

Market Share and Market Power in Merger and Monopolization Cases

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In light of the growing sophistication of the tools of industrial organization economics and reliance on the federal courts to resolve complicated competitive issues, it may be time for the courts to make greater use of economists in analyzing antitrust cases. While the costs of such an endeavor remain unexplored, we argue below that the benefits may be significant. In particular, we assert that the legal precedent requiring the courts to draw inferences about market power based primarily or exclusively on market shares and/or market concentration¹ can often be misleading. However, the only alternative to such judge-made bright-line rules is to utilize modern economic tools to undertake more extensive competitive analyses. The latter choice is essentially the course that the antitrust enforcement agencies are following. This article explores some of the arguments in favor of such an approach.

In the first section of this paper we explain how the essential legal elements of a monopolization claim under Section 2 of the Sherman Act² and an illegal merger under Section 7 of the Clayton Act³ require that the courts draw strong inferences from market share information. We then explain in the second section how, under the 1992 Department of Justice and Federal Trade Commission Horizontal Merger Guidelines (the 'Merger Guidelines'),⁴ more meaningful reliance is placed on a competitive effects inquiry which in practice relies heavily on economic analysis. Market share or concentration is used solely as a screening device to identify situations that warrant further analysis. The third section of this paper exposes the underlying economic justification for courts drawing competitive inferences from market share data. In this section we also show how the simple judicial treatment based on market share fails to distinguish among situations that differ significantly in terms of competitive outcomes. We conclude that the only viable avenue in which to improve judicial accuracy in antitrust cases is to expand the use of economic tools to undertake more extensive factually specific competitive effects analyses, as is done at the enforcement agencies. Revamping the present judicial tests is not a viable option.

MARKET SHARE AND MARKET POWER IN MERGER AND MONOPOLIZATION CASES

The federal courts have developed an analysis of mergers (Clayton Act Section 7) and monopolization (Sherman Act Section 2) that structurally connects market performance with market structure through inferences from market shares. In monopolization cases, for example, a two step process is employed.⁵ In the first step, the court defines the products and firms that comprise the relevant product and geographic markets. If the defendant's market share is above some threshold (usually above 70%), then monopoly power is assumed.⁶ Many courts have taken the position that a 50% market share is a 'prerequisite for a finding of monopoly.'⁷ The second step examines whether any anticompetitive conduct exists. This is important to avoid the prosecution of companies who have garnered large market shares from 'superior product, business acumen, or historic accident'.⁸ In merger cases under Section 7 of the Clayton Act the inquiry is similar. However, in a merger the issue is not the anticompetitive use of market power but rather the possibility that the merger enhances or entrenches market power. As

a result of this difference, courts in merger cases have employed only a one-step test that relies on inferences drawn from post-merger market shares in the relevant market to infer the likelihood of future market power from the merger.⁹ For example, in *United States v. Philadelphia National Bank*,¹⁰ the Supreme Court held that a post-merger market share of 48.8% was sufficient in itself to establish prima facie illegality of the merger. That decision clearly established that post-merger market shares are to be judicially considered to be an accurate proxy for appraising the dangers of increasing market power through horizontal merger. Not only was the market share threshold for a finding of market power lower for merger cases than for monopolization cases, but in situations where a trend of increased concentration was identified, post-merger shares of as low as 7.5% have been declared illegal.¹¹ However, unlike monopolization cases, in merger cases the courts allow defendants a limited ability to rebut the presumption of market power derived from large market shares.¹² In any event, in both merger and monopolization cases, the courts have relied, nearly exclusively, on inferences of market power drawn from market shares in the relevant product and geographic markets.¹³

THE MERGER GUIDELINES

The Merger Guidelines promulgated by the Department of Justice and the Federal Trade Commission¹⁴ take a much different approach to analyzing market power in merger cases than do the courts.¹⁵ Market power is not presumed from market shares or market concentration. Under the Merger Guidelines, market concentration analysis (using the HHI) acts only as a screening device to filter out cases that require no further competitive analysis. No inference is made that large market shares, as reflected in concentration statistics, necessarily mean that market power exists. Instead, the real competitive analysis takes place using the elaborate 'competitive effects' section of the Merger Guidelines that assesses the probability that a merger will either result in anticompetitive coordinated (collusion) or unilateral effects in the future.¹⁶ In practice, the enforcement agencies utilize the significant economic talent represented at the agencies to

analyze the likely competitive impact of each merger taking account of the specific economic and factual environment of the industry.¹⁷

Indeed, one author of the Merger Guidelines has stated forthrightly that the Merger Guidelines, 'use of market delineation as the first step of a largely structural analysis was compelled by case law precedent', (see Werden 1993). Since the enforcement agencies' ultimate ability to prevent anticompetitive mergers is derived from its ability to win lawsuits in the federal courts, effective merger control requires that some significant role be reserved for a market definition and market share-based structural analysis.

Thus, the Merger Guidelines approach can be viewed as a compromise of sorts between court precedent and the preference of many economists that market delineation be relegated to a secondary status or even abandoned.¹⁸ In fact, there are many situations in which market analysis is simply redundant of the more important competitive effects analysis. For example, a merger involving next best substitutes in a differentiated product market, in which competition is primarily 'localized', may not require precise market delineation and market share measurement for an analysis of market power. In such circumstances, the mandatory concentration calculation merely acts as an administrative screen.

COSTS OF DRAWING STRONG INFERENCES FROM MARKET SHARE

The question of whether courts should reduce their reliance on market share and concentration measures to infer market power in monopolization and merger cases is a difficult one. Market share analysis is simple and easy to administer. To abandon such reliance would require a much-expanded use of economic tools and reasoning in legal proceedings. Although a more thorough analysis would be costly, the current state of theoretical and empirical economics reveals that much inaccuracy can result from drawing strong conclusions from market concentration data. In the following sections we discuss the economic reasoning underlying the relationship between market share and market power, and illustrate how limited the relationship is.

Assumptions Underlying the Court's Analysis

A variety of models of economic behavior suggest a relationship between market share and market power. Consider three common types of models used in Industrial Organization: the dominant firm model, the collusive cartel model and non-cooperative oligopoly models (See Carlton and Perloff, 1990, Part 4).

The dominant firm in a market is a firm that can profitably raise price above competitive levels because output expansion by 'competitive fringe' firms is not sufficient to make the price increase unprofitable. In this model, the competitive fringe firms do not cooperate with the dominant firm, but nonetheless benefit from the increase in price. More formally, the elasticity of demand facing the dominant firm is directly related to the overall demand elasticity and the supply elasticity of the competitive fringe as follows:

$$\eta_{df} = \frac{\eta}{S_{df}} - \frac{1 - S_{df}}{S_{df}} \epsilon_{cf} \quad (1)$$

where η_{df} and S_{df} are the demand elasticity facing the dominant firm and the market share of the dominant firm, η is the elasticity of demand facing the market, and ϵ_{cf} is the supply elasticity of the competitive fringe. The optimal markup of price over competitive price (equal to marginal cost) for the dominant firm is described by

$$\frac{P_{df} - P_c}{P_{df}} = \frac{1}{\eta_{df}} \quad (2)$$

Combining Eqns (1) and (2) yields the following expression relating markups over competitive prices to market elasticity of demand, market share of the dominant firm and supply elasticity of the competitive fringe:

$$\frac{P_{df} - P_c}{P_{df}} = \left(\frac{\eta}{S_{df}} - \frac{1 - S_{df}}{S_{df}} \epsilon_{cf} \right)^{-1} \quad (3)$$

Equation (3) provides a direct relationship between market performance, in terms of markups, and market share. Higher market share of the dominant firm would, *ceteris paribus*, lead to a higher markup over competitive price levels.¹⁹ However, it is also clear that another important determinant of market power of the dominant

firm is the supply elasticity of the competitive fringe; high values of supply elasticity can eliminate market power of the dominant firm, whatever the dominant firm's share and the elasticity of demand for the product.

The importance of market share (or industry concentration) is also an element of models of collusive or coordinated cartel behavior. In such models, the costs of detecting and punishing cheating on a collusive agreement are presumed to increase as concentration falls.²⁰ Other important considerations involve the ability to reach an agreement that is mutually beneficial to the group, the efficiency of mechanisms to detect and punish cheating, and the legal treatment of collusion. Thus, in the standard models the more concentrated the industry the more likely, *ceteris paribus*, is anticompetitive collusive activity.

A relationship between market share and performance can be derived as well from non-cooperative models. Such models generally yield a relationship between concentration and pricing performance. For example, consider the general 'conjectural variation' representation of a firm's price-cost margin (percentage markup over marginal cost):

$$\frac{P - P_c}{P} = \frac{1 + v_i}{\eta} S_i \quad (4)$$

where

$$v_i = \sum_{j \neq i} \frac{\partial q_j}{\partial q_i}$$

is firm *i*'s conjectural variation; i.e. firm *i*'s assessment of the output response of all other firms in the industry to a change in firm *i*'s output.²¹ Clearly, it can be gleaned from Eqn (4) that the value of v_i is of critical importance. Perfect competition corresponds to $v_i = -1$, in which case there would be no markup over marginal cost. The case where $v_i = 0$ corresponds to the Cournot assumption; that other firms will not respond to changes in output by firm *i*. As we shall see, the Cournot assumption plays a special role in antitrust analysis.

Market share enters into all of these standard models in such a way that, *ceteris paribus*, greater concentration will generally be associated with reduced market performance.²² This is a basis for

the courts' inferences about market performance derived from market structure. But in real-world situations in which courts must make decisions, the assumptions underlying these models are generally not applicable.

Even the simple models discussed above reveal that market share is, at best, only an imperfect proxy for market power. Other factors play critical roles. In collusive models, the ability and costs of detecting and punishing cheating and the gains from colluding will differ across industries. In dominant firm and oligopoly models, the ability and incentives of competing firms to react to price increases, either by entering or expanding output, are crucial to the outcome. Firms with high market shares may have little or no market power if price increases resulted in extensive entry or output expansion by competitors. Similarly, firms with small shares may have considerable market power when competitors are unable to respond to price increases.

The models discussed above are highly stylized. In such models, firms are assumed to compete only in the market in question, compete according to constant and highly restrictive assumptions regarding their reactions to competitors actions, etc. But even these highly stylized models of competitive interaction require that conclusions regarding market power derived from market concentration be treated with care.

Consider the well-known relationship between the HHI measure of concentration and industry sales weighted price-cost margins in the Cournot model of oligopoly. Weighting the optimal markup expression for an individual firm, given above, by that firm's sales share produces:

$$S_i \frac{P - P_c}{P} = \frac{S_i}{\eta} S_i = \frac{S_i^2}{\eta} \quad (5)$$

The above relationship, summed over all firms in the market, produces the HHI:

$$\sum_{i=1}^n S_i \frac{P - P_c}{P} = \sum_{i=1}^n \frac{S_i^2}{\eta} = \frac{\text{HHI}}{\eta} \quad (6)$$

This relationship is sometimes posited as a justification for the heavy reliance on a measure of concentration to summarize industry performance, where performance is measured by

price-cost margins. Several problems immediately arise. First, although the Cournot assumption results in a neat relationship between price-cost margins and HHI, Cournot is only one of many possible assumptions regarding firm interaction.²³ Many, but not all, other models of oligopoly interaction also imply a relationship between performance and concentration. However, which model applies in a particular case is itself an important subject of analysis. Therefore, the Cournot assumption can be interpreted only as a convenient benchmark or starting point, but not a determination that firms are expected to interact in the Cournot manner. This interpretation supports the Merger Guidelines approach of using the HHI only as a screening device to identify situations in which further analysis should be pursued.

In addition, the relationship between performance and the HHI is parameterized by η , the elasticity of demand. This means that for every value of η there will exist a distinct relationship between performance and HHI. One of the most important achievements of the Merger Guidelines approach was to standardize questions of market power by using a 5% price increase test to define markets. That is, antitrust markets are constructed such that the elasticity of demand is roughly the same across markets. The result is that markets are defined so that HHI's will be comparable.²⁴ This simplification allows us to represent the relationship in a more familiar form:

$$\eta \sum_{i=1}^n S_i \frac{P - P_c}{P} = \text{HHI} \quad (7)$$

Finally, the above formulation assumes that the optimal output of firms is informed only by each firm's sales and costs in that market; i.e. each firm's incentive to raise price depends solely on profitability in the market in question. If this is not true, the simple relationship between the Eqn (7) HHI and performance, described above, will no longer hold.

The following section demonstrates the effect of relaxing the assumption that firms participate only in the market in question by deriving 'modified' HHIs that are comparable to the Eqn (7) HHI. The modifications required to produce a comparable market share-based analysis illus-

trates the potential errors associated with drawing inferences solely from market shares. as well as the type of other facts that must be considered.

Modifying the HHI to Account for Interrelated Markets

The relationship between the HHI and industry performance discussed above is derived from the individual firm's profit-maximization condition in which each firm competes only in the market in question and the individual firms play Cournot. We now allow the firms to also have interests in related markets, and derive modified HHIs that are comparable in the sense that like values of the HHI correspond to like price-cost margin performance in the candidate market. This exercise illustrates, in a few simple cases, the type of analysis that would be required if meaningful conclusions had to be drawn from market share data alone in such situations.

Complementary Products

Consider first the situation in which a producer of product *X* also is a producer of complementary product *Y*, and we are interested in drawing inferences about market power in the market for *X*. Complementarity means that increased sales of *X* also increase demand for *Y*, and vice versa. For example, a manufacturer of computer hardware and software finds that increased sales of hardware increase demand for software, and increased software sales increase demand for hardware.

A seller of both *X* and *Y* will realize less of a benefit (in terms of overall profitability) from an increase in the price of *X* than would a seller of only *X*. We can modify the standard HHI for an *n* firm industry to account for these altered incentives as follows:

$$\eta \sum_{i=1}^n \left(S_{xi} \frac{P_x - c'_x}{P_x} \right) =$$

$$\text{HHI} + \left(\frac{Y}{X} \frac{\partial P_y}{\partial P_x} \Big|_{y=y_0} \right) \sum_{i=1}^n (S_{xi} S_{yi}) \tag{8}$$

where HHI represents the usual HHI for market *X*, *X* and *Y* are total industry sales of *X* and *Y*,

S_{xi} and S_{yi} represent firm *i*'s shares of total output of *X* and *Y*, respectively, and $\partial P_y / \partial P_x$ (quantity of *Y* held constant) measures the relative response of changes in the prices of *X* and *Y* elicited by a change in the quantity of *X* produced.

Equation (8) is the usual HHI plus the cross-product of complementary product selling firms' shares of sales of each of the complementary products weighted by the relative sizes of *Y* and *X* industries and an expression relating changes in product prices to changes in *X* output. Since an increase in *X* production reduces the price of *X* but increases demand for complement *Y*, the sign of the weighting factor is negative, and Eqn (8) is a reduction from the usual HHI. Equation (8) is a concentration measure where complementary goods are at issue that is comparable to the normal case in the sense that like values of the concentration measure (HHI) correspond to like values of performance (measured in terms of markups over cost).

Equation (8) illustrates a fundamental principle. Because increased sales of a product increase demand for its complements, a firm producing complementary products has more of an incentive to sell each complement than would a firm that did not participate in the sale of both products. Therefore, the comparable modified HHI for a market in which some firms also sell complementary products is *less* than the normal HHI to account for increased incentives to sell output.

Vertical Integration

Consider now a situation where firms produce both *X* and *Y*, and where *X* is used as an input in the production of *Y*. In this case, *X* and *Y* are vertically related, and a firm that produces both is said to be vertically integrated. A firm could be self-sufficient (produce *X* to use only in its own production of *Y*), be a net seller of *X* (produce more *X* than it uses internally), or be a net buyer of *X* (produce less *X* than it uses in production of *Y*). The significance for incentives is that a producer of *X* that also produces *Y* will consider how his or her production of *X* will affect the market price of *Y*. By producing more *X*, lower market prices for *X* are 'passed on', resulting in lower prices for *Y*. Also, the integrated firm will not necessarily recognize the market price for *X* as the relevant marginal cost of the input.

Assuming that the market for Y is competitive and that firms that produce X hold Cournot conjectures, we can derive the following modified HHI when all production of X is included in the market.²⁵

$$\eta \sum_{i=1}^n \left(S_{xi} \frac{P_x - c'_x}{P_x} \right) = \text{HHI} - \left(1 - \frac{\partial P_y}{\partial P_x} \right) \sum_{i=1}^n (S_{xi} S_{yi}) \quad (9)$$

Thus the comparable HHI for a market with this type of vertically integrated firms is the usual HHI plus the cross-product of each firm's shares in the upstream and downstream markets, weighted by the amount by which higher prices of X result in higher prices of Y , less 1.

Equation (9) illustrates a fundamental principle. Since the pass-on of higher (lower) X prices into higher (lower) Y prices is less than one, this means that the resulting HHI is *less* than the normal HHI. In general, vertically integrated firms have increased incentives to produce output (when markets are less than perfectly competitive) relative to non-integrated firms. Therefore, the HHI modified to capture this effect is reduced relative to the normal HHI.

The modified HHIs described in the above analysis produce concentration statistics in the complementary products or partially integrated producer settings that are comparable, in the sales weighted price-cost margins sense when firms play Cournot, to the standard case HHI. This exercise is meant to illustrate that the measurement of concentration, especially when used to draw important conclusions, is more than a perfunctory exercise based on historical sales if gross inaccuracies are to be avoided. Such examples illustrate that, in many situations where firms compete in more than one market, simple rules just will not suffice. Accordingly, direct analysis of competitive effects utilizing economic tools may be more economical than modifying the traditional market share rules to increase accuracy.

Derived Demands

Derived demand is another common situation in which the Courts' simple rules cannot even be used. Consider as an example the demand for televised professional football games. Television networks buy rights to televise games from the

National Football League, and in turn sell rights to advertise during the televised games. Television networks are, in effect, reselling an audience of pro-football viewers to advertisers who value access to this audience, say sellers of beer and of power tools. In this sense, the demand for televised games is derived from the demand for audiences that in turn demand beer and power tools.

What is the relevant antitrust market? The antitrust market must include all the constraints on a profitable increase in the price of rights to televise games. Obviously, a threshold inquiry would be whether other sports, such as college football, would be viable substitutes to the network by attracting demographically similar audiences. However, identifying the next best substitute may not be obvious. Networks may find that the next most profitable substitute is non-sports programming that provides a different audience appealing to different advertisers. For example, networks may find the best alternate use of the time slot is showing soap operas, appealing to audiences that buy cosmetics. It seems odd to include college football and programming that appeals to cosmetics buyers in the same relevant market, but this set of alternatives may best capture the constraints on an exercise of market power by the National Football League. Construction of market 'shares' that meaningfully capture these competitive constraints is, at best, problematic.

The lesson is that market shares, as implemented by the courts, will have difficulty summarizing important competitive constraints. In the case of derived demand, delineation of a market, a 'necessary predicate' to antitrust analysis, and construction of meaningful shares from which to draw conclusions will be problematic. Since the Merger Guidelines approach uses market definition and market shares only as a 'screen' for further analysis, the agencies may get to the right result in spite of the market delineation detour. For example, assume that we determined that a monopolist of professional and college football would not find it profitable to raise prices by 5%, due to network substitution away from sports audience marketing to selling other types of audiences to advertisers. Accordingly, we can conclude that there should be no competitive concerns even though shares in a hypothetical market for professional and college football tele-

casts are high, and we have failed to delineate the full boundaries of a market in which professional and college football compete.

Differentiated Products

When products differ in their characteristics, and consumers differ in their preferences for these characteristics, some products will compete more closely than others. This situation poses serious challenges for market share-based analyses. First, it will be difficult to usefully discern the boundaries of the relevant market. As stated by the court analyzing competition among brands of ready-to-eat breakfast cereals, 'In a differentiated product market such as the [ready-to-eat] cereal market, the decision whether to include a product in the market is inevitably somewhat arbitrary, because not all products in a relevant market compete equally with all other products. In such a market, any market definition is likely to exclude some products that are reasonable substitutes for products that are included in the market.'²⁶

Second, when competition is 'localized' due to differentiation, market shares may indicate little about the degree of competition among products. For example, consider a market for automobiles in which the two best-selling products are a minivan and a sports car. While the minivan appeals most strongly to practical buyers, the sports car appeals primarily to buyers not motivated by practical concerns. It is likely that the best-selling minivan competes most closely with other minivans, while the sports car competes primarily with other sports models. Therefore, the degree of competition between the two best-selling models would be limited; the best-selling minivan is primarily constrained by the price and features of other minivans (even if their market share is low), and similarly for sports models.

Professor Willig has shown that when consumer preferences are structured to satisfy Luce's Choice axiom²⁷ market shares can be reliable indicators of competitive interaction among brands, and market share analysis will yield useful results. This assumption essentially means that the probability that a consumer views a particular product as a next best substitute for any other product can be inferred solely from market share. However, as the example above makes clear, this assumption is very restrictive. As stated by Willig, 'The value in [the exercise] for present purposes

is to carefully expose the substantive content of the underlying assumptions. We shall see that the assumptions are unlikely to be valid in many areas of application where specific information can be developed about product characteristics and about consumer preferences for them. For such applications, merger analysis that focuses exclusively on market shares is likely to go awry' (Willig, 1991).

Thus, in the common case of competition among differentiated products, market share analysis is unlikely to produce useful results. In such cases, the most useful analysis involves discerning the pattern and degree of substitution among products and characteristics using the tools of economic analysis.

CONCLUSION

On the issue of the usefulness of judicial rules drawing inferences about market power based on market shares, economic theory affirms in part and dissents in part. On the affirming side, a variety of economic models imply that greater concentration, *ceteris paribus*, will be associated with reduced performance. On the dissenting side, inspection of these models reveals that concentration is only one of many factors relevant to competitive performance. Thus, the judicially approved rules of thumb based on market shares are very crude tools for drawing inferences about market power. Improving the analysis requires an inquiry into a variety of economic factors; the variety of competitive interaction, the ability and incentives of firms to expand output, entry and exit conditions and the effect of firm's participation in related markets on their incentives to compete in the market in question. Thus, we conclude that judicial accuracy in antitrust cases requires greater use of economic tools to directly analyze the competitive effects of mergers and monopolization. This is the avenue the enforcement agencies are currently taking. The Courts may find that it is an example worth following.

NOTES

1. Market concentration refers to a summary of the distribution of sales shares among firms in the industry. The Herfindahl-Hirschmann Index (HHI)

- is one such measure of concentration, and is used in the Merger Guidelines by the Department of Justice Antitrust Division and the Federal Trade Commission. The HHI is the sum of the squares of the individual firm's market shares. The HHI is sensitive to the number of firms in the market as well as the distribution of sales among firms.
2. 15 USC Section 2.
 3. 15 USC Section 18.
 4. 57 Fed. Reg., 41554-55 (September 10 1992).
 5. See *United States v. Grinnell Corp.*, 384 US 563, 570 (1966) (the 'offense of monopoly power under Section 2... has two elements: (1) possession of monopoly power in the relevant market, and (2) the willful acquisition or maintenance of that power...').
 6. Illustrative Supreme Court cases include: *Otter Tail Power Co. v. United States*, 410 US 366 (1973) (91% market share); *International Boxing Club of New York, Inc. v. United States*, 358 US 242 (1959) (81% market share); *United States v. American Tobacco Co.*, 221 US 106 (1911) (86% market share); *United States v. United Shoe Machinery Corp.*, 347 US 521 (1954) (75% market share); *Standard Oil Co. v. United States*, 221 US 1 (1911) (90% market share); See also *Hiland Dairy Inc. v. Kroger Co.*, 402 F.2d 968, 974 n.6 (8th Cir. 1968) (collecting cases).
 7. *Cliff Food Stores, Inc. v. Kroger, Inc.*, 417 F.2d 203, 207 n.2 (5th Cir. 1969).
 8. 384 US at 571.
 9. The Supreme Court has clearly said that the market definition procedure in merger and monopolization cases must be the same. *Id.* at 573.
 10. 374 US 321 (1963).
 11. See *United States v. Vons Grocery Co.*, 384 US 270 (1966).
 12. See *United States v. General Dynamics Corp.*, 415 US 486 (1974) (market power presumption rebutted by depleting reserves); *United States v. Waste Management, Inc.*, 743 F.2d 476 (2nd Cir. 1984) (market power presumption rebutted by evidence of entry); *FTC v. Elders Grain, Inc.*, 868 F.2d 901 (7th Cir. 1989) (market power presumption rebutted by evidence of sophisticated buyers.)
 13. One exception is *Broadway Delivery Corp. v. United Parcel Serv.*, 651 F.2d 122, 128 (2nd Cir. 1981) ('the true significance of market share data can be determined only after careful analysis of the particular market').
 14. 57 Fed. Reg., 41554-55 (September 10 1992).
 15. Obviously, the Merger Guidelines are designed to analyze only mergers, and not monopolization cases.
 16. See Denis (1992) (... 'it instructs both government enforcers and the merging firms to tell a story about why the merger will or will not have adverse effects').
 17. The Department of Justice and the Federal Trade Commission together employ upwards of 100 economists.
 18. E.g., see Fisher (1987) (market definition 'is an artificial construction created by antitrust litigation').
 19. We are adopting the convention that performance is measured by the size of the percentage price distortion, or deviation, of the dominant firm's price from the competitive price.
 20. See Stigler (1964); Aspremont and Gabszewicz (1986); and Jacquemin and Slade (1989). However, Andrew Dick finds that export cartels formed under the Webb-Pomerene Export Act of 1918 were more likely to successfully form in industries characterized by low concentration among sellers. Professor Dick explains that this seemingly anomalous result is consistent with a model in which cartels form to minimize transactions costs. See Dick (this issue pp. 203-216).
 21. The term, v_i , is best thought of as a parameter measuring competitiveness of the industry. This heuristic interpretation sidesteps a fundamental flaw of the conjectural variation approach, which attempts to combine static concepts in a dynamic setting. See Shapiro (1989).
 22. This is true where performance is measured by price-cost margins. However, price cost margins may not be good measures of industry performance. For example, industry output may be a better measure of total welfare. It can be shown that under some conditions price-cost margins, and industry concentration as measured by the HHI, can increase even as industry output increases. See Farrell and Shapiro (1990).
 23. There are several desirable features of the Cournot model, despite its restrictive and unrealistic assumptions regarding behavior. First, Cournot is the prototype for the concept of Nash equilibrium. Second, because Cournot is a single-period Nash equilibrium, Cournot behavior is consistent with equilibrium behavior in a repeat game setting. Finally, it has been shown that some two-stage models of investment followed by competition in prices result in Cournot outcomes. See Kreps and Scheinkman (1983).
 24. See Willig (1991). However, HHIs will not be strictly comparable across markets because competitive margins differ across industries and it will not generally be possible to define markets such that the optimal monopoly price increase is exactly 5%.
 25. The market could have been defined to exclude internally used production of X . In that case, an analogous derivation of a modified HHI can be developed. See Cameron and Reiffen (forthcoming).
 26. *New York v. Kraft General Foods Inc.*, Civ. 0811, United States District Court for the Southern District of New York, 1995 US Dist. LEXIS 2145, at 38.
 27. A structure of random preferences is said to satisfy Luce's Choice Axiom if the ratio of the probabilities that i and j respectively are chosen from the

set of alternatives S is invariant to the membership of S . A convenient demand system with this property is the logit.

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