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Analyzing Horizontal Mergers: Unilateral Effects in Product-Differentiated Markets

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ABSTRACT

This essay offers a brief, non-technical exposition of the antitrust analysis of horizontal mergers in product differentiated markets where the resulting price increase is thought to be "unilateral" – that is, only the post-merger firm increases its prices while other firms in the market do not. More realistically, non-merging firms who are reasonably close in product space to the merging firm will also be able to increase their prices when the post-merger firm's prices rise. The unilateral effects theory is robust and has become quite conventional in merger analysis. There is certainly no reason for thinking that it involves any more conjecture than what occurs in traditional concentration-increasing merger analysis. Nevertheless, as with all predictions about mergers, we must live with a certain measure of uncertainty.

Herbert Hovenkamp[*]

Introduction: diversion ratios and critical loss analysis

The impact of a merger among "adjacent" firms in a product-differentiated market is illustrated by a well-known diagram, shown in Figure A, of a row of hot dog vendors arrayed across a beach during the summer, spaced approximately 50 yards apart.[1] Assume that the

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[1] The illustration comes from Harold Hotelling, Stability in Competition, 39 Econ. J. 41 (1929). See also Jonathan B. Baker, Market Concentration in the Antitrust Analysis of Horizontal Mergers, in Antitrust Law & Economics (Keith Hylton, ed., 2009) (excellent, moderately technical); Gregory J. Werden & Luke M. Froeb, Unilateral Competitive Effects of Horizontal Mergers, ch. 3, in Handbook of Antitrust Economics (Paolo

hot dogs and their vendors are physically identical but the differentiation applies to the variable distances that bathers must walk in order to reach a hot dog stand. Assume further that the pre-merger price of each vendor is a dollar, and that bathers, who are the potential customers, are willing to pay as much as two dollars for each hot dog, less one cent for each yard they must walk. Thus, when all vendors charge the same price, the customers always maximize their value by walking to the closest vendor, but they would be willing to walk to any vendor who is as far as 100 yards away. The 100-yard remote vendor produces value to the customer of precisely the hot dog's price, and at that price no customer will walk to a vendor who is 101 yards or farther away. The vendors are called *A, B, C, D…N*.

FIGURE A
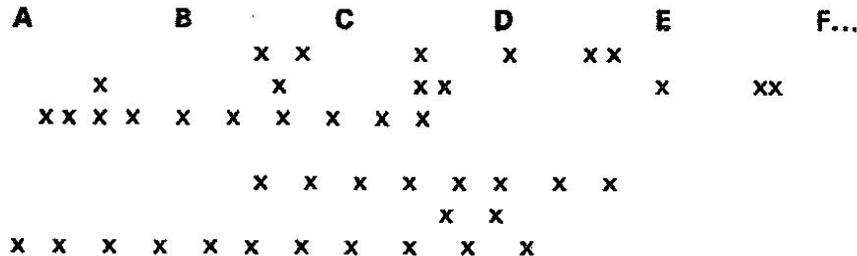
In this setting a potential customer would be willing to purchase a hot dog from as many as five vendors. For example, if she were sunbathing precisely at the location of vendor *D*, then vendors *C* and *E* would be 50 yards away in either direction, and vendors *B* and *F* would be 100 yards away in either direction. Ordinarily the customer would prefer to purchase from *D*, which gives her value of $2.00 for a price of $1.00. Since she must walk 50 yards to either *C* or *E*, these vendors give her value of $1.50 ($2.00 - 50 cents for 50 yards) for $1.00; and vendors *B* and *F* give her value of $1.00 ($2.00 - $1.00 for 100 yards) for her $1.00, thus depriving her of all consumers' surplus but nevertheless leaving her willing to purchase a hot dog.

Buccirossi, ed., MIT Press, 2008) (excellent, but quite technical, discussion); Michael Baye, Market Definition and Unilateral Competitive Effects in Online Retail Markets, 4 J. Comp. L. & Econ. 639 (2008); Jeffrey Church & Roger Ware, Industrial Organization: A Strategic Approach §4.2 (2000); David T. Scheffman & Mary Coleman, Quantitative Analyses of Potential Competitive Effects from a Merger (June 9, 2003, available at *www.ftc.gov*); Thomas Campbell, Predation and Competition in Antitrust: The Case of Nonfungible Goods, 87 Colum. L. Rev. 1625 (1987).

Also observe that in this setting each of the firms has a range of " captured" or preferred customers of 50 yards, or 25 yards on either side, which is half-way to the next vendor. That is, a customer located 20 yards to the left of vendor *B* would be 30 yards from vendor *A*. Vendor *B* could charge that customer a price as much as 10 cents higher than vendor *A* could and still make the sale. However, the vendors are unable to price-discriminate; they must charge all hot dog buyers the same price. Furthermore, they are all in the same position,[2] and in this "equilibrium" situation they all charge a price of $1.00.

Suppose that vendors *C* and *D* should merge, while leaving their stands (or "plants") in the same location. The assumption that they leave their stands in the same place is critical for now, but must be relaxed later when we consider the possibility that firms will reposition their offerings in response to the merger. In the example, it should be clear that the two vendors together will be able to charge a significantly higher price than when they were competing. For example, considering the customers sunbathing between *C* and *D*, the new firm *CD* has at least a 50-cent (50-yard) advantage over vendors *B* and *E*, both of whom are at least 50 yards more remote. Considering this group of customers alone, *CD* could increase its price to $1.50 without losing any of them to either *B* or *E*. Furthermore, the range of customers located between former *C* and *D* is a full 50 yards, the same as the range of individual firms' preferred customers before the merger. In sum, this merger would very likely facilitate a significant price increase, perhaps by as much as 30 or 40 cents.[3]

Furthermore, (1) this price increase could be assessed by firm *CD* even though post-merger firm *CD* had a market share of only 8 percent or so (assuming 25 equal-size vendors prior to the merger and that the beach itself was the smallest relevant market). Still further, (2) although firm *CD* would be able to assess this significant price increase, for the most part other firms in the market would not be able to do so. The exception would be firms *B* and *E*, who are adjacent to *CD* on each side. They may be able to respond to *CD*'s

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[2] Actually, they are all in the same position except for the two vendors at the end points, who have somewhat greater power because they face competition from only one side rather than two.

[3] The firm would probably not increase its price by 50 cents because it would lose too many of the sales to customers located between *B* and *CD* on the left, and *E* and *CD* on the right. Rather, it would compute a price increase that maximized net gains. Depending on how customers were arrayed, this might be a price of, say, $1.30.

price increase by increasing their own prices somewhat, although not as much as *CD*.

Observe also that *CD*'s ability to increase its price by these magnitudes meets all the criteria for defining *CD*'s output as a relevant market unto itself. That is, the merger has put *CD* into a position such that the elasticity of demand facing it is sufficiently low that *CD* can reduce output and charge a price significantly above its costs. For example, a cartel of *C* and *D* would achieve the same result. We often define markets by considering the range of firms that are capable of fixing prices.[4]

Further, the significant increase in power occurs only because the *CD* merger united two firms that were either adjacent or quite close together in the beach/hot dog market. If two remote firms, such as *A* and *E*, had merged, leaving three competitors between them, these price effects would not occur. As we shall see later, unilateral effects theories do not require that the output of the two merging firms be the closest possible substitutes for one another. Nevertheless, they must be regarded by customers as reasonably close substitutes.

While the story is somewhat more abstract when the firms are spread out in product space rather than geographic space, the principle is no different. The degree to which a merger in a product-differentiated market might facilitate a unilateral price increase depends on (1) the relative "closeness" in product space of the merging firms to one another; (2) the relative distance between the post-merger firm's product offering and the offerings of others in the market; and (3) the relative inability of other firms to redesign their products to make them close to the output of the merging firms.

Thus there must be a significant number of customers who regard the products of the two merging firms as their preferred market choices.[5] In *Whole Foods* the FTC and later the D.C. Circuit distinguished between "marginal" customers, who would shop the

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[4] See 2B Phillip E. Areeda & Herbert Hovenkamp, Antitrust Law ¶530a (3d ed. 2008) (hereinafter "Antitrust Law"); and see Gregory J. Werden, the 1982 Merger Guidelines and the Ascent of the Hypothetical Monopolist Paradigm, 71 Antitrust L.J. 253, 255-256, 262-263(2003) (developing history and analytic defense of proposition that relevant market consists of a "collusive group," or smallest grouping of firms capable of colluding profitably with one another). See also Malcolm B. Coate & Jeffrey H. Fischer, A Practical Guide to the Hypothetical Monopolist Test for Market Definition, 4 J.Comp. L. & Econ. 1031 (2008).

[5] See Department of Justice and Federal Trade Commission, 1992 Horizontal Merger Guidelines §2.21. These Guidelines are reprinted in Appendix A of the Supplement.

lowest price, and "core" customers who would be loyal to high end natural food stores even after a price increase.[6] Whether the latter group was significant enough to make a price increase profitable presented an empirical question. The closer the products made by the two merging firms, the more likely that the merger will produce a substantial price increase.[7] Further, something must prevent other firms in the market from repositioning their output to make it more like that of the merging firms, thus enabling them to take advantage of the price increase.

Figure B illustrates a unilateral effects merger in a product-differentiated market. Suppose this market has six firms, *A* through *F*, making a differentiated product. That is, the products of all six firms compete with one another, but different customers prefer the products of different firms. For some the preferences are strong; for others they are weaker. Further, different customers have different rankings of first, second, and third choices, and so on. Assume that *A*'s marginal cost is $1.00, its current price is $2.00, and at that price it sells 100 units. Its residual price elasticity of demand is -2, which means that a 10 percent price increase, to $2.20, will yield a 20 percent demand reduction, to 80 units. Note that this price increase is unprofitable. Pre-increase profits were $100, but post-increase profits are $1.20 per unit, times 80 units, or $96.

FIGURE B
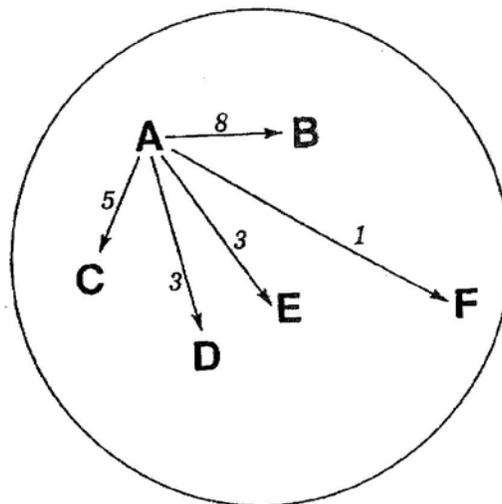
But consider where the customers go when firm *A* raises its price. Assume that of the 20 units that are lost, 8 (40%) go to *B*, the closest rival, 5 (25%) go to *C*, the second closest rival, and 3, 3 and 1 units respectively, go to rivals *D*, *E* and *F*. This percentage rate at which customers substitute from *A* to *B* or from *A* to *C,* is called a "diversion ratio."[8] Assume also that all rivals have the same costs.

In this case an *AC* merger would make the price increase profitable, even though *C* is not A's "closest" rival.[9] While the price increase to $2.20 reduces *A*'s own profits by $4.00, it increases *C*'s profits by $5.00 (that is,*C* sells 5 more at a profit of $1.00 each). A merger with *B* would be even more profitable, since 8 sales, and $8.00 in increased profit, go to *B*. But the important point is that a merger with *either B* or *C* would make *A*'s 10 percent price increase profitable, even though *C* is only the second closest rival. Thus either merger would be challengeable if we regarded a merger facilitating a 10 percent price increase as unlawful.

Of course, a merger between *A* and *C* in the above situation would almost certainly permit firm *B* to increase its prices as well, given that it is an even closer substitute for *A* than *C* is. For example, suppose that the automobile market contains three brands

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[8] See Jonathan B. Baker, Contemporary Empirical Merger Analysis, 5 Geo. Mason L. Rev. 347 (1997); Jonathan B. Baker, Unilateral Competitive Effects Theories in Merger Analysis, 11 Antitrust 21(Spring 1997); Carl Shapiro, Mergers with Differentiated Products, 10 Antitrust 23, 24 (Spring 1996); see also Christopher A. Vellturo, Evaluating Mergers with Differentiated Products, 11 Antitrust 16 (Spring 1997). See also Gregory J. Werden & Luke M. Froeb, The Effects of Mergers in Differentiated Products Industries: Structural Merger Policy and the Logit Model, 10 J.L. Econ. & Organ. 407 (1994); Jonathan B. Baker & Timothy F. Bresnahan, The Gains from Merger or Collusion in Product-Differentiated Industries, 33 J. Indus. Econ. 427 (1985). See also Gregory J. Werden, Simulating Unilateral Competitive Effects from Differentiated Products Mergers, 11 Antitrust 27 (Spring 1997); Jerry A. Hausman & Gregory K. Leonard, Economic Analysis of Differentiated Products Mergers Using Real World Data, 5 Geo. Mason L. Rev. 321 (1997).

[9] See the Government's *Commentary*:

> A merger may produce significant unilateral effects even though a non-merging product is the "closest" substitute for every merging product in the sense that the largest diversion ratio for every product of the merged firm is to a non-merging firm's product. The unilateral effects of a merger of differentiated consumer products are largely determined by the diversion ratios between pairs of products combined by the merger, and the diversion ratios between those products and the products of non-merging firms have at most a secondary effect.

Federal Trade Commission and U.S. Department of Justice, *Commentary on the Horizontal Merger Guidelines* 28 (2006). Available at http://www.ftc.gov/os/2006/03/CommentaryontheHorizontalMergerGuidelinesMarch2006.pdf

of luxury cars that compete quite intensely among themselves for a certain class of customers, and compete to a considerably lesser degree with other automobiles. The three brands are Mercedes, BMW, and Lexus. Of these, Mercedes and BMW are the closest substitutes, which simply means that if Mercedes were to increase its price unilaterally more of the customers who substituted away from Mercedes would go to BMW than would go to Lexus. However, a merger of Mercedes and Lexus could still effect a price increase. But in that case BMW would operate under the price umbrella of its nearest rival, which would be the newly merged Mercedes/Lexus firm. Given the relative weakness of its competition with other manufacturers it would almost certainly profit by increasing its own prices as well. So ultimately this analysis differs very little from saying that the grouping of sales covered by Mercedes, BMW and Lexus constitutes a relevant market unto itself, and a merger of any two firms within this market would very likely lead to the feared price increase.

Significantly, these price increases might be profitable even if rivals responded to the price increase by increasing their own output. That is, we speak of the effects as "unilateral" because the profitability of the merger does not depend on any notion that it facilitates collusion by enabling nonmerging firms to reduce their own output as well. All things being equal, the bigger the market share of the post-merger firm vis-à-vis nonmerging firms, the more resistant it will be to output increases by rivals. For this reason the theory is most robust when the post-merger firm has a significant market share, in the range of 35 percent or more. The Government's *Commentary* on the Merger Guidelines reveals that as an empirical matter the Agencies' unilateral effects challenges "nearly always have involved combined shares greater than 35%."[10] The *Commentary* then adds:

> Combined shares less than 35% may be sufficiently high to produce a substantial unilateral anticompetitive effect if the products are differentiated and the merging products are especially close substitutes or if the product is undifferentiated and the non-merging firms are capacity constrained.[11]

Measuring diversion ratios is often a fairly matter of tracing consumer substitution from electronic scanners or similar data. For

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[10]Id. at 26.
[11] Ibid.

example, if a sporting goods store sells several brands of running shoes and the price of Adidas rises by 10 percent, scanner data might reveal the number of customers who switched away from Adidas, and the relative numbers that switched to Nike, Saucony, Asics, and so on.

"Critical loss analysis" refers to the empirical determination whether a price increase of a given magnitude is profitable by comparing the gains from higher prices against the losses that result from loss of volume.[12] For example, in a case such as *Whole Foods* the question is whether after the merger the natural foods grocer would be able to profit by increasing price substantially.[13] In response to a price increase of a given magnitude a certain group of loyal, or "core," customers would pay more; other, more "marginal" customers would abandon the Whole Foods chain in favor of more general line grocery chains that were also increasingly carrying natural foods items. If the increased profits that *Whole Foods* increased from the loyal core group of customers was greater than the revenue that it lost from the price sensitive marginal customers, and if this price increase were of sufficient magnitude, then the price increase would be profitable and the narrower market definition appropriate.[14]

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[12] See Barry Harris and Joseph Simmons, Focusing Market Definition: How Much Substitution is Enough, 12 Res. L. & Econ. 207 (1989); Baniel P. O'Brien and Abraham L. Wickelgren, A Critical Analysis of Critical Loss Analysis (FTC Working Paper, May 23, 2003), available at http://www.ftc.gov/be/workpapers/wp254.pdf.

[13] *FTC v. Whole Foods Markets, Inc*., 548 F.3d 1028 (D.C. Cir. 2008). On critical loss analysis and the *Whole Foods* case, see Carlton Varner & Heather Cooper, Product Markets in Merger Cases: The *Whole Foods* Decision, Antitrust Source (Oct. 2007), available at *http://www.abanet.org/antitrust/at-source/07/10/Oct07-Varner.pdf*; and Joseph Farrell and Carl Shapiro, Improving Critical Loss Analysis, Antitrust Source (Feb. 2008), available at http://faculty.haas.berkeley.edu/shapiro/critical2008.pdf. See also Kevin Murphy and Robert Topel, Critical Loss Analysis in the Whole Foods Case, Global Competition Policy (March 17, 2008).

[14] On the use of critical loss analysis to assess mergers, see Joseph Farrell and Carl Shapiro, Improving Critical Loss Analysis, 2008 The Antitrust Source 1 (Feb. 2008), available at http://www.abanet.org/antitrust/at-source/08/02/Feb08-Farrell-Shapiro.pdf; Malcolm B. Coate and Joseph J. Simons, Models, Mathematics and Critical Loss (FTC, working paper, Feb. 18, 2009, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1346067; Malcolm B. Coate and Jeffrey H. Fischer, A Practical Guide to the Hypothetical Monopolist Test for Market Definition, 4 J.Comp. L. & Econ. 1031 (2008). For a good and balanced critique, see Jonathan B. Baker, Market Definition: An Analytic Overview, 74 Antitrust L. J. 129 (2007). Other good discussions include Daniel P. O'Brien & Abraham L. Wickelgren, A Critical Analysis of Critical Loss Analysis, 71 Antitrust L.J. 161 (2003); Michael L. Katz & Carl Shapiro, Critical Loss: Let's Tell the Whole Story, Antitrust 49 (Spring 2003);

Critical loss analysis begins with a price increase of a given magnitude, and then consider how many sales must be lost before this particular price increase would become unprofitable. Then it considers whether the actual level of sales lost in response to a given price increase exceeds the critical level.[15] If the actual level is greater than the critical level, then the price increase is unprofitable and the market must be drawn more broadly. In some cases a large price increase might be profitable while a smaller one would not be; in others a small increase might be profitable while a larger one would not be.[16] In most cases the merger in question has not occurred. As a result the merger must be "simulated," with the relevant losses estimated from demand elasticities.

While simplified and artificial, the foregoing illustrations nevertheless make an important point. In differentiated markets mergers between firms making "adjacent" or similar product variations can have a much more significant anticompetitive effect than mergers between firms making more remote products. The differentiations can apply to both spatial location, as in the hot dog vendor illustration, and to product specification or design.

Critical loss analysis can yield the anomaly that it tends to indicate larger markets (and thus less market power) when price/cost margins are high.[17] In such cases the loss of relatively few customers can be quite costly, indicating that fewer customer

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James Langenfeld & Wenqing Li, Critical Loss Analysis in Evaluating Mergers, 46 Antitrust Bull. 299 (2001); Dennis W. Carlton, Using Economics to Improve Antitrust Policy, 2004 Colum. Bus. L. Rev. 283 (2004); Gregory J. Werden, Beyond Critical Loss: Tailoring Applications of the Hypothetical Monopolist Paradigm, 4 Competition L.J. 69 (2005); Kenneth L. Danger & H.E. Frech III, Critical Thinking About "Critical Loss" in Antitrust, 46 Antitrust Bull. 339 (2001).

[15] See *City of New York v. Group Health, Inc.*, 2008 WL 4974578 (S.D.N.Y. Nov. 21, 2008) (critical loss analysis relevant to determination of amount of price increase that would likely occur subsequent to a merger); *Delco LLC v. Giant of Maryland*, LLC, 2007 WL 3307018 (D.N.J. Nov. 8, 2008) (similar).

[16] See Gregory Werden, Market Delineation and the Justice Department's Merger Guidelines, 1983 Duke L.J. 514 (1983). Cf., e.g., *California v. Sutter Health Sys.*, 130 F.Supp.2d 1109, 1129 (C.D.Cal. 2001) (erroneously concluding that the only relevant price increase to be considered was the 5 percent increase suggested in the Guidelines; this could lead to the perverse result that a merger would be exonerated because the post-merger firm's 5% price increase would be unprofitable, even though a 10% price increase would be profitable). On the latter point, see Gregory J. Werden, Beyond Critical Loss: Tailoring Applications of the Hypothetical Monopolist Paradigm, 4 Competition L.J. 69 (2005).

[17] See, e.g., *FTC v. Swedish Match*, 131 F.Supp.2d 151 (D.D.C. 2000) (ultimately finding narrower market in case of high price/cost margins).

substitutions are necessary to achieve the "critical" amount of loss. [18] But the other side is that margins might be high because the firms are already charging monopoly prices, indicating that the market should be defined narrowly. [19] In sum, a version of the "*Cellophane* Fallacy*" can be implicit in critical loss analysis, as it is in market delineation under the Merger Guidelines generally. [20] That is, the approach may reflect the fact that the firms are already charging a profit-maximizing price that is significantly above their costs. Indeed, if two firms that are very close to one another in product space are behaving as a perfect cartel, which charges the same price as a monopoly, then a merger of the two would not affect their price at all. They would go right on charging the monopoly price. Nevertheless, we would never permit such a merger because the two-person (duopoly) situation is inherently less stable than the monopoly situation, and later on proof of an unlawful agreement might be established. As a result opportunities exist to apply the antitrust laws to the two firm situation that will be lost once the merger has united them into a single firm.

Although the price effects of such mergers are often said to be "unilateral," other firms in the market may be able to increase their own prices as well. In the case of ordinary concentration increasing mergers facilitating coordinated interaction,[21] we generally say that every firm in the market experiences the resulting price increase, whether or not the firm was involved in the merger. At the opposite extreme—when a merger creates an absolute monopoly—the post-merger firm is the only one to enjoy the price increase. In this intermediate case, the fact of product differentiation plus the product or geographic proximity of the two merging firms means that they will enjoy a significant price increase. But, depending on the situation, some of the remaining firms may be able to increase their prices as

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[18] See Jonathan B. Baker, Market Definition: An Analytic Overview, 74 Antitrust L. J. 129, 155-156 (2007).

[19] See Daniel P. O'Brien & Abraham L. Wickelgren, A Critical Analysis of Critical Loss Analysis, 71 Antitrust L.J. 161 (2003); Michael L. Katz & Carl Shapiro, Critical Loss: Let's Tell the Whole Story, Antitrust, Spring 2003, at 49; James Langenfeld & Wenqing Li, Critical Loss Analysis in Evaluating Mergers, 46 Antitrust Bull. 299 (2001); Dennis W. Carlton, Using Economics to Improve Antitrust Policy, 2004 Colum. Bus. L. Rev. 283 (2004).

[20] On the *Cellophane* fallacy, see 2B Antitrust Law ¶539 (3d ed. 2008). See Gregory J. Werden, Beyond Critical Loss: Tailoring Applications of the Hypothetical Monopolist Paradigm, 4 Competition L.J. 69 (2005), which also discusses other problems with the critical loss technique.

[21] See 4 Antitrust Law, Ch. 9B-2.

well, although by a smaller amount. This is because, while their products are relatively distinguishable from those of the merging firms, the firms were nevertheless in the same market to begin with, so the substitution rate among them is nevertheless significant. As a result, a significant price increase by the post-merger firm reduces competitive pressures on other firms as well, depending on their degree of " remoteness" from the post-merger firm's output. Thus, for example, the post-merger firm might be able to increase its priceby10 percent, while other firms in the market exact price increases of, say, 1 to 3 percent, depending on how proximate their output is to that of the post-merger firm.[22]

In *Evanston* the FTC found that a previously consummated merger among two hospitals substantially lessened competition based largely on the fact that prices actually rose subsequent to the merger.[23] The price increases were found to result from the unilateral effect of limiting competition between two closely placed hospitals in a diverse greater–Chicago market. The court rejected the proposition that a unilateral effects theory could apply only if the merging firms were the closest substitutes for the product in question, noting that a merger between one firm and even its second- or third-closest substitute could result in an unacceptable price increase.[24] This would be tantamount to a conclusion that a relevant market exists for the output of the two merging firms.[25]

In this case there was undisputed evidence that the post-merger firm immediately raised prices subsequent to the merger, and the Commission rejected the hospital's explanation that it did so only because it had previously been ignorant about demand and had undercharged certain classes of customers. The FTC accepted regression analyses offered by its experts that related these price increases to the structural effects of the merger rather than to competitively "benign" factors.

In any event, measurement of diversion of customers seems

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[22] For example, in Figure B, supra, if firms A and C merged and increased their post-merger price, firm B would very likely then be able to increase its price as well, given that its closest rival A was now charging a higher price.

[23] *Evanston Northwestern Healthcare Corp*., 2007 WL 2286195 (F.T.C., Aug. 6, 2007) (to the extent it is relevant, H.H. was consulted by the defendant).

[24] Id., citing 4 Antitrust Law ¶914h (2d ed. 2004).

[25] Id., citing Gregory J. Werden, Simulating the Effects of Differentiated Product Mergers: A Practical Alternative to Structural Merger Policy, 5 Geo. Mason L. Rev. 363, 384 & n.97 (1997).

essential to the analysis. In *Oracle* the court observed that the government had failed to produce evidence of customer diversion ratios.[26] For its part, the government argued that the market was characterized by a high degree of price discrimination, making such numbers difficult to produce or meaningless when they were produced. The court was not persuaded. It noted that without such evidence there was insufficient proof of "localized competition" between Oracle and Peoplesoft, the merging firms.[27] In sum, without diversion ratio evidence one could not determine how much Oracle and Peoplesoft competed with each other, nor, how little either of these firms competed with some third firm. That argument seems weighty in a situation where the basis for challenging the merger is that the quantum of competition between the merging firms is high, while that between the merging firms and other firms is low. At the same time, however, the court erred in concluding that before the government could prevail on its unilateral effects claim it had to prove "a relevant market in which the merging parties would have essentially a monopoly or dominant position…."[28] While a dominant position is necessary for monopolization, the concern of merger law is impermissible price increases, something which can be achieved on far lower market shares.

Is market definition necessary?

A formal market definition is literally unnecessary to an economist's prediction whether a merger in a product differentiated market will facilitate a unilateral price increase. Formulas can be devised for predicting the impact of a post-merger price increase that do not depend on a formal market definition.[29] At the same time, the

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[26] *United States v. Oracle Corp.*, 331 F. Supp. 2d 1098 (N.D. Cal. 2004).

[27] Id. at 1117. See also *United States v. Sungard Data Sys., Inc.,* 172 F.Supp.2d 172 (D.D.C. 2001) (government's market too narrowly drawn).

[28] Id. at 1123.

[29] See Carl Shapiro & Joseph Farrell, Mergers with Unilateral Effects: A Simpler and More Accurate Alternative to Market Definition (FTC, Feb. 12, 2008), available at http://www.ftc.gov/bc/unilateral/docs/shapiro.pdf. The authors develop this formula for assessing whether such a merger will result in upward pricing pressure:

$$D_{21}\,(P_2 - C_2) > eC_1$$

Where,

D_{21} = the Diversion Ratio from Product 2 to Product 1

P_2 = Pre-merger price of product 2

case law seems quite clearly to require a market definition.[30]

But these differences are more of rhetoric than of substance. Economists often measure market power by looking at elasticities, and use the term "relevant market" only because the legal policy so requires. In a unilateral effects merger case the query is whether the post-merger firm will be able to raise its price to an unacceptable level (say, 5 percent to 10 percent above current prices or, in some cases, above the competitive price) for an unacceptable period of time. If that is the case then it clearly follows that a "grouping of sales" exists in which such a price increase is plausible. That grouping may consist of the two merging firms, or it may consist of the two merging firms plus a few others that are reasonably adjacent in product space. In all events, to speak of this post-merger grouping as a "relevant market" is both sensible and quite conventional within antitrust.

It may also be the case that the post-merger "relevant market" is narrower than any observed pre-merger market. For example, suppose we were to define a relevant market as a grouping of sales for which a firm or firms could collectively and profitably hold price at 10 percent above cost. It is quite possible that firms B and D in a field of A,B,C,D & E would not be able to sustain such a price as long as they were competing with one another. As a result we would say that the output of B and D does not constitute a relevant market, but that perhaps the relevant market includes all five firms.[31] After the merger, however, B and D are no longer constrained by one another's prices and the feared price increase may be possible. At that point it would become appropriate to say that the output of B and D is itself a relevant market; or perhaps alternatively that the market consists of the output of B, C & D, with C being a firm that is also located very close to B and D in product space.

C_2 = Marginal Cost of Product 2
C_1 = Marginal cost of Product 1
e = credit for merger efficiencies

The formula requires knowledge of both the price and marginal cost of product 2, a number which already provides considerable information about that product's power.

[30] See, e.g., *FTC v. Whole Foods Market, Inc.*, 548F.3d 1028, 1040 (D.C. Cir. 2008). See also *United States v. Philadelphia Natl. Bank*, 374 U.S. 321, 363 (1963) (requiring proof of "a firm controlling an undue percentage share of the relevant market"); followed in *FTC v. H.J. Heinz Co.*, 246 F.3d 708, 715 (D.C. Cir. 2001)

[31] Although a cartel of B, C and D might still be able to raise prices to an unacceptable level.

This result is not inconsistent with the case law. For example, *Philadelphia Bank* assessed this requirement:

> Specifically, we think that a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effects.[32]

Clearly, the reference to a merger that "produces" a firm that controls an "undue percentage share of the relevant market" is a reference to the situation that exists subsequent to the merger. Quite consistently with *Philadelphia Bank*, one can conclude the merger facilitated an unacceptable price increase among a narrower grouping of firms, which is therefore appropriately described as a relevant market.

For the time being at least, the courts remain insistent on a market definition in a merger case and the quoted language from *Philadelphia Bank* appears to restrain the lower courts from doing otherwise. But the concept of a relevant market is surely flexible enough to permit the courts to identify a "relevant market" while economists use their own tools of measurement to predict whether a merger will yield an unacceptable price increase above marginal cost. As Landes and Posner observed already in 1981 the concept of a relevant market for all forms of antitrust analysis, including mergers, is entirely dependent on the elasticities of supply and demand that a firm faces.[33] A unilateral effects merger that yields an

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[32] *Philadelphia Bank*, 374 U.S. at 363.

[33] See William M. Landes and Richard A. Posner, Market Power in Antitrust Cases, 94 Harv. L. Rev. 937, 962 (1981):

> … market definition is important in determining whether a firm has market power (and how much it has) only because of the difficulty of measuring elasticities of demand and supply reliably. If we knew the elasticity of demand facing firm i, we could measure its market power directly … without troubling ourselves about what its market share was. Less obviously, if we could readily determine market elasticities of demand (but not firm elasticities of demand), we would not have to worry about how broadly or narrowly the market was defined…. If the market were defined broadly--that is, if distant as well as close substitutes for firm i's product were included in the market--i's market share would tend to be small, but the market elasticity of demand would also tend to be low; so many substitutes would be included in the market that consumers would have difficulty substituting away from the market if market price rose…. If instead the market were defined narrowly, the firm's market share would be larger but the effect on market power would be offset by the higher market elasticity of

unacceptable price increase is simply a merger that reduces the relevant elasticities facing the merging firm, thus permitting a narrower market definition.[34]

Indeed, one characteristic of unilateral effects merger cases in product differentiated markets is that the market boundaries themselves tend to be both uncertain and shifting. The historical conception of a relevant market involved a grouping of firms that produced the "same" product, which was distinguishable from other firms that produced a "different" product." Product differentiation necessarily entails that competition among different firms within such a market is imperfect, and the degree of imperfection varies from one pair of firms to another. Whether a yet further differentiated firm is inside or outside the market is entirely a matter of definition. The problem is exacerbated by the fact that not only is the output of the firms differentiated, but both the product and the firms themselves may be subject to rapid technological change.[35] To the extent that firms continuously seek to differentiate their products these boundaries shift as a firm move closer to or further away from the product space of another firm.

The *Oracle* court noted the great difficulty in defining relevant markets when there are gradations of substitutability between different firms, and the only difference between the substitutability of the products of the merging firms and that between the merging firms and outsiders is a relatively narrow one of degree. The Court then suggested "that strong presumptions based on mere market concentration may be ill-advised in differentiated products unilateral effects cases."[36]

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demand….

[34] This conception may revitalize a conception of "submarket," but the two concepts are completely different and revitalization would lead to confusion. See 2B Antitrust Law ¶533 (3d ed. 2008). See also Jonathan B. Baker, Stepping Out in an Old Brown Shoe: in Qualified Praise of Submarkets, 68 Antitrust L.J. 203 (2000).

[35] Michael L. Katz and Howard A. Shelanski, Mergers and Innovation, 74 Antitrust L.J. 1, 32-33 (2007); see also Michael L. Katz and Howard A. Shelanski, Merger Analysis and the Treatment of Uncertainty: Should we Expect Better, 74 Antitrust L.J. 537 (2007).

[36] *Oracle*, 331 F. Supp. 2d at 1121 citing Roscoe B Starek III & Stephen Stockum, What Makes Mergers Anticompetitive?: "Unilateral Effects" Analysis Under the 1992 Merger Guidelines, 63 Antitrust L.J. 801, 804 (1995); Jerry A. Hausman & Gregory K. Leonard, Economic Analysis of Differentiated Products Mergers Using Real World Data, 5 Geo. Mason L. Rev. 321, 337-339 (1997); Gregory J. Werden & Luke M. Froeb, The Effects of Mergers in Differentiated Products Industries: Structural Merger Policy and the Logit Model, 10 J.L. Econ. & Organ. 407, 413 (1994).

And given these constraints the D.C. Circuit's analysis in *Whole Foods* seems to be about right -- faithful to both the economists' analysis and also to the legal reality of *Philadelphia Bank's* mandate that a relevant market must be identified in a merger case.[37] The court rejected the FTC's claim that a relevant market was unnecessary, but it recognized a plausible the claim that a narrower market for premium natural and organic supermarkets (PNOS), in which the merging firms were dominant. The court unfortunately also used the term "submarket,"[38] but this usage was unnecessary to its analysis, because it concluded that the smaller market existed on the basis of traditional price increasing criteria that are used to identify relevant markets.

Anticompetitive effects dissipated by easy competitor mobility

The competitive effects of merger of hot dog vendors in the previous illustrations would quickly be dissipated if individual hot dog vendors could cheaply and quickly relocate their stands—for example, if all were mobile carts that could be moved at the vendor's will. In that case, when firms *C* and *D* merged and attempted a price increase of, say, 30 percent, we would expect firms *A*, *B*, *E*, *F* and perhaps others to move their carts closer into the *CD* territory in order to participate in these price increases. The effect would be to drive the prices back down toward the $1 level. The same thing could happen in the case of the merger in the product-differentiated market depending on how easily nonmerging firms could reconfigure their products to make them more closely resemble the merging firms' product. In sum, the threat of such a merger to produce anticompetitive results depends on the inability of other firms to respond by innovating or relocating into that portion of the market that has now become more competitive as a result of the merger. As the *Oracle* court put it:

> repositioning by the non-merging firms must be
> unlikely. In other words, a plaintiff must
> demonstrate that the non-merging firms are
> unlikely to introduce products sufficiently similar

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[37] *FTC v. Whole Foods Market, Inc.*, 548 F.3d 1028, 1040 (D.C. Cir. 2008).

[38] Id. at 1039 ("The FTC's evidence delineated a PNOS submarket catering to a core group of customers who 'have decided that natural and organic is important, lifestyle of health and ecological sustainability is important,'" quoting the district court, 502 F.Supp.2d at 23).

              to the products controlled by the merging firms to
eliminate any significant market power created
by the merger.[39]

By contrast, in *Whole Foods* the FTC cited evidence that
repositioning by conventional grocers to compete more
closely with natural food stores would be difficult because
by moving their offerings in this direction they would have
to weaken their position vis-à-vis their core customers.[40]
The district court disagreed, and found significant
repositioning.[41] The D.C. Circuit cited this evidence as
well, but did not find it conclusive.[42]

Merger to Monopoly? Early Railroad Merger Cases

     Is the merger of hot dog vendors illustrated previously any
different from a conventional merger to monopoly? That question is
largely one of market definition, as some of the early merger cases
illustrate. For example *Union Pacific* was a government challenge to
Union Pacific's acquisition of Southern Pacific, two large,
predominantly east-west railroad systems that were adjacent to each
other and that previously had competed along many routes.[43] As the

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[39] *Oracle*, 331 F. Supp. 2d at 1118. See also id. at 1109:
> assuming that localized product or geographic competition exists between Oracle and
> PeopleSoft, plaintiffs have not proved that SAP, Microsoft and Lawson would not be
> able to reposition themselves in the market so as to constrain an anticompetitive price
> increase or reduction in output by a post-merger Oracle.

And see id. at 1135 (similar). Likewise, in *FTC v. Whole Foods Markets, Inc.* , 548 F.3d
1028 (D.C. Cir. 2008), a price increase by the post-merger firm would naturally induce the
general grocery chains to reposition their own inventory so as to compete more closely
with the natural food stores, where margins were higher; their ability to do so in a
reasonable amount of time could be decisive in determining whether the merger would lead
to an unacceptable price increase. On the repositioning issue generally, see Yves
Botteman, Mergers, Standard of Proof and Expert Economic Evidence, 2 J.Competition L.
& Econ. 71 (2006); John Harkrider, Proving Anticompetitive Impact: Moving Past Merger
Guidelines Presumptions, 2005 Col. Bus. L. Rev. 317, 325 (2005).

[40] The evidence is summaried in Deborah L. Feinstein and Michael B. Bernstein, All
Over the Map: Grocery Store Enforcement from *Von*'s to *Whole Foods*, 22 Antitrust 52, 55
(Fall, 2007).

[41] See *F.T.C. v. Whole Foods Market, Inc.*, 502 F.Supp.2d 1, 25 (D.D.C. 2008).

[42] 548 F.3d at 1035.

[43] *United States v. Union Pacific R.R. Co.*, 226 U.S. 61 (1912); see also *United States*

Supreme Court noted, although there were alternatives for carrying railroad traffic from the Gulf of Mexico to the Pacific Coast, the merger of these two railroads eliminated much of the closest competition.[44]

One way to view such a case is to see the geographic area covered by the Union Pacific and the Southern Pacific as a relevant market, and the merger as eliminating all competition between the only two participants in that market. Although modern market definition criteria had not yet been developed, this is apparently the perspective that the Court took. But in fact there were numerous competing lines, and the amount of competition varied depending on the origin and destination of the freight in question. What made the mergers anticompetitive is that they involved *adjacent* systems in the network, and the merger thus had the effect of isolating relatively more shipments from the competition of other lines. This was clearest in the *Southern Pacific* case. As the Court explained, when routing traffic originating on its lines the Southern Pacific—presumably acting as most railroads would—attempted to keep the traffic completely on its own line rather than transferring to the line of another railroad.[45] One of the lines it was most often forced to share was controlled by the Central Pacific. By acquiring the Central Pacific Southern Pacific was thus able to make a higher percentage of its lines noncompetitive.

Thus today we might look at the great railroad system merger cases as mergers in product-differentiated markets, with the differentiation resting entirely on geographic location. While the competing systems had many common points of interconnection and large cities were served by numerous systems, more isolated areas were typically served by a single system or perhaps two systems. As a result, competition ranged from fairly intense for long-haul rates between pairs of large cities, to almost nonexistent for short hauls between two relatively small towns.[46] While modern market definition criteria might permit finding many individual routes to be relevant markets, the systems themselves might be found to be in significant competition with each other. But the merger of "adjacent" systems

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v. Southern Pacific Co., 259 U.S. 214 (1922); *Northern Securities Co. v. United States*, 193 U.S. 197 (1904).

[44] *Union Pacific*, 226 U.S. at 88-89.

[45] *Southern Pacific*, 259 U.S. at 231.

[46] The late nineteenth and early twentieth century system is described in more detail in Herbert Hovenkamp, Regulatory Conflict in the Gilded Age: Federalism and the Railroad Problem, 97 Yale L.J. 1017-1072 (1988).

would have the effect of significantly reducing the amount of competition along numerous routes—thus increasing the number of routes on which monopoly price increases would not be disciplined by competition.

Relative incidence of unilateral effects

As the 1992 Horizontal Merger Guidelines[47] observe, product differentiation can make collusion or oligopoly far more difficult than it would be in a market where every firm's product was identical with everyone else's.[48] As a result, collusion is of relatively less concern in markets that are characterized by *significant* product differentiation.

By "significant," we mean product differentiation that goes to fairly fundamental differences in product design, manufacturing costs, technology, or use of inputs.[49] While many markets exhibit some degree of product differentiation, not all product differentiation is significant. For example, today even agricultural products are subject to branding, such as Chiquita and Del Monte bananas. Other products, such as ready-to-eat breakfast cereals, seem far more different on first appearance than they are in fact. While Kellogg's Frosted Flakes and Post's Alphabits might appear quite distinct, they are in fact made with common ingredients and common technology, with equipment that can be reconfigured to extrude different shapes or designs. And, of course, they are promoted differently. But leaving aside intellectual property rights, a firm making one could quite easily switch its production facilities to the manufacturing of the other. To this extent, costs are more or less the same, and collusion might be quite possible.

When product differentiation is significant, therefore, collusion becomes less likely, but mergers effecting unilateral price increases in specific segments of the product-differentiated market become

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[47] Department of Justice and Federal Trade Commission, 1992 Horizontal Merger Guidelines §2.21 (reprinted in Appendix A of the Supplement).

[48] On the impact of production differentiation on collusion, see 12 Herbert Hovenkamp, Antitrust Law ¶2002f2 (2d ed. 2005).

[49] See *Oracle*, 331 F. Supp. 2d at 1120 ("Merely demonstrating that the merging parties' products are differentiated is not sufficient. Instead, a plaintiff must demonstrate product differentiation sufficient to sustain a small but significant and non-transitory price increase.").

relatively more likely.[50]

Robustness; Conceptual Difficulties

Analysis of unilateral effects in merger cases seems rather new, although the discussion of the early railroad merger cases indicates that at least some of the issues have been around for some time. In any event, this novelty should not be interpreted to mean that unilateral effects analysis is more speculative or less provable using econometric methodologies than other types of anticompetitive effects. Indeed, in a great many cases unilateral effects may be more readily capable of proof than is the likelihood of collusion,[51] although the robustness of the conclusions depend critically on the availability

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[50] Cf. *State of New York v. Kraft General Foods, Inc.*, 926 F. Supp. 321, 352-358 (S.D.N.Y. 1995), concluding that a merger of two ready-to-eat breakfast cereal manufacturers was unlikely to produce anticompetitive unilateral effects. The court noted mainly that the participants' Grape-Nuts and Shredded Wheat appealed to somewhat different groups of consumers, had been developed through different types of advertising campaigns, and had significant physical dissimilarities and different pricing structures. The Court then suggested that one could not easily or effectively supplant the other in the ready-to-eat cereal market. As a result, the evidence did not support the plaintiff's contention that Grape-Nuts and Shredded Wheat are the first and second choices of a significant percentage of cereal consumers.

See also *United States v. Gillette Co.*, 828 F. Supp. 78, 84 (D.D.C. 1993):

> [T]he evidence indicates that the market is awash with manufacturers and that the merger is unlikely to give the merged company the ability—unilaterally or collusively—to create anti-competitive effects. … First, there is ample evidence that the merged company will not be able to increase prices on premium fountain pens unilaterally: There is ample evidence that fountain pens compete with other modes of writing. … [A]n increase in one type of pen will make it relatively less attractive than other types of pen. … In addition, given the competition between fountain pens and other modes of writing and the ease with which manufacturers may enter this wider market, Gillette will not be able to raise prices unilaterally on its premium fountain pens.

[51] See Jonathan B. Baker, Contemporary Empirical Merger Analysis, 5 Geo. Mason L. Rev. 347 (1997); Christopher A. Vellturo, Evaluating Mergers with Differentiated Products, 11 Antitrust 16 (Spring 1997). As Vellturo notes, often the data necessary to estimate the " diversion ratio," or the extent to which customers respond to a price increase in product A by switching to product B, are more readily obtained than the data necessary to measure a relevant market and compute overall demand effects. To that extent such analysis can be more reliable than traditional market concentration analysis. For more technical discussions, see Werden & Froeb, 10 J.L. Econ. & Organ. 407; Baker & Bresnahan, 33 J. Indus. Econ.427; Werden, Simulating Unilateral Competitive Effects, 11 Antitrust 27.

of data.[52]

Oligopoly theories are largely familiar to federal judges and antitrust lawyers, and they have been widely used in merger analysis for many years. But this familiarity belies their complexity and the many assumptions that attend any prediction of the price effects of a particular market structure. The pure theory, while elegant, depends on many simplifying assumptions[53] that rarely apply in real-world situations. As a result, empirical analysis by economists consists in large part of controlling for deviations. Thus, for example, the Horizontal Merger Guidelines consider numerous factors that can vary the significance of a particular concentration level.[54] While stating these factors is relatively easy, assigning weights to them and measuring their impact on the firms' collective ability to increase price can be extremely difficult. Further, as any economist knows, a "market share" is a relatively meaningless number unless accompanied by information concerning the cross-elasticities of demand and supply that the firms in the resulting market face.[55] However, the market definition/market share computation process that goes on in the typical antitrust case involves defining a market using fairly rough criteria and then treating all market share numbers of similar magnitude as meaning about the same thing.

As a result, the predictions that the Merger Guidelines enable us to make on the basis of market share are often imprecise, providing relatively clear indications of anticompetitive effects in cases that are significantly over the thresholds, but less clear indications about marginal cases. Nevertheless, the case law has been willing to accommodate this uncertainty, and the language of Clayton Act §7 seems to accept it. The statute does not require sure proof of price increases of a given magnitude; rather, it requires only reasonable evidence showing that the effect of a merger "may be" substantially to "lessen competition."

Applying these same criteria, measurement of unilateral effects

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[52] See Hausman & Leonard, 5 Geo. Mason L. Rev. 321.

[53] Briefly: perfectly fungible product, perfect information about the output of rivals, constant costs, no strategic behavior other than the immediate search for the output level at which marginal cost and marginal revenue are equal.

[54] 1992 Merger Guidelines §2.11 (reprinted in Appendix A of the Supplement).

[55] See William M. Landes & Richard A. Posner, Market Power in Antitrust Cases, 94 Harv. L. Rev. 937 (1981). Making the point forcefully in the defense of alternative econometric methodologies in unilateral effects merger cases is the Jerry A. Hausman & Gregory K. Leonard, Economic Analysis of Differentiated Products Mergers Using Real World Data, 5 Geo. Mason L. Rev. 321 (1997).

with modern econometric tools is very likely no less speculative and probably more manageable when appropriate data are available.[56] Predicting behavior may be a more manageable exercise because fewer firms have to be taken into account. In the ordinary collusion facilitation case one must at least theoretically anticipate the behavior of every firm in the post-merger market. In the typical unilateral effects case, by contrast, the concern is with the behavior of the merger participants plus the relative position and capacity of "adjacent" firms.

Needless to say, however, the methodologies are technical and require the use of an expert trained in empirical economic analysis.

At the same time, unilateral effects merger theories face some significant difficulties.[57] One problem in estimating unilateral effects is that retail pricing data used alone can exaggerate the anticompetitive effects of mergers by focusing exclusively on the demand side of the market.[58] Suppose Beech-Nut and Gerber are relatively close substitutes making "premium" baby food and decide to merge. Scanner data indicates that these firms are close substitutes for each other but that Heinz, which makes a lower-priced brand, is more removed. As a result, the data suggest that a price increase will result from the Beech-Nut and Gerber merger. But the scanner data provide information only about customers' immediate responses to price variations among the three brands. The data say nothing about whether Heinz would be in a position to modify its product so as to compete in the premium market niche itself. Nor do they say anything about grocers' ability to respond to a price increase in premium baby food by reallocating more shelf space to lower-priced brands. Excessive reliance on short-run consumer behavior undoubtedly provides an exaggerated picture to the extent that consumer choice is only one of many avenues along which substitution among products occurs.[59] Before consumer data tell us

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[56] See especially Carl Shapiro & Joseph Farrell, Mergers with Unilateral Effects: A Simpler and More Accurate Alternative to Market Definition (FTC, Feb. 12, 2008), available at http://www.ftc.gov/bc/unilateral/docs/shapiro.pdf; Jonathan Baker, Contemporary Empirical Merger Analysis, 5 Geo. Mason L. Rev. at 347, noting that direct measure of demand elasticities is often a more reliable mechanism for assessing power than assessments of relevant market and market share.

[57] See Herbert Hovenkamp, The Antitrust Enterprise: Principle and Execution, ch. 9 (2005). See also *Oracle*, 331 F. Supp. 2d at 1098, which noted many difficulties.

[58] This is can be the case of critical loss analysis, which tends to focus on consumer behavior rather than supplier substitution.

[59] See Edward J. Lopez, New Anti-Merger Theories: A Critique, 20 Cato J. #3(Winter

reliably that a merger between two makers of similar products is anticompetitive, we also need to have fairly reliable information about how other firms in the market are likely to respond to the market shifts caused by the merger.[60]

A second problem with unilateral effects theories is more conceptual. The theory postulates a single relevant market that under the Merger Guidelines must be well defined. This means that the goods in it must be reasonably good substitutes for each other. The unilateral effects theory then postulates that the output of the two merging firms is particularly close, while the output of nonmerging firms is sufficiently distinct that they cannot discipline a higher price charged by the merging firms. Returning to the previous example of a market containing firms *A* through *F* and a merger between *C* and *D*, why is it that firms *A*, *B*, *E*, and *F* are unable to respond to the *CD* price increase? If they cannot make such a response, then it seems reasonable to conclude that they were improperly included in this market to begin with. But if the market was really limited to firms *C* and *D*, then we have a simple merger to monopoly, which does not require any "unilateral effects" theory to analyze.[61]

Criteria for Identifying Likelihood of Unilateral Price Increase

A merger in a product-differentiated market is more likely to result in a unilateral price increase as:

    (1) the products of the two merger participants are relatively similar to one another;

    (2) the products of the two merger participants are more different from the products produced by most other firms in the market that are not participating in the merger, although one or two may be equally or more similar; and

    (3) nonparticipants are unable readily to alter or reconfigure their products to make them more nearly like the products of the merger participants.

To the extent that such a merger enables the post-merger firm profitably to assess a significant price increase without losing sales

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    [60] On this point, see Timothy J. Muris, The Government and Merger Efficiencies: Still Hostile After All These Years, 7 Geo. Mason L. Rev. 729, 739-740 (1999).

    [61] On mergers to monopoly, see 4 Antitrust Law ¶911 (3d ed. 2009).

to other firms, we would say that the merger facilitates the emergence of a new grouping of sales, or relevant market, in which the merging firms have either a monopoly or else a dominant share.[62]

In assessing the first criterion with respect to any merger, we might ask whether the two merging firms produce any products that would be the first and second choices of consumers in that market, considering pre-merger prices.[63] Thus, for example, suppose the merging firms both manufacture differentiated product *A*, whose variations are expressed as *A1*, *A2*, *A3*, *A4*, … *An*. In this case, let us suppose that the acquiring firm produces variation *A2* and the acquired firm produces a fairly close variation, *A3*. Further, for a significant group of consumers *A2* is the first choice at pre-merger prices, while *A3* would be the second choice. The competition between the manufacturers of *A2* and *A3* can be said to be more intense for the patronage of these customers than the competition between the makers of such pairings as *A2* and *A6*, or *A3* and *A1*.

Suppose the econometric evidence indicates that a 10 percent pre-merger price increase in *A2* would have been unprofitable because a significant number of *A2*'s customers would have substituted *A3*—that is, the diversion ratio between *A2* and *A3* is high.[64] After the merger, however, a 10 percent price increase in combined *A2/A3* would be undermined only by substitutions of third or fourth choices, such as *A1* or *A4*. If the relative difference in consumer preferences for *A1* or *A4* is significantly greater than the

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[62] Accord, *Oracle,* 331 F. Supp. 2d at 1118 (citing this paragraph in the previous edition).

[63] See Shapiro, 10 Antitrust at 24.

[64] The diversion ratio expresses the extent to which buyers of the acquiring firm will substitute the good of the acquired firm, or vice versa, not the degree of substitution generally, which is the same as cross-price elasticity of demand. For an empirical critique, see Jerry A. Hausman & Gregory K. Leonard, Economic Analysis of Differentiated Products Mergers Using Real World Data, 5 Geo. Mason J. Rev. 321 (1997).

To illustrate, suppose that the evidence indicates that in response to a 10 percent price increase, 60 percent of the customers of *A2* will substitute away, but they will go in roughly equal numbers to *A1*, *A3*, *A4*, *A5*, *A6*, *A7* and *A8*. In that case it is clear that the manufacturers of all of these variations are in close competition with *A2* and eliminating *A3* as a rival will still leave all the others, suggesting that a significant price increase would still be unprofitable.

By contrast, if the evidence suggests that in response to *A2*'s 10 percent price increase 60 percent of the customers would substitute away but two-thirds of these would purchase *A3*, then the *A2/A3* merger would eliminate this option for these customers, who might then pay the higher price rather than substitute to *A1*, *A4*, or others.

relative difference between *A2* and *A3* had been, then this combined 10 percent price increase in *A2/A3* could be quite profitable, even though the increase in *A2* alone would not have been. As suggested earlier, that conclusion could be expressed in conventional antitrust terms by saying that the post-merger grouping *A2/A3* is a relevant market that the post-merger firm now dominates, although the sufficiently similar output of other firms must be included as well. Significantly, a cartel of *A2* and *A3* would also have been profitable.

At this point, however, we can expect that the manufacturers of *A1* and *A4*, and perhaps others, will try to compete for the higher profit sales made by the newly merged *A2/A3* firm. If these manufacturers are like the mobile hot dog vendors in the previous illustration, then the post-merger price increase will not last very long. *A1,A4*, and perhaps other firms will immediately produce a product variation sufficiently resembling the *A2/A3* variations that customers would rather purchase than pay the higher price.[65]

Interstate Bakers approved a consent decree requiring the merging wholesale bakers, Interstate and Continental, to divest certain brand labels.[66] As the court described the allegations:

> The Complaint alleges that Interstate's acquisition of Continental would likely lead to an increase in price charged to consumers for white pan bread. Following the acquisition, Interstate likely would unilaterally raise the price of its own brands. … Because Interstate and Continental's brands are perceived by consumers as close substitutes, Interstate could pursue such a pricing strategy without losing so much in sales to competing white pan bread brands or to private labels that the price increase would be unprofitable. Interstate could, for instance, profitably impose a significant increase in the price of Wonder white pan bread, since a substantial portion of any sales lost for that product would be recaptured by increased sales of Interstate's other brands.
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> Since many consumers consider Interstate

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[65] See *Oracle*, 331 F. Supp. 2d at 1109, 1118 (noting this to be the case).

[66] *United States v. Interstate Bakeries Corp.*, 1996-1 Trade Cas. ¶ 71,271 (N.D. Ill. 1995).

and Continental brands to be closer substitutes
than most other branded or private label white
breads, the competitive discipline provided by
rivals after the acquisition would be insufficient to
prevent Interstate from significantly increasing
the prices now being charged for Interstate and
Continental branded white pan bread. Moreover,
in response to Interstate's price increases,
competing bakers would likely increase their
prices of white pan bread.[67]

Finally, the efficiencies defense elaborated in Subchapter 9E
applies here as fully as in other types of merger cases.

Government Guidelines

In determining whether to challenge mergers under this unilateral
effects theory, the Merger Guidelines state that the enforcement
agency will consider several factors. *First,* "Substantial unilateral
price elevation in a market for differentiated products requires that
there be a significant share of sales in the market accounted for by
consumers who regard the products of the merging firms as their first
and second choices, and that repositioning of the non-parties'
product lines to replace the localized competition lost through the
merger be unlikely."[68]

Second, "The price rise will be greater the closer substitutes are
to the products of the merging firms, i.e., the more the buyers of one
product consider the other product to be their next choice."[69]

Third, although the general market concentration thresholds for
challenging horizontal mergers do not apply so readily under this

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[67] Id. at 76,190. *Cf. United States v. Kimberly-Clark Corp.*, 1996-1 Trade Cas. ¶71,405
(N.D. Tex. 1995) a judgment on a consent decree terminating a challenge to a merger that
included two out of three major manufacturers of facial tissue. The acquiring firm,
Kimberly-Clark, produced Kleenex, which dominated the market with a 48.5 percent share
and was a lower-priced tissue. The acquired firm, Scott, produced Scotties, which had only
a 7 percent share but was also aggressively priced, forcing Kleenex to be priced lower than
it otherwise would be. Under the decree Kimberly-Clark agreed to divest the Scotties'
brand and two out of four tissue mills.

[68] 1992 Horizontal Merger Guidelines, §2.21. See Malcolm B. Coate, Unilateral
Effects under the Guidelines: Models, Merits, and Merger Policy (FTC working paper, Oct.
1, 2008), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1263474

[69] Guidelines, §2.211.

theory, as a rough generalization mergers will be subject to challenge where they fall outside the "safe harbor" provisions of those thresholds[70] and the market share of the merger participants exceeds 35 percent. This latter figure, it is noted, may overstate or understate the competitive significance of the merger, depending on the degree of similarity in the products of the two merging firms and their joint similarity to the products of others.

Fourth, as it is more difficult and costly for nonparticipants to the merger in the product-differentiated market to reconfigure their products so as to compete more directly with the post-merger firm, the competitive effects of the merger increase and challenge is more likely.[71]

Economics of Unilateral Effects

While mergers between rival sellers can increase the likelihood of collusive behavior, they can also make it profitable for the merging firms to raise their prices without *relying on* a similar response by other firms in the market. This is particularly true in oligopolistic markets. Although the firms continue to choose their outputs and/or prices independently, the combination of two or more firms into one eliminates the constraints that each of the merging firms imposed on the others' choices, and the new equilibrium can deviate (further) from the competitive outcome. The extent to which these unilateral effects are likely to occur depends on the nature of the interaction among the firms in the market (including the behavior of potential entrants), the degree of substitutability among the firms' products and the relation between costs and outputs for the firms. While the post-merger firm may not depend on the responses of others in increasing its own price, close rivals may be in a position to take advantage of the post-merger firm's price increase, either to (1) increase their own prices; or (2) reposition their product so as to bring it closer to the product of the post-merger firm, where margins are now higher.

A common version of unilateral effects, the localized competition

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[70] This would be: (a) where the post-merger HHI is in the range 1000-1800 and the HHI increase resulting from the merger exceeds 100; or (b) where the post-merger HHI exceeds 1800 and the increase in HHI caused by the merger exceeds 50. See 1992 Guidelines §1.51. For the HHI, its computation, and the general Guidelines thresholds, see 4 Antitrust Law ¶¶930-932 (3d ed. 2009).

[71] 1992 Guidelines §2.

theory that is set forth in the 1992 Merger Guidelines,[72] can be seen in the following example.[73] Suppose that Firm *A* and Firm *B* each sell a single brand in a differentiated product market. In the initial pre-merger equilibrium, Firm *A* sells 100 units at a price of $2 per unit and faces a demand curve for its output with an elasticity of -2. Thus, a 10 percent increase in the price that Firm *A* charges would lead to a 20 percent reduction in the quantity that Firm *A* sells. Some of these lost sales would result from consumers switching to other brands of the product (including the brand offered by Firm *B*), while other lost sales would result from consumers buying other goods altogether. If the constant marginal cost of production for Firm *A* is $1 per unit, a 10 percent price increase would not be profitable; it would lead to increased profits (or contribution to fixed costs) of $0.20 on the 80 units that it would continue to sell, or $16, but at a cost of $1.00 profit on each of the 20 units that are no longer purchased, or $20. Alternatively, Firm *A* would earn a profit of $96 by selling 80 units at a markup of $1.20, as opposed to the $100 profit it would earn by selling 100 units at the original $1 markup.

To see how a merger between Firm *A* and Firm *B* could change this situation, suppose that 25 percent of the sales that Firm *A* would lose as a result of the 10 percent price increase would be captured by Firm *B* as consumers switch to alternative brands, and that Firm *B* is also selling its output at a $1 markup over marginal cost. If Firm *A* acquires Firm *B*, the profits that the merged firm earns on the five units diverted from *A*'s brand to *B*'s brand are no longer lost when the price of Firm *A*'s brand is increased, and the $0.20 price increase is now profitable. Against the $20 loss of profits from reduced sales of brand *A*, the merged firm gains $16 on the 80 units of brand *A* that it continues to sell plus an additional $5 on the increased sales of brand *B*, for a total of $21.

Before the merger, Firm *A*'s price was constrained by the ability of consumers to switch to other goods, including Firm *B*'s product, and the constraint imposed by the latter is removed as a result of the merger. Similarly, Firm *A*'s constraint on Firm *B*'s pricing is also eliminated as a result of the merger, and we would want to consider the possibility that the merged firm would now be in a position to

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[72] Id., §2.21.

[73] Similar examples are presented in Carl Shapiro, Mergers with Differentiated Products, 10 Antitrust 23, 24 (Spring 1996); Jonathan B. Baker, Contemporary Empirical Merger Analysis, 5 Geo. Mason L. Rev. 347 (1997); Jonathan B. Baker, Unilateral Competitive Effects Theories in Merger Analysis, 11 Antitrust 21(Spring 1997).

raise the price of brand *B*. This would depend on the willingness of consumers to switch to other products in response to an increase in brand *B*'s price and the extent to which those sales would go to brand *A*. The analysis of the proposed merger should not stop with the demand side either. Subsequent steps should include an inquiry into the ability and willingness of other nonmerging producers to respond to the price increase by changing their prices or promotion activities, repositioning their brands to make them closer substitutes, or by entering new brands. Any of these responses could lead to an increase in the number of consumers who switch from brand *A* and may make the post-merger price increase unprofitable. Accommodating responses by rivals, on the other hand, would tend to make the post-merger price increase larger. Cost savings that arise as a result of the merger may also reduce the incentive to raise price, and if sufficiently large could actually lead to price decreases.[74]

Note that Firm *B* need not be the "closest" substitute for Firm *A*, in the sense that more consumers switch to Firm *B* than to any other firm in response to an increase in the price of Firm *A*'s brand. Even if 50 percent of the sales that Firm *A* would lose as a result of the 10 percent price increase would be captured by Firm *C*, the merger between Firms *A* and *B* would still make a unilateral price increase profitable. All the analysis requires is that a significant fraction of the lost sales be diverted to brand *B*; if only 10 percent of the lost sales (two units) are diverted, the additional $2 of profit on the increased sales of brand *B* is not sufficient to make the 10 percent price increase profitable for the merged firm.

Note also the importance of the markup (the difference between price and marginal cost) for Firm *B* to the calculation. If the markup for Firm *B* were only $0.50, say because Firm *B* has higher costs, the additional profit to the merged firm on sales to consumers switching from brand *A* to brand *B* is only $2.50 ($0.50 times 5 units), which is no longer sufficient to make the price increase profitable. Conversely, if the markup on Firm *B*'s output were $1.50, the merger would make the 10 percent price increase profitable if only 20 percent (four units) of the lost sales of brand *A* were diverted to brand *B*. One troublesome result of this analysis is that, just as the Merger Guidelines generally, the methodology tends to find larger markets as prices are higher in relation to cost, thus leading to the

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claim that the methodologies we use to assess mergers commit a version of the "*Cellophane*" fallacy.[75]

The critical factors in the demand side of this analysis are the own-price elasticity of demand for Firm *A*'s brand, which determines the sales of brand *A* that will be lost in response to a price increase, and the fraction of those lost sales that will be captured by Firm *B*. The latter has been termed the Diversion Ratio; it is related to the cross-price elasticity of demand for brand *A* with respect to the price of brand *B*, to the own-price elasticity of demand for brand *A*, and to the pre-merger sales of both brands.[76] In one set of circumstances, the Diversion Ratio is related to the shares of the two firms; specifically, if N percent of sales that are lost by Firm *A* result from consumers switching brands (with 100 - N percent resulting from purchases of goods outside the market) and if all brands are equally "close" or " distant" to each other,[77] the Diversion Ratio between brands *A* and *B* reduces to $(0.01 \times N \times S_B)/(1 - S_A)$, where SA and SB are the shares of brands *A* and *B*, respectively.[78] More generally, however, other evidence, including statistical estimates of the demand elasticities will be required.

Unilateral Effects Facilitated by Capacity Constraints or Differential Costs

Introduction

A merger can also facilitate unilateral price increases in the

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[75] The "*Cellophane*" fallacy consist in concluding that a firm lacks monopoly power because it would lose too many sales in response to a given price increase, when cross elasticity of demand is in fact high because the firm is already charging a monopoly price. See 2B Antitrust Law ¶533 (3d ed. 2007).

[76]See Carl Shapiro,Mergers with Differentiated Products, 10 Antitrust 23, 24 (Spring 1996); and Robert Willig, Merger Analysis, Industrial Organization Theory, and Merger Guidelines, Brookings Papers on Economic Activity: Microeconomics 281 (1991).

[77] The assumption that all brands are equally close underlies the so-called "logit" model used to simulate the effect of mergers. See Werden & Froeb, The Effects of Mergers in Differentiated Prodcuts Industries: Sturctural Merger Policy and the Logit Model, 10 J.L. Econ. & Organ. 407 (1994).

[78] Thus, if 75 percent of sales that are lost by Firm *A*result from consumers switching brands and 25 percent result from consumers switching to goods outside the market, all brands are equally "close" or "distant" to each other, and the shares of brands *A* and *B* are 20 and 25 percent, respectively. The Diversion Ratio between brands *A* and *B* would be $(.75)(.25)/(1-.20) \approx .23$; approximately 23 percent of the sales lost by brand *A* would be diverted to brand *B*.

special situation where (1) nonmerging firms in the market cannot readily increase their output except at significantly higher cost; and (2) the merger places the post-merger firm in a unique position to make "all or nothing" offers to a relatively small group of large buyers. Theoretically this theory can apply to a merger in an undifferentiated market – that is, where all sellers make an identical product.

Consider this example: a market contains several relatively small sellers who cannot readily increase their output; as a result, buyers must typically obtain their needs by purchasing from two or more sellers. Suppose, for example, that the selling market has eight firms producing 100 units each. Four of the firms have costs of $5 per unit and another four firms have costs of $6 per unit. But a large buyer needs 300 units, which it could generally obtain before the merger for $5 per unit by forcing the four lower-cost firms to bid against each other. But now suppose that any two of the four lower-cost firms should merge and immediately raise their price to $5.49, telling the buyer that it will sell either all or none at that price. The other two low-cost firms continue to compete with each other, but neither of them nor the two in combination have sufficient capacity to meet the large buyers' needs. In this situation, the best deal the buyer can obtain is to purchase 200 units from the post-merger firm for $5.49 and take competitive bids from the other two low-cost firms, presumably purchasing the remaining 100 units for $5.00. This would give the buyer total costs of $1,598. If it rejected the post-merger firm's offer, its most favorable position would be to purchase the 200 units from the two non-merging low-cost firms at $5.00 and the additional 100 units from one of the high-cost firms at $6.00, giving total costs of $1,600.

Note that (1) the price increase in the illustration is significant, from $1,500 to $1,598, or about 7 percent; (2) the price increase is unilateral, in that the remaining two low-cost firms continue to compete with each other and the four higher-cost firms continue to compete with each other for the trade of smaller buyers; but (3) the price increase will not occur if the remaining two low-cost sellers are able at equivalent costs to increase their aggregate output to 300 units, thus satisfying the large buyers' entire demand.[79]

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[79] See Jonathan B. Baker, Unilateral Competitive Effects Theories in Merger Analysis, 11 Antitrust 21 (Spring 1997), who uses somewhat different illustrations and cites the merger of two large pharmacy chains, Rite Aid and Revco, as matching the facts of one of the illustrations. The principal buyer was Blue Cross, who preferred to deal with a single

Government Guidelines

The 1992 Horizontal Merger Guidelines[80] state that the government may challenge mergers when nonmerging rivals are subject to binding capacity constraints that prevent them from increasing their own output significantly in response to the merged firm's output reduction to below pre-merger levels. Such a merger is most likely to be challenged where such capacity constraints are unlikely to be removed within two years or existing excess capacity is significantly more costly to use than capacity currently in production and where the merging parties account for at least 35 percent of the market.[81]

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large pharmacy rather than a large group of smaller ones, but who would be forced to pay a higher price as a result of the merger.

However, the analysis exaggerates the ability of mergers of small market share to yield high increases. Baker illustrates with a "market" of ten firms whose respective marginal costs are 1, 2, 3, … 10, each of whom produces a single unit; and a buyer who requires seven units. Before any merger and under perfect information the buyer pays a price of a little under 56. Each of the seven low-cost sellers knows that it can charge any price up to eight before the buyer will turn to the eighth seller; and so each of these sellers will bid just under eight. But if any two of the seven low-cost sellers should merge and make an all-or-none offer, rejecting that offer would force the purchaser to turn to sellers eight and nine, thus permitting each actual seller in the market to bid a price just under nine. As a result, the price of the seven units goes from just under 56 to just under 63.

Baker then posits that this is a merger that reduces the number of firms in the market from 10 equal firms to 9 (eight one-unit firms plus one two-unit firm), and raising the HHI from 1000 to 1200. Thus a merger covering only 20 percent of the market yields a price increase of 12.5 percent. See Baker, id. at 26 n.29. However, the marginal costs differences are so significant that much smaller market definitions would be warranted. Firm 1 has marginal costs of 1, firm 2 of 2, firm 3 of 3, and so on. Under usual market definition criteria firms 1 and 2 together would constitute a relevant market because even high-cost firm 2 could raise its price by 50 percent to 3 without losing sales. As a result, a merger of firms 1 and 2 would be counted as a merger to monopoly. If firms 1 and 3 were to merge, their collective sales plus the sales of firm 2 would count as a market, for firm 3 could still raise its price by one-third above its costs without incurring consumer defections to firm 4. In that case post-merger market shares would be 67 percent for firm 1-3, and 33 percent for firm 2, yielding an HHI of 5578, more than triple the Guidelines threshold for high concentration and presumptive illegality. See 4 Antitrust Law ¶932a (3d ed. 2009).

Of course, if one completely ignores costs and looks at current prices, then the smallest relevant market consists of firms 1-7. See also Gregory J. Werden & Luke M. Froeb, Unilateral Competitive Effects of Horizontal Mergers, ch. 3, in Handbook of Antitrust Economics (Paolo Buccirossi, ed., MIT Press, 2008).

[80] Department of Justice and Federal Trade Commission, 1992 Horizontal Merger Guidelines §2.22.

[81] See *Foster*, No. 07-352, 2007 U.S. Dist. LEXIS 47606 (D.N.M. 2007), motion for preliminary injunction denied, *FTC v. Foster*, 2007 WL 1793441 (D.N.M. Apr. 29, 2007) (concluding that the FTC defined the geographic market too narrowly and that non-merging entities would be able to reposition themselves in response to a post-merger price

increase). The FTC ultimately dismissed the complaint. See *Foster*, 2007 WL 2985369 (Oct. 3, 2007).