MEMORANDUM

March 18, 2004

To: FTC/DOJ Workshop on Merger Enforcement

From: Jonathan B. Baker[1]

Re: Comments on Applying the Horizontal Merger Guidelines

Thank you for providing me with the opportunity to supplement my remarks at the merger enforcement workshop with written comments on a number of important topics that arise in horizontal merger investigations under the Horizontal Merger Guidelines ("Guidelines" or "Merger Guidelines"). I have not attempted to write an integrated essay; my comments instead address specific issues, organized around the categories set forth in the workshop announcement.

Application of the Hypothetical Monopolist Test: Critical Elasticity and Critical Loss

The agencies seek comment on the use of critical loss and critical elasticity analysis in market definition, as one means of determining whether a profit-maximizing monopolist of a candidate market would likely increase prices. I have two comments. First, critical loss and critical elasticity analyses are best understood as a type of simulation, offering similar benefits and raising similar problems as simulation models employed in unilateral effects analysis. This perspective challenges those who are skeptical about simulation modeling in the unilateral effects context to explain why the same skepticism should not carry over to the application of critical loss analysis in the market definition context. Second, in practice these methodologies have at times been applied without attention to their potential difficulties. Under such

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circumstances, they can be unhelpful or misleading.

A. Critical loss analysis as simulation modeling

The concepts of critical elasticity and critical loss recognize that the profitability of a small price increase by a hypothetical monopolist turns on a tradeoff: price-cost margins increase by the small amount of the price rise for sales to those buyers who continue to purchase (notwithstanding the higher price), but the hypothetical monopolist loses the entire price-cost margin it would previously have received from those buyers who are led by the higher price to substitute away from its products or locations. To develop an intuition or judgment about market definition, some exploit this tradeoff to ask whether the lost sales from a small price rise instituted by a hypothetical monopolist would exceed a specified fraction of the market, the benchmark "critical loss" beyond which the price increase would not be profitable. Alternatively, using the same information in a different way, others ask whether the demand facing a hypothetical monopolist was so responsive to price – whether the demand elasticity exceeds a benchmark "critical elasticity" level – as to make a price increase unprofitable given accounting price-cost margins.

These methodologies can both be understood as simple forms of simulation modeling. They derive from the first order condition for profit-maximization by a single-product monopolist that does not discriminate among buyers, written not as equating marginal revenue with marginal cost but in the equivalent form of equating the absolute value of the inverse of the elasticity of the demand function facing the monopolist with the seller's Lerner Index of price-

cost margin (price less marginal cost, as a fraction of price). (This condition may be written as $1/\epsilon = L$.) In consequence, a price increase is profitable for a hypothetical monopolist if and only if the inverse elasticity of demand exceeds the Lerner Index ($1/\epsilon > L$). When this equation is used to define markets by simulating whether a hypothetical monopolist would raise price, the two sides of the inequality are estimated and compared.[2] The Lerner Index of price-cost margin, on the right hand side of the inequality, provides a benchmark for evaluating the magnitude of buyer substitution. The likely magnitude of actual substitution is summarized on the left hand side by the elasticity of demand for the output of the hypothetical monopolist.[3]

It is not surprising that similar methods are employed for simulating market definition as for simulating unilateral competitive effects among sellers of differentiated products. In both cases, the primary goal is to assess whether the economic force of buyer substitution would prevent a price increase.[4] In application, moreover, the critical loss and critical elasticity methodologies rely on estimates of (or assumptions about) parameters similar to those on which the simulation of unilateral effects depend, including marginal cost, the elasticity of the demand facing the hypothetical monopolist, and the nature of rivalry among sellers (*e.g.* an assumption that firms outside the candidate market do not alter prices in response to a price increase within the market). For these reasons, the strengths and weaknesses of critical loss and critical

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[2] When critical loss and critical elasticity methodologies are applied in practice, related formulas are typically employed. *See generally*, Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, 66 ANTITRUST L. J. 363 (1998).

[3] In applying this equation to evaluate a proposed market definition, the demand elasticity parameter summarizes all the available evidence as to buyer substitution. There is no presumption that it is estimated econometrically, though it could be.

[4] Other relevant economic forces (including supply substitution, entry, and rivalry among sellers) are accounted for in other Guidelines steps.

elasticity analysis are similar to those of simulation modeling generally.

B. Difficulties in application

Critical loss analysis is sometimes used as a basis for broadening markets when markups are high. The inference of broad markets from high margins may be based on the following intuition: if the accounting price-cost margin is high, it does not take many lost sales to make a price increase unprofitable, as each lost sale is very costly. Demand would have to be relatively less elastic (relatively unresponsive to price) for that to occur, but that is implausible in a narrow market, so the market is likely broad. As recent economic commentators on the subject of critical loss analysis have emphasized,[5] however, this logic is at odds with an equally reasonable but competing intuition: if the accounting price-cost margin in high, the reason may well be that firms have learned that buyers do not readily substitute in response to price increases (demand is relatively inelastic), so the properly-defined market is likely narrow. The conundrum posed by these competing intuitions may often be simply resolved: price-cost margins commonly provide limited information about demand, and enforcement agencies and litigants can readily be mislead if they do not also rely on other evidence to infer the demand elasticity.

A wide range of other evidence may be available for assessing the extent of buyer substitution. That evidence can be grouped into five categories: (1) the views of industry experts (broadly conceived, to include, for example, the views of sellers of complementary

[5] Daniel P. O'Brien & Abraham L. Wickelgren, *A Critical Analysis of Critical Loss Analysis*, 71 ANTITRUST L. J. 161 (2003); Michael Katz & Carl Shapiro, *Critical Loss: Let's Tell the Whole Story*, ANTITRUST, Spring 2003, at 49.

products); (2) evidence from industry participants, including inferences about buyer substitution made from seller business decisions (for example, which rivals the merging firms monitor and respond to, or the way price varies with market structure); (3) inferences about buyer substitution made from the distribution of the characteristics of products and geographic locations known to matter to buyers (including the distribution of switching costs); (4) evidence about buyer preferences from surveys as to their likely response to price changes; and (5) the response of buyers to changes in relative prices in the past (whether anecdotal, as from natural experiments, or systematic, as from econometric analyses of demand).[6]

These are not the only potential problems with simulation that must be addressed in applying critical loss analysis. Notwithstanding the range of potentially relevant evidence, it may be difficult to estimate the likely extent of buyer substitution with confidence. Moreover, the resulting inference as to critical loss may also depend on what is assumed (or known) about the curvature of demand and the oligopoly solution concept. Difficulties may also arise when identifying price-cost margins (the basis for the benchmark against which the magnitude of buyer substitution must be compared). Accounting data on costs may not track the relevant economic concepts, and it can be difficult to determine the critical loss benchmark when prices

[6] It is worth remarking briefly on pitfalls that commonly arise when employing two other types of evidence to make inferences about buyer substitution: similarities in price levels, and common movements in price over time (price correlations). Both approaches can perform poorly in identifying the products or locations that are close substitutes to buyers. Price level analysis ignores the possibility of buyer substitution between high price/high quality goods and low price/low quality alternatives; and price correlations can be driven by common shifts in demand, and only bear on market definition if sufficient outside information is provided to make clear that the exercise is tantamount to estimating elasticities of demand. As discussed in the text, moreover, it can also be difficult to make convincing inferences about buyer substitution from price-cost margins, a third type of evidence sometimes suggested for that purpose.

and margins differ across firms. Moreover, in some cases, the profit-maximizing calculus will be more complex than is often presumed in simple critical loss simulations. For example, when firms sell multiple products that are substitutes or complements, or when buyers do not pay the identical price, the appropriate first order condition may vary from the simple formula that is the basis for critical loss analysis as commonly applied. Under such circumstances, modeling may suggest that more complex simulation methods would be more suitable for understanding whether a hypothetical monopolist would raise price.

In light of these difficulties, the enforcement agencies and practitioners should exercise caution when employing critical loss and critical elasticity analysis as an analytical tool for market definition. When critical loss analysis is applied without attention to potential difficulties such as these, the methodology can be unhelpful or misleading.

Concentration and Market Shares

Much discussion concerning the extent to which market concentration and market shares should be relied upon for merger enforcement decisions addresses whether and when *high* market concentration is a good predictor of competitive problems from merger, and thus whether harm to competition should be presumed from high and increasing concentration from merger (and how that presumption can be rebutted). In practice, the frequency of agency enforcement against a proposed merger appears to increase with the post-merger concentration level and the

magnitude of the rise in market concentration from merger,[7] and properly so.[8]

The Guidelines also incorporate (in the form of safe harbors for concentration generally and unilateral effects in particular) the reverse presumption, that *low* levels or small increases in concentration do *not* raise competitive concerns. These presumptions too should be considered rebuttable, for three reasons. First, low concentration does not make coordination impossible. Successful price fixing conspiracies have occurred in unconcentrated markets,[9] and mergers that do not raise concentration markedly may make coordination more effective or more likely if they involve the acquisition of a maverick or a weakening of a maverick's pricing incentives.[10] In addition, low concentration could mislead as to the prospects for successful coordination if many firms face capacity-constraints (or are otherwise unable to expand output cheaply) and the remaining firms are concentrated. Second, mergers creating anticompetitive unilateral effects

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[7] Federal Trade Commission, Horizontal Merger Investigation Data, Fiscal Years 1996-2003 (Feb. 2, 2004) (available at <http://www.ftc.gov/opa/2004/02/horizmerger.htm>).

[8] Jonathan B. Baker & Steven C. Salop, *Should Concentration be Dropped from the Merger Guidelines?* PERSPECTIVES ON FUNDAMENTAL ANTITRUST THEORY at 339-54 (ABA Antitrust Section Task Force Report, July 2001), *reprinted in* 33 U. WEST LOS ANGELES L. REV. 3 (2001).

[9] *See* William J. Kolasky, *Coordinated Competitive Effects in Merger Review: From Dead Frenchmen to Beautiful Minds and Mavericks* (April 24, 2002) (available at <http://www.usdoj.gov/atr/public/speeches/11050.htm>) ("The number of participants in several of the cartels we prosecuted were surprising high. ... and occasionally we have uncovered cartels with ten or more members.")

[10] For example, if Liggett was the maverick inhibiting cigarette industry coordination during the 1980s and 1990s, it played that role with a national market share of two to five percent. Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 213 (1993).

among sellers of differentiated products may occur in markets with low concentration.[11] Third, low concentration could merely reflect an error in the sometimes difficult process of market definition, when a properly defined market would generate higher market shares that would raise greater competitive concerns.[12]

Uncommitted Entry

The distinction between committed and uncommitted entry is important both in theory and in practice, regardless of how rarely uncommitted entry is identified by the agencies in reviewing contested mergers.[13] First, the distinction incorporates modern economic learning about entry – particularly about the role of sunk costs as a means of strategic entry deterrence. That new learning has been important in helping industrial organization economists clarify the meaning of "barriers to entry." Second, the distinction is central to the way the enforcement agencies addressed the litigation problem created by two 1990 appeals court decisions, *Baker*

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[11] Jonathan B. Baker, *Stepping Out in an Old* Brown Shoe*: In Qualified Praise of Submarkets*, 68 ANTITRUST L.J. 203, 215-17 (2000).

[12] Relatedly, the 35% post-merger market share safe harbor for unilateral effects, to the the extent it applies to mergers among sellers of differentiated products, can put pressure on the enforcement agencies to define narrow markets in unilateral cases. Those markets could be misleading if looked to by courts when defining markets in coordinated effects cases. (Market definition must be conducted with reference to the competitive effects theory, and there is nothing troublesome in principle if markets vary in this way. The potential for confusion lies in practice.)

[13] *See generally*, Jonathan B. Baker, *Responding to Developments in Economics and the Courts: Entry in the Merger Guidelines*, 71 ANTITRUST L.J. 189, 194-5 (2003).

Hughes[14] and *Syufy*.[15] The enforcement agencies no longer commonly lose merger challenges on grounds of ease of entry. This change is likely, at least in part, a consequence of the Guidelines' success in articulating the distinction between committed and uncommitted entry, and explaining why the difference matters.

Third, the distinction between committed and uncommitted entry – and the subsidiary analysis of whether committed entry would be timely, likely and sufficient to solve the competitive problem from merger – provides a useful framework for investigating entry in merger analysis. It helps focus the entry inquiry and organize the development of relevant evidence. Although mergers intensively investigated by the agencies generally involve the possibility of committed entry, not the prospect of uncommitted entry, that does not make the distinction valueless. Rather, it likely reflects the success of the Guidelines in educating the antitrust community as to significance of the distinction between committed and uncommitted entry, allowing the agencies to avoid extensive investigation of acquisitions in markets in which entry would be uncommitted and not be limited.

The analysis of uncommitted entry in the Guidelines is straightforward: uncommitted entrants are treated as market participants and assigned market shares. I question the statement in the Workshop Announcement that the Guidelines do not "indicate how one assigns shares to uncommitted entrants." The Guidelines have a clear and sensible interpretation that has been accepted since they were issued: uncommitted entrants are assigned a market share based on the capacity they would profitably divert to the relevant market in the event of a small but significant

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[14] U.S. v. Baker Hughes, Inc., 908 F.2d 981 (D.C. Cir. 1990).

[15] U.S. v. Syufy Enters., 903 F.2d 659 (9th Cir. 1990).

price increase.[16]

Coordinated Competitive Effects

The enforcement agencies, in investigating whether a merger would make coordination more likely or more effective, must determine (1) whether the firms, post-merger, would likely be able to solve their "cartel problems" of reaching consensus on the terms of coordination and deterring deviation (cheating) from those terms (as through rapid detection and severe punishment) – perhaps not completely, but sufficiently to permit the exercise of market power – and (2) whether the merger is likely to make a difference.[17] My comments on coordinated effects analysis will focus on three aspects of the inquiry: the importance of conducting an integrated analysis of factors bearing on whether the market is conducive to coordination rather than treating the factors as a checklist; asymmetries in market structures and the role of

[16] Janusz A. Ordover & Jonathan B. Baker, *Entry Analysis Under the 1992 Horizontal Merger Guidelines*, 61 ANTITRUST L.J. 139, 141 (1992). This interpretation follows from two sentences in the Guidelines section on calculating market shares (§1.41). First, shares are normally calculated by the "total sales or capacity currently devoted to the relevant market" (which is zero for an uncommitted entrant) "together with that which likely would be devoted to the relevant market in response to a 'small but significant and nontransitory' price increase." Second, the Guidelines exclude of a firm's sales or capacity in measuring its market share "to the extent that the firm's capacity is committed or so profitably employed outside the relevant market that it would not be available to respond to an increase in price in the market."

[17] The Workshop Announcement frames the second inquiry as focusing on how the merger makes coordination "more or less likely or durable." This language omits another possibility recognized in the Guidelines: that the merger could make pre-existing coordination more (or less) perfect, complete or effective, as by making the coordinated price rise to approach the monopoly price more closely or, if coordination is punctuated by occasional price wars, by making those price wars less frequent or steep.

mavericks; and the uses of empirical evidence.[18]

A. Can firms plausibly solve their cartel problems?

Coordination requires that the firms in a market solve their cartel problems, making the market conducive to coordination. The Guidelines (§§ 2.11, 2.12) list a number of factors relevant to determining whether that outcome is plausible, and similar lists are found in industrial organization textbooks and antitrust casebooks.[19] But the Guidelines do not merely list these factors. Some factors are discussed as relevant to the analysis of reaching a consensus, while others are relevant to deterring deviation. As the Guidelines structure suggests, and antitrust practice increasingly recognizes, these factors are not a "checklist." The likelihood of coordination is not based on whether a particular fraction of the factors is present. Rather, these factors must be integrated into an analysis of whether the firms can be expected to solve their cartel problems.[20]

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[18] By coordinated effects, I mean outcomes arising out of repeated interaction among firms following strategies that take into account past conduct by rivals. These kind of outcomes are represented in the technical economics literature as the result of oligopoly supergames. Coordinated outcomes could differ from what would result from the repetition of the outcome in a one-shot stage game, because punishment threats might support less competitive outcomes if the firms can identify and reach them.

[19] *E.g.* Luis M. B. Cabral, INTRODUCTION TO INDUSTRIAL ORGANIZATION 127-43 (2000); Dennis W. Carlton and Jeffrey M. Perloff, MODERN INDUSTRIAL ORGANIZATION 121-50 (2000); Jeffrey Church and Roger Ware, INDUSTRIAL ORGANIZATION: A STRATEGIC APPROACH 340-55 (2000); Andrew I. Gavil, William E. Kovacic and Jonathan B. Baker, *Antitrust Law in Perspective: Cases, Concepts and Problems in Competition Policy* 223-28 (2002).

[20] *See id.* at 303 (describing how the dissenting opinion in a non-merger case, *Blomkest Fertilizer, Inc. v. Potash Corp. of Saskatchewan, Inc.*, 203 F.3d 1028 (8th Cir. 2000), attempted to integrate similar evidence to understand whether firms could solve their cartel

B. Asymmetries in market structure and the role of mavericks

The industrial organization literature on coordination highlights, among other things, the role of differences among firms. The firms within a market can differ on all sorts of dimensions, including market shares; rate of capacity utilization; location of facilities or of customers; degree of vertical integration; level of marginal costs; methods of distribution; extent of production of other products, substitutes or complements; product quality; scope and magnitude of research and development activities; nature of terms commonly employed in contracts with customers or suppliers; and identity of suppliers. Significant differences among firms create asymmetries in market structure.

As with all factors affecting the ability of firms to coordinate successfully, differences among firms do not matter in the abstract. Their relevance to the analysis of coordinated competitive effects of mergers, as well as to determining the significance of mergers that alter the extent and nature of the resulting market asymmetries, depends on which cartel problems are significant for the industry and how the merger is thought to affect the ability of market participants to solve those problems. Thus, coordinated competitive effects analysis should focus on identifying why the firms in a market could not (completely) solve their cartel problems before the merger, and whether the merger plausibly reduced those constraints.

The latter inquiry leads naturally to identifying which firm in the market is the "maverick" that constrains coordination from becoming more effective and complete, and

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problems).

evaluating whether and how the merger changes the incentives facing the maverick firm.[21] The concept of maverick should be understood broadly as referring to any firm that constrains more effective or complete coordination, and is not limited, for example, to an observably disruptive firm or a firm with low costs and excess capacity. However, a firm that cuts price is not automatically a maverick, because industry outcomes may not be the product of coordination or, even if they are, the price-cutter could merely be anticipating that the maverick will act (and would reverse its price reduction if the maverick does not follow). Mavericks can be identified based on revealed preference (*e.g.* a pattern of refusing to go along when rivals attempt to raise price in an industry where the oligopoly interaction is plausibly characterized as coordinated); based on a natural experiment (whether industry prices change when the maverick's firm-specific costs change, but prices do not respond to the firm-specific costs of rivals); or based on a priori factors (features of market structure that suggest that the firm has a small commitment to the market relative to its ability to expand, for example).

Mergers involving a maverick can be expected to create competitive concerns; mergers involving non-maverick firms may or may not raise competitive problems.[22] One recent enforcement action from the Antitrust Division, the Justice Department's consent settlement resolving concerns with the proposed merger of Premdor with Masonite, provides an illustration

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[21] *See generally*, Jonathan B. Baker, *Mavericks, Mergers, and Exclusion: Proving Coordinated Competitive Effects Under the Antitrust Laws*, 77 N.Y.U. L.REV. 135 (2002).

[22] If industry conduct pre-merger is plausibly described as coordinated, so the question is whether the merger would make coordination more effective, there is likely a single maverick constraining more effective coordination (though multiple mavericks could exist, perhaps most plausibly in a market in which multiple competitive dimensions are important). If pre-merger conduct is not coordinated, and the question is whether coordination would become more likely as a result of merger, it is more likely that multiple mavericks exist.

highlighting the way coordinated effect analysis turns on the role of mavericks.[23]

When coordinated effects are plausible, a focus on who the industry maverick is and how the merger affects the maverick's incentives can provide a rigorous analysis of the effect of the merger on competition. When it is not possible to identify the maverick with confidence, or determine the effect of the merger on its incentives, however, it is appropriate for enforcers instead to rely on the structural presumption to evaluate the effect of the merger on competition, and exhibit increased concern about coordination increases the greater the level of post-merger concentration and its increase from merger.

C. Value of empirical evidence in analyzing coordinated effects

Many factors that might affect the ability of firms to solve cartel problems may be susceptible to empirical analysis. The enforcement agencies have properly been hospitable to

[23] *See generally*, David S. Sibley & Ken Heyer, *Selected Economic Analysis at the Antitrust Division: The Year in Review*, 23 REV. INDUS. ORG. 95, 103-04, 107-08 (2003); Michael L. Katz, *Recent Antitrust Enforcement Actions by the U.S. Department of Justice: A Selective Survey of Economic Issues*, 21 REV. INDUS. ORG. 373, 384-86 (2002); United States v. Premdor, Inc., 66 Fed. Reg. 45,326, 45,335-39 (Aug. 28, 2001) (competitive impact statement). As I interpret these materials, the Justice Department concluded (1) one merging party was the maverick in the upstream market for doorskins, and the merged firm would have less incentive than the pre-merger maverick to keep upstream prices low; (2) the other merging party was the key supplier to the unintegrated firms that were mavericks in the downstream market for doors, amd the merged firm would have less incentive that the pre-merger maverick to expand supply in response to higher downstream prices; and (3) in the alternative, a major integrated seller (not one of the merging firrms), was the maverick in both the upstream and downstream markets, but it would have less incentive to constrain coordination in one or both markets after the merger than before, because the merged firm would have posed a greater punishment threat after the transaction was completed.

efforts to bring empirical evidence to bear in evaluating possible coordinated effects.[24] In doing so, it is important first to develop a plausible theory of how coordination would be implemented in light of other facts about market structure and conduct in the industry under review, and then to tie the empirical analyses to that theory.

Unilateral Competitive Effects

To the best of my knowledge, every serious antitrust economist accepts that unilateral effects analysis makes sense economically and was an appropriate addition to the Merger Guidelines in 1992. Some commentators have noted legitimate technical issues in the application of certain tools for assessing unilateral effects, particularly simulation models. But this healthy debate about methods of analysis does not call into question the theory itself.

The types of evidence relevant to evaluating the potential for adverse unilateral competitive effects of mergers among sellers of differentiated products are often similar to the types of evidence relevant to market definition under the Guidelines, because both inquiries are

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[24] For a Justice Department perspective, see the discussion by an ex-DOJ economist who was deeply involved in coordinated effects analysis at the Antitrust Division, in Andrew Dick, *Coordinated Interaction: Pre-Merger Constraints and Post-Merger Effects* (2002, revised 2004) (available from its author at Charles River Associates). For an FTC example, see Mary T. Coleman, David W. Meyer and David T. Scheffman, *Economic Analyses of Mergers at the FTC: The Cruise Ships Mergers Investigation*, 23 REV. INDUS. ORG. 121 (2003). Other ideas as to empirical analyses that might bear on the evaluation of possible coordinated effects are proposed in David T. Scheffman and Mary Coleman, Quantitative Analyses of Potential Competitive Effects from a Merger (FTC Bureau of Economics, June 9, 2003) (available at <http://www.ftc.gov/be/quantmergeranalysis.pdf>). As with the analyses conducted in the cruise line investigation, each suggestion Scheffman and Coleman make is tied, implicitly or explicitly, to a specific theory of how coordination would be implemented, and thus would be probative only to the extent that theory were plausible give other information about industry structure and firm conduct.

concerned importantly with the same economic force, buyer substitution. Merger simulation can be useful in evaluating the possibility of unilateral competitive effects in several ways. First, simulation models can transform estimated demand elasticities into a convenient metric for understanding their implications for uniliateral effects. Second, they can provide a way to work out the implications of a range of qualitative judgments necessary to gauge the scope of localized competition that might be made based on documentary and interview evidence, and to test the sensitivity of competitive effects predictions to plausible variations in those assumptions. The results can guide the competitive effects analysis by educating intuitions and pointing out where further investigation would be most valuable.[25] Third, simulation analyses may be useful for weighing opposing forces, as with trading off the strength of the anticompetitive incentive resulting from the loss of localized competition against the procompetitive effects of product repositioning and efficiencies. Indeed, it is difficult to see how the implications of demand elasticities could be understood, or tradeoffs of anticompetitive incentives against procompetitive effects could be undertaken, without appeal to some sort of model, whether or not that model is formally specified.

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[25] A hypothetical example involving entry likelihood analysis illustrates how simulation analysis could usefully educate intuitions, here regarding the sales opportunities available to an entrant. A simulation model might suggest how large a market share a new entrant would be able to achieve in the post-merger setting without driving price below the premerger level, under the assumption that the entrant would take share away from other firms proportionally to their pre-merger market shares. But if product differentiation might be important, the model might also be solved under an alternative assumption, that the entrant's share would be taken more from rivals with products that are closer substitutes along some metric. If the sales opportunities fall substantially relative to employing the previous assumption, that result might suggest the value of further inquiry into the significance of differentiation to buyers, and the feasibility of entry plans that would involve introducing products at various locations in product space.

Simulation analyses, like all antitrust analyses, must be conducted with care, because the results can be sensitive to a wide range of assumptions, including as to the parameters and functional form of demand, the nature of the oligopoly interaction, and the magnitude and slope of marginal costs. The more these aspects of simulation analysis are tied to evidence – whether quantitative empirical studies or more qualitative judgments based on documents, testimony and experience – the more useful and convincing a simulation analysis will be. But in situations in which the difficulties of developing useful simulations loom large, scarce investigative resources may be better spent on refining estimates of key parameters such as demand elasticities than on refining simulation models to work out the implications of those parameters[26] – with the hope that with more precise estimates of the key parameters, the resolution of the investigation would not be sensitive to the method by which such simulations are conducted.

Non-Price Competition, Including Innovation

The Merger Guidelines say little about the effect of merger on innovation.[27] Although there is no compelling reason to revise the Merger Guidelines today – they were last revised in 1997, they continue to describe well agency practice, and they remain up-to-date in their

[26] Some of the potentially difficult technical issues involved in identifying the structure of demand generally, and estimating demand elasticities in particular, are discussed in Jonathan B. Baker, *Contemporary Empirical Merger Analysis*, 5 GEO. MASON. L. REV. 347, 351-55 (1997) and Jonathan B. Baker and Daniel L. Rubinfeld, *Empirical Methods in Antitrust Litigation: Review and Critique*, 1 AMER. L. & ECON. REV. 386, 414-16 (1999).

[27] They note that sellers with market power may lessen competition on non-price dimensions including innovation, and they recognize new and improved products or production processes as efficiencies.

underlying economic analysis – I am sympathetic to Bobby Willig's suggestion at the Workshop that the agencies consider adding a new section making explicit their approach to analyzing innovation competition (without altering any existing Guidelines text).[28] Any systematic effort to survey theories of anticompetitive effects involving innovation might consider coordination, unilateral effects, and the loss of innovation competition from the creation of monopsony power in geographically localized input markets. It is also necessary to consider possible efficiencies related to innovation that could arise from merger. I will sketch some preliminary thoughts on these possibilities below.

Coordination in research and development efforts is commonly considered unlikely

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[28] The process of revising the Merger Guidelines is difficult, and perhaps for this reason, Guidelines revisions have in the past have been undertaken not solely in a good government effort to keep them up-to-date, but also in response to broad policy challenges. From this perspective, the 1982 Merger Guidelines were developed out of a need to harmonize the then-ascendant Chicago School economic learning with the pre-existing case law, which was rooted in prior, structural era thinking. The 1984 Merger Guidelines sought to resolve a national political debate over the Justice Department's handling of politically-sensitive mergers among large steel producers faced with foreign competition. The revision clarified geographic market definition analysis for firms competing with foreign rivals and expressed more sympathy toward an efficiency justification for acquisitions. The 1992 Horizontal Merger Guidelines followed a series of Antitrust Division losses in court. The Justice Department had analyzed those adverse results as resulting from an overemphasis by the government on market structure in litigation rather than on articulating a compelling competitive effects story, and from its lack of success in explaining the distinction between committed and uncommitted entry; these deficiencies were addressed by the revisions. The 1992 Guidelines also educated the bar, economic consultants, judges and agency staff alike on new methods of analysis that the enforcement agencies had begun to employ internally, most notably involving the analysis of unilateral competitive effects, that were stimulated by then-contemporary developments in microeconomics. Agency interest in clarifying the role of efficiencies in merger analysis, the subject of the 1997 revisions, had become salient in through increased attention to the possibility of an efficiency defense by the courts and through the F.T.C.'s hearings on Competition Policy in the New High-Tech, Global Marketplace. Innovation competition has been the subject of recent hearings held by the agencies, and presents a broad rationale for revising the Merger Guidelines comparable to those that were salient in the past.

because it can be hard to detect deviation from an agreement to direct R&D away from certain activities and the benefits of cheating are often large and "lumpy." In addition, it may be difficult for the firms to reach a consensus on how to reduce R&D activity when the results of R&D are uncertain. Some of these difficulties could be reduced, however, if research or production joint ventures or technology licensing are commonly employed in the industry.[29] Moreover, it is possible to imagine coordination on R&D *outputs* somewhat more easily than coordination on inputs. For example, an arrangement of the form "I won't bring my product extension to the market if you don't bring your comparable product extension to the market" might work if the firms are known to have such an innovation that they can roll out quickly.[30] Nevertheless, coordinated competitive effects of mergers involving innovation competition are probably not common. Harm to innovation competition from merger is in general more plausibly the result of unilateral rather than coordinated effects.

The unilateral effects section of the Guidelines effectively presumes, consistent with plausible economic models and empirical evidence about firm behavior, that a unilateral output reduction (or price increase) by the merging firms will generate an output reduction and price

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[29] A firm less tied to its rivals than most through joint ventures and technology licensing arrangements might constrain a coordinated reduction in competition in the development of new products and processes, as a research and development maverick. The acquisition of such a firm could make coordination on non-price dimensions involving R&D more likely or more effective.

[30] A agreement not to deploy new products is most likely to be profitable for the firms if the new product introduction would be expensive and if the new product would not stimulate industry-wide demand, but would merely give each firm a substantial competitive advantage over its rival if not imitated.

increase for the market as a whole.[31] In general, research and development competition likely behaves similarly to price and output competition,[32] in that a unilateral reduction in R&D effort by one firm would be expected to generate a market-wide reduction in industry R&D activity (*e.g.* lengthening the expected time until a successful innovation), even if some rivals increase their own R&D activity in response.[33] This outcome – the likelihood that aggregate industry innovative effort would decline as the result of the loss of a research track through merger – appears particularly plausible in the types of industries in which the agencies have historically focused their attention when concerned about loss of innovation competition: markets in which market concentration is high (in the sense that only a handful of firms actively pursue the innovation with research efforts that are close substitutes), and markets in which identifiable existing assets (perhaps involving a large installed base or high market share in current generation products, or expertise in distribution or in obtaining regulatory approvals) appear

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[31] Even if products are strategic substitutes, and rivals would compete more aggressively if the merged firm acts less aggressively, aggregate market output may decline while price rises.

[32] Research and development competition may be more complex than price and output competition, however, for at least two reasons. First, R&D competition could have more of a "winner-take-all" tournament element than price and output competition. Second, R&D competition has an investment element: the firms compete on R&D today and, once the success or failure of efforts to develop new products or processes is determined, they compete on price and output tomorrow.

[33] This outcome may not arise in all industry settings, however. In an industry with a winner-take-all patent race, for example, the loss of a rival may raise the marginal value of research and development to the remaining firms. Under some circumstances, it is possible that those firms could be induced to spend so much more on R&D as to increase industry-wide R&D investment, even after accounting for any reduction in R&D spending by the merged firm. If so, the loss of a firm through merger could conceivably improve aggregate industry prospects for innovation.

necessary for successful new product or process development.[34]

Another unilateral theory of harm to competition that has not to my knowledge been seriously explored in a merger investigation is suggested by Michael Porter's striking observation that geographic clusters like Silicon Valley are highly innovative, even when the geographic markets for output competition are much larger.[35] This observation raises the possibility that a merger could harm innovation competition by creating monopsony power in a narrow geographic market for key inputs, and it would be interesting to investigate this possibility in an appropriate case.

Finally, a merger can make research and development less expensive or more effective, as has been explicitly recognized since 1997 in the efficiencies section of the Merger Guidelines. The Schumpeterian thesis that monopoly may promote innovation may suggest an additional way in which a merger may benefit competition by promoting innovation. In particular, I understand the empirical economic literature spurred by Schumpeter to suggest, plausibly, that a merger among sellers of current products could benefit innovation competition if: (1) the industry is pushing out the technological frontier, or is ripe for doing so; (2) intellectual property protection in the industry is weak, so the merging firm would largely be unable to appropriate the benefits of its new ideas pre-merger; and (3) market power in current markets helps ensure

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[34] In other settings, in contrast, it is more likely that new products or processes substituting for existing goods or methods could be developed in unrelated markets, in ways that an enforcement agency (or even current market participants) could not practically or reliably assess.

[35] Michael Porter, THE COMPETITIVE ADVANTAGE OF NATIONS 120 (1990).

that an innovator can appropriate to a substantial degree the benefits of its new ideas.[36] This appropriability theory of how a merger could benefit innovation competition makes sense if the specified conditions are met (though even then the harm from market power could outweigh the efficiency gain) and is worth considering in an appropriate case.

Dynamic Competitive Analysis

As the Workshop Announcement recognizes, competitive effects (whether harmful or beneficial) that occur at all time horizons, including the long-term future, are in principle relevant to merger analysis. In thinking about how to account for effects that may vary over time, it is important conceptually to distinguish two issues: the possibility that we may be less confident about our predictions the farther in the future we look – an issue which I do not consider further here – and the possibility that there may be different buyers at different time periods so that future harms or benefits may accrue to different buyers than would near term harms or benefits.[37] The welfare issues at stake in the latter case are similar to those that arise when a merger benefits buyers in one market but harms different buyers in another market. The

[36] This interpretation is suggested by cross-sectional empirical studies that find that what initially appears to be a relationship between high concentration and high rates of innovation disappears when company and industry-specific effects are controlled for. Those firm and industry effects plausibly reflect differences in appropriability conditions across industries.

[37] This discussion assumes that the future effects are known with certainty, ignoring complications associated with uncertainty as to outcomes. If, in a specific merger investigation, outcomes are uncertain and the probable magnitude of the harm is not large, it is likely that the agency could find a better use of enforcement resources than to pursue the case.

Guidelines allow the enforcement agencies to count benefits in one market in favor of the transaction, trading them off against harms in the other market, if the two outcomes are inextricably linked. Because intertemporal benefits and harms are likely to be inextricably linked, it would seem appropriate in general to look at the discounted present value of benefits or harms to buyers as a group over time, to the extent information is available about how those effects vary over time.[38]

Some hypothetical examples will make clear what is being suggested. First, consider an industry with a dominant firm and competitive fringe. Suppose that the competitive price is 10 and absent the merger, the dominant firm would be expected to charge a supracompetitive price of 12 for the foreseeable future. A merger between two fringe firms is expected to generate permanent reductions in marginal cost and lead to more competition for a time, lowering the price to 10 for several years. But after that period, suppose that the new duopoly would likely find a way to coordinate pricing to some extent. If the future coordinated duopoly price is no greater than 12, every consumer in every future period is better off with the merger than without, and aggregate economic welfare is higher in every period, so the merger should be permitted regardless of whether the welfare standard looks to aggregate surplus or consumers' surplus only.

Second, suppose that the post-merger price initially falls to 10, as before, but that the

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[38] I do not discuss the choice of discount rate except to note that the benefits and costs at issue accrue to the public, so a rate appropriate for governmental decision-making should be selected. The Office of Management and Budget gives guidance as to the choice of discount rate for cost-benefit analyses by government agencies. OMB Circular No. A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs (available at <http://www.whitehouse.gov/omb/circulars/index.html>).

later coordinated price instead exceeds 12. Now the merger presents a tradeoff. Relative to the but-for world, consumers are better off for a time, then worse off. Moreover, aggregate surplus increases in the short term and, let us assume, declines in the long term.[39] Whatever the welfare standard, a tradeoff should be made, comparing the discounted future harm against the short term benefits, in order for the agency to decide whether to bring an enforcement action.

Third, suppose that the anticompetitive harm comes first, so the post-merger price exceeds 12 for a time while the efficiencies are delayed. Eventually the efficiencies kick in, in a way that matters: conferring production cost savings if an aggregate welfare standard is applied, or inducing a market price below 12 if a consumer welfare standard is applied. Again a tradeoff is presented. Both the harms and benefits to competition must be discounted so their present values can be compared. Because the benefits to competition are delayed, they will be discounted more than the harms in making this comparison.

[39] Whether aggregate welfare increases or declines in the long term depends on how production efficiency benefits in the future compare with the allocative efficiency loss from supracompetitive pricing.