be related to improvements in competition.

definition analysis is in these cases, because the exogenous definition of a market simplifies the identification issue by excluding other explanations for the entry effect. Markets are often defined based on some physical or regulatory considerations that significantly limit the ability of products from outside the market to affect the level of competition within the market.²⁸ Finally, because entry would not generate evidence of a competitive concern if the pre-existing market was clearly competitive, entry experiments tend to be observed in relatively concentrated market structures.²⁹

Entry/exit analysis in seven analogous markets also served as qualitative evidence of a competitive concern. In these cases, the entry (four cases) or exit (three cases) affected competition in some closely related market, creating a structural situation comparable to that of the relevant market under review. Then, the inference was made that the loss of competition in the analogous market under study led to higher prices. Although these studies are not quite as convincing as a direct entry analysis, a reasonable case can be made that the experiment is viable if the analogous market is similar to the one under review and the conditions in these markets (clear market definition, few rivals, and barriers to entry) track the conditions observed in the market associated with the merger.

A *Whole Foods* entry study probably represents the most complicated experiment to evaluate if the analyst intends to simultaneously address both product market and competitive effects. Without exogenous evidence to define the market, it is difficult to interpret the impact of entry on the economic performance of a rival. Simply assuming a loss in profits isolates a competitive effect runs the risk of mis-identifying the natural process of rivalry for evidence of an equilibrium unilateral effect within a market. However, entry analysis is probably the easiest approach to use when qualitative data is available to show competitive effects in a clear market. By obtaining facts sufficient to define a relevant market, along with a reasonably constant cost structure, the analyst can focus the entry experiment on showing how the market responded to an additional competitor and determine if the loss of a competitor is likely to be problematic.

²⁸ See Malcolm B Coate and Jeffrey H Fischer, 'A Practical Guide to the Hypothetical Monopoly Test for Market Definition' (2008) 4 J Competition L & Econ 1031–63 and Coate and Fischer (n 3). In some cases, natural experiments are also used to aid in market definition.

²⁹ In a competitive market, evidence that entry lowered prices would be compatible with an upward sloping cost curve. Given the entrant shifts the supply curve out at the pre-entry competitive price, the post-entry price must be lower (given an elastic demand curve). Evidence of constant costs could cause the analyst to re-examine the conclusion, if entry materially depressed price, because this price reduction would be linked to a more competitive environment. Obviously, entry effects should be measured after the market has a chance to return to equilibrium, because the shock of entry can lead to short run price reductions.

Summary

The three styles of unilateral effects analysis share an interest in estimating the effect of the transaction on the post-merger prices charged by the merging firms. In industries where price (or other performance variables such as margins or profits) can be measured, quantitative modelling may be possible. In many other markets, sufficient information exists for qualitative experiments to be evaluated. Although the study of FTC case files uncovered relatively few quantitative studies, numerous more qualitative natural experiments were found. Had more of these FTC cases gone to trial, it is likely that more detailed analyses would have transformed some of these qualitative reviews into quantitative studies.

From an empirical perspective, the full *Staples* study offers the potential for the clearest link between structure and performance, given its ability to track local market equilibriums. *Oracle* and *Whole Foods* analyses also offer promise, especially if the presentations are combined with additional analysis (ie market definition). For qualitative studies, entry-based analyses probably are the most robust when undertaken within a clearly defined market, shown to exhibit very few competitive alternatives, and applied to firms with similar cost structures. In effect, entry experiments can serve as a relatively clean test of the merger's competitive effect. Qualitative structural and bidding evidence also merits attention, but it might be more difficult to exclude alternative explanations for the empirical results. All of these studies appear useful as tests of the Guidelines' structural analysis.

IV. Natural experiments in collusion cases

In collusion cases, a much broader spectrum of natural experiments are available to validate a coordinated interaction concern, with the theory focused on the market price. Two obvious classifications exist for the modeling, one designed to show that the market in question is currently performing in a less than competitive manner (supporting the inference that the merger will make the situation worse) and a second based on a showing that the merger, if allowed, is likely to cause some material change (i.e., regime-shift) in the competitive performance of the relevant market.³⁰ Within each classification, different experimental styles exist. The bulk of the experiments are qualitative in nature; quantitative studies, discussed in section III, once redesigned to focus on market price, may also be relevant. Details on the two analytical techniques follow.

³⁰ It is also possible to interpret the first technique as suggestive of a historical regime shift model, because the current performance evolved from either a monopoly market accommodating entry or a competitive market concentrating over its product life cycle. In either case, some regime shift occurred to create the current structure-performance relationship.

Evidence on ongoing collusion in the relevant market

The standard collusion model posits a link between market structure and performance for a specific market. Thus, if the evidence shows that the current market's performance is less than competitive, a strong case can be made that any further market consolidation via merger is likely to further reduce the market's performance (by either enhancing the extent of the anticompetitive behavior or by undermining the market forces likely to return the market to competitive performance).

The importance of economic evidence in evaluating market performance was clearly noted in 1976 by Professor, now Judge, Richard Posner.³¹ He listed a set of economic conditions compatible with an inference of tacit collusion and argued that these factors could be used, in combination with evidence on market structure and conduct, to infer collusive pricing from economic data. Although his idea of directly proving price fixing with economic evidence has not been accepted by the antitrust profession, the importance of performance evidence in merger review was integrated into the 1982 revision of the Merger Guidelines³² and has been applied in merger investigations ever since. The 2010 Guidelines confirm the importance of empirical evidence in merger analysis.

Posner's (1976) characteristics can be organized into three categories of natural experiments (price discrimination, geographic market price disparity, and market shock analysis) and supplemented with two additional experimental analyses, one linked to historical mergers and the other serving as a catch-all condition for evidence that links conduct to poor performance.³³ The presentation below will start with the merger and conduct considerations and then address Posner's factors.

The simplest structural analysis uses a previous merger as a natural experiment for the competitive effect of a current merger. If the historical merger adversely affects market performance, then it appears reasonable to conclude that the merger under review will also adversely affect performance, because it eliminates another rival. In the sample, a total of five transactions identified at least some evidence suggesting that a previous merger in the relevant market had been anticompetitive. Obviously, this inference requires

³¹ Richard A Posner, *Antitrust Law: An Economic Perspective* (University of Chicago Press 1976).

³² U. S. Department of Justice *Merger Guidelines* (1982) *Antitrust Trade and Regulation Report*, No 1059 s III-C-4. See Malcolm B Coate [*Should Economic Theory Control Price Fixing Analysis* (2012) available at SSRN <<http://ssrn.com/abstract=2103359>> accessed 4 December 2012] for a discussion of some of the problems associated with the application of performance data to prove a price fixing case in the absence of an agreement.

³³ The interested reader will see that the analysis does not provide a one-to-one mapping from Posner's list to the three categories, because three conditions are excluded as more related to conduct than market performance, and one (elasticity of demand) serves to reject the collusion hypothesis. (Conduct analysis was also discussed in Posner's book and directly aids in the two-stage Guidelines-based merger analysis.) Market shock analysis serves as a catch-all category for the performance checklist characteristics not covered by price discrimination or geographic price dispersion.

some judgment and thus should be carefully evaluated prior to concluding that the merger at issue is also likely to be problematic. For example, it would be useful to find out how the historical merger adversely affected competition and ensure that similar conditions are still present in the industry. The analyses in four of the five relevant FTC matters were simplified by the relatively homogeneous nature of the market, while in one matter, the product was relatively differentiated.

On occasion, careful study of the competitive process can identify specific market interactions (conduct) that cause poor performance (collusion) in the market of concern. In effect, some specific conduct, when combined with the pre-existing market structure, is likely to lead to poor performance. In these cases, allowing a merger to eliminate one of the few rivals appears problematic. Five merger investigations raised this evidence. For two of these matters, facilitating practices appeared linked to less than competitive conduct, underpinning the conclusion of an ongoing competitive concern. In the other three matters, the fact situation matched up some type of tacit communication with poor pre-merger performance.³⁴ To the extent that no credible alternative explanation exists for the relevant observations, the market behaviour appears to support an inference of less than competitive performance. An example of how the analysis works is taken from *Cardinal Health*.³⁵ Judge Sporkin observed that the use of 'most favoured nations' contracts served to prevent discounting below the level set by the policy. Three of the four firms involved in the pair of drug wholesaling mergers were found to have 'engaged in a subtle form of price stabilization'.³⁶ This evidence, in combination with the basic market structure, served to justify the injunction blocking the merger.

Ongoing price discrimination, if carefully evaluated, can also be used to suggest that the market is not fully competitive. The strongest analysis links prices to the number of bidders on a particular contract using a methodology comparable to that appropriate for *Oracle*, but tied, if possible, to the market price. For a collusion concern, the idea is that some specific situation evolves that enables the firms in the market to systematically raise the price offered to some disfavoured group of customers. Sales might appear randomly allocated among the competitors, in contrast to the implementation of strategic policies seen in unilateral effects cases.³⁷ In two related market analyses, the FTC staff managed to collect data suggestive of price discrimination linked to the limitations on the ability of rivals in the market to submit bids to specific

³⁴ Evidence on the poor performance tended to be the qualitative opinion of customers. Had further investigation of these cases been necessary, more quantitative evidence on performance variables could have been collected.

³⁵ *FTC v Cardinal Health* 12 F Supp 2d 34 (DDC 1998).

³⁶ *ibid* at 65.

³⁷ In unilateral effects cases, the reason for the higher prices is more obvious, as the customer has a preference for a specific style of product and some of the suppliers are not able to offer competitive bids due to exogenous market conditions.

customers. Here, the statistical analysis identified a structural link with price, while controlling for a set of alternative explanatory variables. In five other market studies (within two investigations), a simple price discrimination scheme was observed in which disadvantaged customers were charged higher prices. To the extent that the merger disadvantages additional customers (or further disadvantages currently affected customers), the transaction is likely to be anticompetitive.³⁸ Of course, great care must be taken to avoid mistaking a competitive price discrimination policy for evidence of less than competitive conduct.³⁹

Geographic market price disparity analysis exploits information on different geographic markets in an attempt to establish that the market of concern is not performing competitively. If a local market-level structure–performance relationship exists, then allowing a merger in an already concentrated market appears ill-advised. In principle, the approach taken in *Staples* could be used, although preferably with a focus on the market price.⁴⁰ Alternatively, qualitative analysis could evaluate more limited information, while trying to control for alternative explanations of the relevant finding, prior to concluding a competitive problem exists. In the review of FTC cases, three matters were found with this type of evidence showing the market is currently less than competitive. These analyses involved relatively homogeneous markets, thus avoiding the need to adjust price for differences in quality. Given enough time, it would probably be possible to quantify this type of competitive analysis, although in our examples, the matters settled, avoiding the need to prepare for litigation.⁴¹ In effect, if prices in the market under review are already higher

³⁸ Simply being able to target selected customers with higher prices is not sufficient. For example, in *Owen-Illinois*, price discrimination was considered and rejected as a competitive concern, because the evidence showed that glass manufacturers serving niches in the market not affected by a pricing scheme could reposition their capacity into other niches affected by the price discrimination and maintain competitive pricing. On the other hand, had all the rivals in the glass jar market managed to coordinate sufficiently to charge customers in a relevant niche a higher (and unjustified) price, then a price discrimination claim would have been made. *FTC v Owens Illinois*, 681 F Supp 27 (DDC 1988) aff'd, 850 F 2d 694.

³⁹ Benjamin Klein and John S Wiley Jr, 'Competitive Price Discrimination as an Antitrust Justification for Intellectual Property Refusal to Deal' (2003) 70 Antitrust LJ 599, 624–29, distinguishes between competitive price discrimination through which a firm exploits the fact that product differentiation leaves it with the economic market power necessary to charge different customers different prices for its own good and anticompetitive price discrimination through which a group of firms in a relevant market exploit their ability to cooperate and exercise the antitrust market power necessary to charge different customers different prices to earn supranormal profits Klein's and Wiley's interpretation of economic market power calls into question simplistic applications of unilateral Nash–Bertrand modeling in Industrial Organization.

⁴⁰ The similarity between *Staples* analysis and geographic market price disparity raises the possibility that Commission staff will disagree on the interpretation of the natural experiment, with one staff claiming the experiment supports a unilateral effects concern and the other staff reporting a coordinated interaction problem. Given the evidence is very likely to point in the same direction (challenge), the Commission will only face a problem if the case went to litigation. Technically, the required remedies might differ, although this is more likely when the market definitions also differ. And *Staples* analysis might also support a 'regime shift' concern, if the merger involves a relatively less concentrated market that is currently performing competitively. This situation is discussed in the next subsection.

⁴¹ Mary Coleman and James Langenfeld, 'Natural Experiments' in Wayne D Collins (ed) *Issues in Competition Law and Policy* (American Bar Association 2009) at 770–71, discusses a somewhat comparable issue in the Acetex–Celanese merger, although the analysis is only used for product market. Had different geographic markets

than some benchmark, it is reasonable to conclude that the merger should be blocked.⁴²

The final category focuses on finding some type of response in a competitive variable (price, quantity, market share, capacity, or inventory) associated with a movement to a less than competitive structural regime.⁴³ For example, if price jumps upwards, as the intensity of competition falls, with no alternative competitive explanation, it may be possible to conclude that the market is prone to less than competitive behaviour. Therefore, further structural consolidation such as a merger is likely to be problematic. The difficulty associated with implementing this analysis is illustrated by the fact that no examples were found in the FTC analysis. Possibly clean experiments affecting key competitive variables are rare, because the evidence would be suggestive of a price fixing arrangement. Or firms that have managed to raise price to less than competitive levels are less likely to be involved in mergers.

Posner's basic idea of evaluating the competitive performance of the market offers the potential to evaluate the likely competitive effects under a coordinated interaction theory. The relatively unstructured nature of the analysis creates the potential for a wide range of studies to be useful, but difficulties in linking structure with market performance may limit the applicability of the approach. Future research focused on evidence used in actual collusion cases may generate benefits for merger analysis by defining the best type of studies to identify less than competitive performance.

Evidence on likely regime shifts in relevant markets

Collusion concerns are also raised when the available evidence suggests that the structural change associated with a merger is likely to lead to a 'regime shift' from a competitive to a less than competitive marketplace. Two generic styles of collusion analysis are relevant. First, the evidence may suggest that one of the merging firms is a 'maverick,' with a unique motivation for competitive behaviour. As long as the maverick firm remains independent, collusive pricing is unlikely. Thus, the loss of a demonstrated maverick firm raises potential competitive concerns. Second, evidence may link the post-merger structure in

existed, the data on the relevant price differences been convincing, and the market structures comparable, the geographic price disparity condition could have played a role in that merger analysis

⁴² In *Bon-Ton Stores*, court appeared to conclude that higher prices were found in markets with fewer department stores. To the extent that the Rochester market was already relatively concentrated, an argument could be made to block the merger on either a unilateral or collusion theory. See *Bon-Ton Stores v May Department Stores* 881 F Supp 860, 877 (WDNY 1994).

⁴³ In *Swedish Match*, the court found the combination of a long-term decline in demand and stable margins was compatible with less than competitive behaviour. Although profit and margin levels are notoriously difficult to use in competitive analysis (because a competitive benchmark is not easy to define), the court may have found one instance in which margin (profit) data is useful. See, *FTC v Swedish Match* 131 F Supp 2d 151 (DDC 2000). (The example is presented for illustration purposes only, because this matter is generally seen as a unilateral effects case.)

the market of concern to the structure of a similar, but less than competitive, market. Then the analogy can be drawn that the change in structure caused by the merger is likely to lead to a change in market performance from a pre-merger competitive level to a post-merger less than competitive level, comparable to that observed in the analogy market.

Maverick analysis, dating from at least the 1968 Merger Guidelines, focuses on the review of evidence that shows a specific firm (the maverick) has a history of pro-competitive behaviour in the face of a price increase by other rivals that is sufficient to maintain a competitive equilibrium. By changing the incentives of the maverick, a merger may substantially lessen competition in a market prone to less than competitive behaviour. In the best case scenario, evidence on the two key points of (i) maverick status and (ii) potential for competitive problem will be clear. For example, in one (or more) historical market interactions, the pre-existing market structure may have created the incentive for most of the competitors in a market to take actions to support a move to a less than competitive regime, but the maverick firm acted to retain the current competitive performance.⁴⁴ In other scenarios, it might be necessary to collect the evidence on the two points separately. Possibly the maverick activity may have followed some exogenous market shock, so an independent analysis of the market structure would be required to conclude anticompetitive post-merger pricing is likely to occur.

The review of the FTC files identified eleven instances of alleged maverick behaviour. In general, staff had some indication of an event in which the maverick's competitive behaviour mattered, although the characterization of the alternative market outcome as less than competitive may have been inferred.⁴⁵ Thus, corroborating evidence associated with the potential anticompetitive price increase would be expected. One example of an incomplete maverick analysis was observed in *Libbey* and serves to fix ideas.⁴⁶ The court found Anchor, the acquired entity, was an aggressive competitor, pricing 10–20 per cent below the leading firm, Libbey. Had this behaviour forced Libbey to reduce a proposed price increase it had attempted to impose as the leading firm, the maverick label could have been relevant. Simply assuming maverick status from the lower price is inappropriate, because competitively innocuous explanations exist for the price discounts.

The second line of analysis studies closely related markets in which (i) the market structure mirrors the relevant post-merger structure and (ii) the closely

⁴⁴ U. S. Department of Justice, *Merger Guidelines* (1968) reprinted in 2 *Trade Regulation Report* (CHH) para 4510, 9 August 1982. In *US v. H&R Block* 833 F Supp 2d 36, 80 (DCC 2011), the court found TaxACT served as a particular aggressive competitor introducing innovation into the market even when their dominant rivals attempted to maintain the status quo. Thus, maverick status might also be attached to a uniquely innovative firm.

⁴⁵ By construction, the maverick activity prevented the price increase, so evidence on the anticompetitive nature of the price increase would be difficult to collect.

⁴⁶ *FTC v Libbey, Inc* 211 F Supp 2d 34 (DDC 2002).

related market is performing in a less than competitive manner. These two observations, taken together, serve to support the conclusion that the proposed merger, if allowed, may transform a current competitive market into a less than competitive market comparable to the closely related market studied in the analysis. Either a quantitative study [similar to *Staples* (if cross sectional data is used) or *Whole Foods* (if entry data is used)], or a qualitative analysis could be used to prove the poor performance in the closely related market, while analogy claims would generally be linked to other geographic markets in which the same product is sold.

Staff identified a total of nine mergers in which effects could be modelled with analogous markets.⁴⁷ In general, these markets focused on a specific product, but used different geographic market areas in the analysis. In two, econometric analysis served to substantiate a competitive concern, while the others used more qualitative approach. The key evidence compared the performance of the market affected by the merger and a set of closely related and more concentrated (ie fewer rivals) markets. Findings suggesting a related market exhibited worse performance (higher prices) made it possible to infer that the change in structure caused by the merger would be likely to adversely affect competition.

The regime-shift methodology suggests two completely different lines of analysis. In the maverick structure, an industry study is undertaken to identify some special impact associated with competition from one of the merging parties. This maverick analysis usually requires qualitative analysis to isolate the key facts. In contrast, an empirical regime shift analysis focuses on evidence suggesting a change in structure causes a sharp shift in market performance. Such an analysis could use a simple t-test to identify the effect, or an econometric model with dummy variables to isolate the relevant structure. In some cases, qualitative observations may lead the analyst to search for more quantifiable facts to facilitate the natural experiment analysis.

Summary

Both collusion-based natural experiment methodologies offer the potential to evaluate the likely effect of a merger on competition. Few quantitative studies exist, and those that do tend to mimic the unilateral effects analyses noted in the third section. More qualitative analyses are identified, some with the potential to develop into quantitative studies had the matter been litigated. Not surprisingly, other analyses attempt to detect ongoing collusion, but the complexity of the analysis leaves significant room for economists to interpret the facts differently. Other qualitative reviews link a structure change with a

⁴⁷ One market was also coded as a maverick, as the staff identified two natural experiments suggestive of a competitive concern in one investigation.

regime shift from a competitive to partially collusive equilibrium to identify the natural experiment. This analysis would obviously be easier in relatively homogeneous goods.

The most concrete analyses focus on substantiating a positive structure–performance relationship linked to the market of concern. While this is straightforward to understand, data is rarely available. Qualitative analyses are likely to be most useful as part of a broad-based review of the market’s current performance. Possibly, innovations in price fixing analysis designed to identify the price effects of cartels would be useful in merger review, although the analysis would not need to show agreement.⁴⁸ Another concrete, but probably rare, line of analysis, focuses on a market performance models estimated for a set of related markets. Here, the goal is to show the merger in question is likely to lead to a regime shift to justify a competitive concern. Finally, qualitative or even quantitative evidence on maverick status could benefit from economic research into the causes for this unique pro-competitive behavior. Again, natural experiment evidence appears useful as a test of the structural Guideline analysis.

V. Pro-competitive natural experiments

While some experiments support theories of competitive concern, other natural experiments suggest that the market is likely to remain competitive. Here, the analysis is more generic, because the studies do not need to focus on unilateral or collusion concerns, but may simply identify conditions that tend to ensure that the market will remain competitive. Two classifications serve to organize the specific natural experiments observed in the FTC case analyses. In the first method, market structure is shown to be unrelated to market performance at levels comparable to those associated with the relevant merger. This analysis may track those observed in the third and fourth sections, but instead of finding a positive structure–performance relationship, it finds no relevant link.⁴⁹ The second style addresses a range of considerations noted in the Merger Guidelines, and provides experimental evidence supportive of continued competition. If conditions unrelated to market structure drive the competitive process, then a merger is not likely to be anticompetitive.

⁴⁸ For a discussion on proving a price fixing case, see Coate (n 32).

⁴⁹ These experiments generally start out as an attempt to link structure with performance and are often performed in moderately concentrated industries. When no significant positive relationship is found, the study suggests that no concern exists as long as the post-merger structure falls within the sample used in the empirical analysis.

Analysis of the link between market structure and performance

The simplest approach to showing a merger is not likely to substantially lessen competition is to find data that undermines the relationship between some measure of market structure (eg the number rivals) and some index for the performance of the market at issue. To the extent that a natural experiment predicts prices will not rise after the merger, that evidence must be given weight in the merger challenge decision.⁵⁰ Experiments may highlight the limited effect of one of the merging parties on competition, trace the lack of impact from structural shocks, or undertake an equilibrium structure–performance study.

The FTC staff identified these types of relationships in 15 investigations. In each case, the conclusion that the merger in question was not likely to lead to higher prices in the relevant market was supported by analysis suggesting that a reduction in the number of rivals would not affect market performance. Roughly half of the analyses are clearly qualitative. A third of the studies present econometric structure–performance models, while the remaining studies apply simpler quantitative tests. A range of methodologies were observed. Some of the studies were based on analogies to historical mergers that imposed comparable changes in structure on other markets without affecting the market price, while one specific study used some type of shock to market conditions as a proxy for a structural change. Multiple reviews evaluated the link between market structure and price in a set of related markets and found no relationship. One other study evaluated the impact of the acquired company on competition and found that it had no effect; this suggested that the merger would be competitively innocuous.

Empirical testing of considerations from the Merger Guidelines

A second style of pro-competitive experiment addresses empirical evidence that effectively precludes an application of the Merger Guidelines from finding a competitive concern with the merger at issue. Basically, any empirical analysis that prevents the analyst from making a credible finding on an issue that serves as a necessary condition for a Guidelines-based inference of a competitive concern is relevant.⁵¹ Examples include natural experiments focused on the

⁵⁰ Coleman and Langenfeld (n 41) 763–64 detail a pro-competitive experiment evaluated by the defendants in *Heinz*. Given the merging parties (Heinz and Beechnut) did not compete in every retail grocery market, it was possible to compare prices of baby food in markets with three rivals and markets with two rivals. The analysis showed no relationship between market structure and price, thus supporting the defendant's position. The defendant won at trial, but lost on appeal. See *FTC v Heinz*, 1116 F Supp 2d 190 *rev'd* 246 F 3rd 708 (DCC 2001).

⁵¹ Again a distinction is drawn between a natural experiment that allows the testing of a specific theory (ie entry is easy) and an econometric analysis that generates the parameter values for a model (ie a demand structure) that is then used in a competitive effects analysis. The first type of evidence involves the evaluation of a shock to competition and allows immediate conclusions, the second involves an evaluation of some equilibrium

ease of entry, the breadth of the relevant market, or evidence suggesting infinite supply elasticity for the fringe at premerger prices. Within the Guideline's framework, these analyses are suggestive of the merged firm's inability to raise price after a merger.

The basic ideas appear best described with examples. In three matters, the historical evidence suggested that the fringe rivals had infinite supply elasticities and thus, the prices in the relevant market could not be increased. Technically, one could consider these facts as part of the Guideline's market definition analysis, but the style of the memo focused on a concentrated market, and presented a range of other reasons why the merger was not anticompetitive. By negating the implications of a narrow Guidelines-based merger evaluation, the natural experiment analysis suggested continued post-merger competition.

A number of other natural experiments have affected the evaluation of the competitive process. In two matters, power buyers had already demonstrated their ability to sponsor entry into the market to ensure product was available at competitive prices. Thus, this entry evidence tended to preclude a finding of entry impediments. In another five cases, special supply-side conditions existed to prevent incumbents from pricing their products above the competitive level. For example, if the product in question was a by-product of some other production process, the by-product must be sold at the market clearing price to get rid of the material. Empirical evidence that the market behaved this way would serve as the experiment.

Maverick issues were raised in five matters. In contrast to the acquisition of the maverick being anticompetitive, here, the continued independence of the maverick promoted continued competition. The maverick analysis tracked the earlier text, with evidence suggestive of the maverick preserving competition expected prior to the classification of the consideration as a natural experiment.

Summary

Pro-competitive natural experiments serve for tests of theories of continued competition in much the same way that other natural experiments serve for tests of theories of anticompetitive effect. Two styles of analysis exist and use both quantitative and qualitative methodologies. Structure–performance studies are relevant when they show no relationship over a range of market structures that covers the post-merger environment. Less formal studies, some quantitative (testing differences in means) and others qualitative (summarizing observations from exogenous changes in structure) are also relevant. Other studies evaluate specific considerations of the Merger Guidelines review, and when relevant, tend to argue against a merger challenge. These analyses can

process and is meaningful to the extent that the equilibrium process can be used to forecast the effect of the merger.

use quantitative tools (eg estimate fringe elasticity) or qualitative reviews (eg evidence sufficient to preclude narrow market). For some of the qualitative analyses, the agency could expect the parties to develop quantitative evidence had the matter gone to trial.

In practice, the evidence for pro-competitive events may evolve out of an attempt to define a natural experiment that substantiates a competitive concern. As a competitive study progresses, the evidence may serve to reject the competitive concern and thus, the relevant scenario amounts to a pro-competitive natural experiment. Other studies evolve through the standard Merger Guidelines analysis. While it is impossible to prove a concern with relevant evidence on just one Guideline's condition, clear information precluding the condition negates the particular concern. For example, natural experiment evidence substantiating ease of entry implies the merger is not likely to be anticompetitive. Maverick status of particular third parties is also of interest, with an independent maverick having the potential to preserve a competitive environment.

VI. Empirical experience with natural experiments

The third to fifth sections present a survey of the natural experiments identified in a broad sample of FTC merger investigations. Although this evidence is suggestive of either a competitive concern or a lack thereof, the staff evaluations of the economic evidence does not determine the outcome of the merger investigation. In fact, for five matters, one type of evidence suggested an anticompetitive effect, while another type of evidence implied continued post-merger competition.⁵² And in other cases, a matter was challenged or an investigation was closed even though the evidence pointed to the opposite conclusion. Further anomalies could be observed if the analysis added validated customer concerns and hot documents to the information on natural experiments to focus on all direct effects' evidence. This is not surprising in light of the fact that every case undergoes the two-stage Guidelines' review, with the totality of the evidence leading to a prediction on the likely competitive effect of the merger.⁵³ The FTC has the option to reject the evidence when it proves incompatible with the overall analysis.

Empirically, it is useful to know if direct effects' evidence is clearly related to the FTC's merger challenge decision.⁵⁴ Moreover, by separating the data by theory of concern, it is possible to determine if a specific type of evidence

⁵² Four of these matters resulted in merger challenges; the other matter was closed.

⁵³ The bulk of the structural concerns are exogenous to direct effects' evidence and are identified early in the investigation, before the evaluation of effects' evidence is complete. Thus, insights related to effects' evidence should control for structure. Below, the count for the number of significant rivals is used as that control.

⁵⁴ A more limited analysis is presented in Table 4 of Coate (2006) (n 10). The likelihood of natural experiment or more general evidence findings in unilateral and collusion cases are almost identical to the results in Tables 2 and 3, even though the sample ends in 2003 and focuses only on the merger filings with only one market subject to competitive review.

Table 2. Impact of merger evidence on unilateral investigations by structure (information on pro-competitive evidence in parentheses)

Unilateral theory	Cases	Challenged		Cases	Closed	
		Natural experiments	Any effects' evidence		Natural experiments	Any effects' evidence
Two-to-one	97	29 (1)	80 (2)	3	1 (2)	1 (2)
Three-to-two	50	15 (1)	39 (2)	14	3 (5)	4 (6)
Four-to-three	16	1 (0)	9 (0)	5	0 (1)	2 (1)
Five-to-four or more	5	1 (0)	4 (0)	21	0 (2)	2 (5)
Total	168	46 (2)	132 (4)	43	4 (10)	9 (14)

appears more useful in addressing a given theory. Finally, once the data is tabulated, it is possible to subdivide the information by time period to see if the use of evidence has changed over FTC administrations. These questions are explored below.

The data analysis also makes it possible to focus on the merger enforcement regime that applies when the proposed theory is not substantiated by the relevant direct effects' evidence. Results summarized in Tables 2 and 3 are used to define a sample of 136 case studies in which empirical evidence supportive of the investigation's outcome is not available. The structural attributes of these markets are studied in appendix.

Impact of evidence on the merger challenge decision

Table 2 presents summary information on both natural experiments and all three forms of direct effects' evidence for the 211 unilateral effects studies, first for the markets in which the FTC decided to challenge the transaction and then for the investigations in which no action was taken (labelled 'closed' below). Four structural classification schemes are linked to the number of significant rivals in the market (two-to-one, three-to-two, four-to-three, and five-to-four or more), along with case counts for the relevant cells. Summaries for the full samples are provided in the last row. Within each classification (challenged or closed), the number of market analyses in which the staff provides a natural experiment analysis suggestive of an anticompetitive concern is given first, followed, by the number for pro-competitive experiments suggestive of continued competition (reported in parentheses). The remaining column, labelled 'Direct Effects' Evidence' contains an aggregate case count for the number of matters in which any form of direct effects' evidence (findings of natural experiments, validated customer complaints, or hot

documents) is listed as supporting the competitive concerns in the relevant market. A comparable case summary statistic for the number of overall pro-competitive considerations (here, pro-competitive experiments or customer support) is given in parenthesis. For example, in last row, Table 2 shows that the FTC staff identified natural experiment evidence suggestive of a competitive problem in 46 of the 168 challenged unilateral effects actions and in four of the 43 closed matters. For the broader concept of direct effects' evidence, 132 findings are made in the 168 challenged cases in comparison to 9 in the 43 closed matters. For both the natural experiment and direct effects' evidence variables, the large differences in the probabilities of an affirmative finding for concern in the sample of challenged transactions are statistically higher than the likelihood of some type of evidence finding in the closed investigations (t -statistics are 3.2 and 8.1, respectively). Overall, well over 90 per cent of both the natural experiment findings and the direct effects' evidence findings occur in challenged unilateral effects' mergers, suggesting this evidence is generally related to the outcome of the investigation.⁵⁵

Evidence associated with continued competition is rarely found when the merger is challenged (pro-competitive natural experiments in two matters, and customer support in another two), but is more likely in the 43 closed matters (pro-competitive natural experiments in ten matters, customer support in another four). Again, both differences in the ratios for challenged and closed unilateral effects matters are statistically significant (t -statistics are 3.3 and 4.1, respectively). Overall, the tabulation shows that evidence suggestive of a competitive concern is much more likely to be found in challenged matters, while pro-competitive evidence is more likely to be identified in closed matters.

Table 3 provides similar data for the 144 collusion investigations. By construction, all two-to-one mergers are unilateral (monopoly or dominant firm theories), so the collusion sample is limited to matters with three-to-two, four-to-three and five-to-four or more structures. Here, a total of 32 natural experiments are identified in the sample of 63 challenged collusion cases and seven natural experiments are detailed in the sample of 81 closed collusion investigations. Broadening the study to all direct effects' evidence finds 45 matters with at least some type of effects' evidence found in the 63 challenged cases and 12 matters with comparable evidence in the sample of 81 closed

⁵⁵ Direct effects' evidence is developed during the investigation and written into the official reports before the FTC's formal merger challenge decision is made. Hypothetically, the count on the number of significant rivals could be customized to the presence of evidence and thus, the results in the table could be an illusion. To address this possibility, a comparable table was prepared with the objective Herfindahl index (although the Herfindahl depends on the market definition, markets are generally defined early in the investigation and the Guidelines structure makes it difficult to artificially adjust the market boundaries). Using four comparable break points to scale the data generates almost identical results. At worst, four evidence findings move from a strong structural case (three or fewer rivals or HHI over 4000) to a weak structural case.

Table 3. Impact of merger evidence on collusion investigations by structure (information on pro-competitive evidence in parentheses)

Collusion theory	Cases	Challenged		Cases	Closed	
		Natural experiments	Any effects' evidence		Natural experiments	Any effects' evidence
Three-to-two	26	14 (0)	21 (1)	5	0 (0)	1 (1)
Four-to-three	25	14 (4)	19 (5)	22	1 (3)	2 (9)
Five-to-four or more	12	4 (0)	5 (1)	54	6 (11)	9 (18)
Total	63	32 (4)	45 (7)	81	7 (14)	12 (28)

investigations. Again, the differences in the evidence ratios between the challenged collusion sample and the closed collusion sample are large and statistically significant (*t*-statistics are 5.9 and 8.1, respectively). Here, 82 per cent of the natural experiment findings occur in challenged collusion cases (for the direct effects' evidence findings, the comparable number is 79 per cent). Pro-competitive natural experiment and direct effects' evidence suggestive of continued competition are more likely to be found in the closed investigations than in the challenged collusion transactions (*t*-statistics are 2.1 and 3.5, respectively). Overall, the collusion cases follow the same pattern as the unilateral effects cases, with evidence suggestive of, but not controlling, the policy outcome.

Natural experiments are significantly more likely to be found (*t*-statistic 3.2) in challenged collusion cases (32 of 63) than challenged unilateral matters (46 of 168). However, the opposite result is observed if the analysis focuses on other types of evidence. Validated customer concerns or hot documents are identified in 114 of the 168 challenged unilateral cases, while a comparable finding exists in only 29 of the 63 challenged collusion cases.⁵⁶ Here, the rate is significantly higher for the unilateral cases (*t*-statistic 3.0).⁵⁷ When all the evidence findings are combined, no significant difference is observed in the likelihood of substantiating a structural concern with direct effects' evidence for the challenged unilateral and collusion samples (*t*-statistic 1.1). Overall, the staff finds more natural experiment evidence in collusion challenges and more customer complaints and hot documents in unilateral effects challenges, but no difference in the overall availability of evidence.

⁵⁶ This statistic subtracts the natural experiment evidence count from the total evidence count and then adds back the customer concern and hot document findings that occurred in the natural experiment sample (23 of the 40 unilateral challenged matters and 15 of the 30 the collusion challenged matters).

⁵⁷ Similar results hold if the 97 challenged (two-to-one) unilateral matters are dropped from the sample (removing a total of 66 customer concerns or hot document findings). (The comparable *t*-statistics are 3.3 for natural experiment evidence and 2.4 for customer concerns combined with hot documents.)

Table 4. Impact of merger evidence in unilateral investigations by structure and era (information presented for Pitofsky/post-Pitofsky periods)

Unilateral theory	Cases	Challenged		Cases	Closed	
		Natural experiments	Any effects' evidence		Natural experiments	Any effects' evidence
Two-to-one	38/42	12/11	31/38	1/1	0/1	0/1
Three-to-two	15/27	0/13	10/24	6/7	0/5	1/5
Four-to-three	6/8	1/0	4/4	1/3	0/1	0/1
Five-to-four or more	1/1	0/1	1/1	9/9	0/2	1/3
Total	60/78	13/25	46/67	17/20	0/9	2/10

Analysis of change over time

Tables 4 and 5 present information comparable to that in Tables 2 and 3, but each cell contains data for the Pitofsky chairmanship and the mostly Republican follow-on administrations.⁵⁸ For challenged mergers, the tables list case-counts, tabulations of natural experiments suggestive of a concern, and finally a summary index for the observation of any direct effects' evidence compatible with a challenge, while for closed cases, natural experiments supportive of continued competition are given first, followed by counts that combine natural experiment and customer support evidence. In effect, the relevant cells define the number of cases in which empirical considerations matched the policy outcome (challenge or close). Data for the pre-Pitofsky era can be recovered by subtracting the total case counts in Tables 4 and 5 from the comparable case-count in Tables 2 and 3 (as noted earlier, the information suggestive of continued competition is given in parenthesis for these tables).

Overall, the data shows very little systematic change for the challenged matters. A total of 13 experiments are observed in the 60 challenged Pitofsky era unilateral effects mergers, and 25 unilateral experiments in the second sub-sample of 78 unilateral challenges; the difference in the ratio of experiments to merger challenges is not significant. The difference in counts is reversed in the collusion cases, with the Pitofsky administration more likely to identify natural experiments. (Here, the smaller sample limits the relevance of testing.) Overall, it is impossible to conclude that staff has developed a greater interest in natural experiments over time, given the merger was challenged. Some pro-competitive evidence is observed in 23 of the 52 closed

⁵⁸ The results are basically the same if the information from the Leibowitz administration is deleted from the sample. The Pitofsky era starts in April 1995 and ends in May 2001.

Table 5. Impact of merger evidence in collusion investigations by structure and era (information presented for Pitofsky/post-Pitofsky periods)

Collusion theory	Cases	Challenged		Cases	Closed	
		Natural experiments	Any effects' evidence		Natural experiments	Any effects' evidence
Three-to-two	10/12	6/7	8/11	4/1	0/0	1/0
Four-to-three	12/11	9/4	10/8	7/12	0/3	2/6
Five-to-four or more	1/8	1/2	1/3	17/19	4/6	5/7
Total	23/31	16/13	19/22	28/32	4/9	8/13

matters (using both unilateral and collusion data) in the post-Pitofsky era, while only 10 of the total 45 Pitofsky cases, a result that generates a significant difference in the ratio of the number of pro-competitive effects' evidence cases to the total number of closed investigations (*t*-statistic 2.3). Little systematic difference exists in the structural types of mergers reviewed.⁵⁹ As a bottom line, no real temporal variation is observed in the data, other than some increase in the observation of evidence suggestive of continued competition.

VII. Conclusion

The study of direct effects' evidence such as natural experiments provides a very useful methodology to improve merger analysis. Although some assumptions are needed to structure the relevant analyses, given a reasonable experimental design, the results of a natural experiment can serve as a test of a Guidelines-based, structural theory of concern. Findings of likely anticompetitive effects support enforcement, while findings suggestive of continued competition imply a merger is competitively innocuous. Although the bulk of the historical studies are qualitative in nature, some could have been quantified through the collection of additional evidence had the dispute moved to litigation. Validated customer concerns and hot documents represent other sources of evidence. Empirical analysis suggests that in over 90 per cent of the unilateral matters with direct effects' evidence, the investigation results in a decision to challenge the merger. The comparable number for coordinated interaction investigations approximates 80 per cent. Structural analysis can still be considered when direct effects' evidence is unavailable and the appendix

⁵⁹ Small samples make testing difficult. However, the only noticeable difference involves the five-to-four or more category for the collusion theory. The bulk of these cases happen to fall into the oil and grocery industries that are subject to aggressive enforcement.

provides an overview of the historical record on these types of cases. As a bottom line, direct effects' evidence often allows a merger analysis to test the implications of a Guidelines' based structural review.

Appendix: Structural analysis in the absence of evidence

A review of Tables 2 and 3 shows that a number of merger investigations lack relevant effects' evidence and thus the FTC's challenge decision has to be based on structural analysis. To create a sample for review, all merger challenges in the relevant cells in which direct effects' evidence (natural experiments, customer concerns, or hot documents) suggested a competitive problem are deleted, as are all closed investigations in which pro-competitive effects' evidence implies no challenge was justified. Overall, the study is left with 36 challenged unilateral matters and 29 closed unilateral cases. Comparable numbers for the collusion investigations are 18 and 53. The sample was further reduced by focusing on matters in which the Bureau of Competition and Economics agreed that impediments to entry existed.⁶⁰ A study of this subset of the data should isolate the impact of the underlying structural regime from the effect of the exogenous entry evidence.

Table A1 presents the data, first for unilateral transactions and then for collusion cases. Challenges affect a total of 35 markets (22 unilateral and 13 collusion), while investigations of 23 markets (9 unilateral and 14 collusion) close. Combining the outcomes for two-to-one mergers with three-to-two mergers shows 88 per cent of the studies end in a merger challenge.⁶¹ For the four-to-three transactions, the outcome appears influenced by the theory of concern, with unilateral matters much more likely to be challenged, while collusion investigations tend to close. Little evidence exists to suggest that Nash-Bertrand modelling played an important role in this result, because only one of the five cases involved a consumer good where simulation analyses are most relevant.⁶² Collusion concerns remain plausible for structures of five-to-four or even higher rival counts; structural concerns disappear in unilateral concerns matters. A review of these actual matters explains the result, as the sample contains a number of oil and grocery industry cases in

⁶⁰ Evidence on impediments to entry is a necessary condition for a merger challenge and thus matters in which the record showed entry would be easy should be excluded. Two definitions of ease of entry, one linked to consensus within the two Bureaus' and the other linked to findings of entry impediments by either bureau are used below.

⁶¹ The case law suggests that three-to-two mergers are likely to raise competitive concerns. See for example, *FTC v Heinz* 1116 F Supp 2d 190 rev'd 246 F 3rd 708 (DCC 2001) and *FTC v CCC Holdings* 605 F Supp 2d, 26 (DDC 2009).

⁶² Two of the other four matters involved markets in which bidding seemed to play a role, the other two involved claims that the products of the merger partners were close in product space. In one of these two investigations, evidence suggested switching was difficult, while in the other, the repositioning evidence was weaker.

Table A1. Outcomes of pure structural investigations by theory of concern (count for relevant matters with any evidence of entry impediments in parenthesis)

	Unilateral Challenged	Matters Closed	Collusion Challenged	Matters Closed
Two-to-one	11 (17)	1 (1)	NA	NA
Three-to-two	6 (11)	2 (4)	5 (5)	0 (0)
Four-to-three	5 (7)	1 (2)	2 (6)	5 (8)
Five-to-four or more	0 (1)	5 (12)	6 (7)	9 (18)
Total	22 (36)	9 (19)	13 (18)	14 (26)

NA: not applicable.

which a collusion concern is seen as credible. Excluding these matters from the review identifies very few investigations in which collusion was considered a concern (outside the context of a three-to-two transaction).

These results are robust to including the matters in which entry evidence is mixed in the analysis (and thus only excluding situations in which both the Bureaus of Competition and Economics report easy entry and a merger challenge is not appropriate under the Guidelines). Table A1 contains this data in parenthesis. The most interesting result is the addition of a couple of challenged four-to-three collusion cases in consumer goods markets. With two other consumer product matters closed with comparable structure, it is hard to draw an implication for general policy.⁶³

The close review of the data suggests that absent relevant effects' evidence considerations, a consensus has evolved in merger policy in which three-to-two mergers are generally considered problematic, unless entry concerns negate the inference of a concern. Four-to-three mergers are more of a toss-up, again unless ease of entry precludes a challenge. Special case situations appear to enable enforcement in less concentrated markets, but most of these investigations are closed.

⁶³ The collusion concern implies that the staff decided not to apply a unilateral effects theory. See Malcolm B Coate, 'Benchmarking the Upward Pricing Pressure Model with Evidence from the Federal Trade Commission' (2011) 7 J Competition L & Econ 825–46, for a discussion of the reasons why the staff rejects unilateral theories of concern.