

**SOME THOUGHTS ON CONCENTRATION, MARKET SHARES,  
AND MERGER ENFORCEMENT POLICY**

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Among antitrust economists and policymakers, perhaps no issue has generated more controversy than the effect of concentration and market share on performance, and the implications of that relationship for merger policy. Despite countless studies, reviews, and efforts at synthesis, consensus remains elusive and, to many, the debate seems increasingly stale and repetitious.

Rather than another assessment of the economic evidence regarding concentration, shares, and performance, I would like to offer a review of the major theories of the anticompetitive potential of mergers—cooperation, unilateral effects, and strategic behavior. I maintain that each theory rests on somewhat different factual bases and therefore requires different information for analytical purposes. Concentration is especially important in evaluating mergers which threaten to improve coordination among firms, and for strategic behavior implemented in concert against rivals. Market shares rather than concentration are important for mergers where the concern is with unilateral action to raise price or disadvantage rivals. Throughout, the importance of other factors must be recognized.

Since current Merger Guidelines imply that concentration and shares should be calculated and employed in all cases, some reconsideration of this prescription would seem warranted. There are, however, considerable difficulties with implementing a conceptually sounder approach. In addition, actual agency enforcement practices with respect to concentration and market shares do not correspond closely to the written Guidelines. Based on recently released data, I offer some insights into the actual probability of enforcement action as a function of concentration level and changes in concentration caused by merger. This analysis, too, suggests some policy matters deserving further attention.

#### **COMPETITIVE CONCERNS AND DETERMINING FACTORS**

There are three broad types of concern with mergers: cooperative effects, unilateral effects, and strategic behavior.<sup>1</sup> The longest-standing concern is cooperative effects, and the first Merger Guidelines in 1968 were written with cooperation and perhaps explicit collusion in mind. This reflected a widely-held view that by reducing the number of firms, a merger increases the probability that the remaining firms could price in a noncompetitive manner. Accordingly, the Guidelines were intended to prevent the elimination via merger of any firm of significant size.

The cooperative effects theory suggests that certain specific factors are influential in the final outcome and therefore important ex ante in predicting the likelihood of anticompetitive effects from a particular merger. Market concentration and the shares of merger participants are high on this list. In this focus, the Guidelines rest firmly on both economic theory and empirical

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<sup>1</sup> Similar statements of concerns can be found, for example, in the Statement of the American Antitrust Institute, February 10, 2004, submitted to this Workshop. This author is a Research Fellow of AAI.

evidence that relates firm numbers, market shares, and overall concentration to noncompetitive pricing. A wide range of static and dynamic theory predicts such a relationship. A large body of empirical studies finds a statistically significant relationship between market structure and prices. Even allowing for the inherent imperfections of empirical work, this represents a thoroughly established proposition.

Theory and empirical evidence do not imply a single causal factor or a single form to the relationship under all circumstances. This should not be surprising since discretion over behavior—and hence variation in that behavior—is the essence of oligopoly. Variation also results from other determinants of price performance, and some of those—notably, entry conditions—can virtually trump concentration in extreme cases. While in principle the inclusion of these other factors improves predictability, in practice the effect is often to render policy-making less tidy because of their lesser degree of measurability and because of the imprecise trade-off they pose with each other. None of those considerations, however, undermines the crucial fact that concentration is related to price and has predictive value in merger analysis oriented toward cooperative effects.

Neither theory nor empirical evidence supported strictures as tight as those written into the initial Guidelines, and practice had abandoned them long before the 1982 revision. Moreover, this focus on cooperative effects failed altogether to capture a second mechanism by which a merger might affect price. A merger involving sellers of closely related products can relax the pricing constraint on either product by eliminating a major substitute, a possibility that depends on demand substitution among the (usually) two affected products rather than cooperation among multiple sellers. The inclusion of unilateral effects in the 1992 Guidelines properly elevated this

second concern to co-equal status.

Unilateral effects depend crucially on demand substitutability between the merging firms' own products: Where product substitutability is sufficiently high, a merger internalizes consumer substitution away from the higher priced product, thereby avoiding at least some of the penalty otherwise associated with raising price. Demand substitution in turn is a function of own and cross demand elasticities. Since these are rarely available, the diversion ratio—a measure of the fraction of sales likely to go to the alternative product—can be informative. And it should be noted that under certain assumptions, market shares help in estimating the magnitude of the diversion ratio. But concentration plays no role for the simple reason that cooperative action among firms is not an issue.

In fact, in addition to the calculation of concentration, several other standard Guidelines exercises are not strictly required for unilateral effects analysis. Market definition, product heterogeneity, and even entry issues are in principle subsumed in careful measures of the relevant elasticities and diversion ratios.<sup>2</sup> It is true that the difficulty of obtaining elasticities often returns the analysis to the exercise of defining markets or measuring concentration as indirect evidence about their value. For the same reason concentration may be of some use. To the extent that the market shares of the merging parties are related to the degree of competitive concern (as indicia of the diversion ratio, for example), that will also be reflected in higher measured concentration, other things equal. But the relationship between two firms' shares and overall concentration is loose, and in principle concentration itself—which reflects all firms' shares—is simply not the issue.

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<sup>2</sup> For a similar, but less sweeping, assertion, see Jonathan Baker and Steven Salop, "Should Concentration Be Dropped From the Merger Guidelines?" ABA Antitrust Section Task Force Report, July 2001, reprinted in 33 U. West Los Angeles L. Rev. 3 (2001).

Finally, over a lengthy period economics has fruitfully explored a wide variety of anticompetitive conduct by sellers vis-a-vis their rivals. Models of rational foreclosure, raising rivals' costs, disciplining conduct, bundling, and so forth do not involve either cooperative or unilateral price increases directed at consumers and hence do not fit comfortably into that dichotomy. Rather, strategic behavior involves efforts to diminish the competitive effectiveness of rivals, ultimately with adverse consequences to consumers. Strategic behavior is not explicitly articulated in the Merger Guidelines, but such possibilities are advanced as the competitive harm from particular mergers with greater frequency.

Strategic behavior is not a single theory and does not depend upon a single set of underlying conditions. The premises that underlie rational foreclosure are not the same as those relevant to disciplining behavior or bundling, and as a consequence, it is difficult to enumerate factors having general predictive power with respect to these concerns. The most that can perhaps be said is that where the prospective anticompetitive behavior is likely the result of coordinated action against smaller rivals, the criteria for coordinated effects are more applicable, whereas unilateral action by a merged firm against its rivals is more suggestive of the theory of unilateral effects. Whether the factors involved in coordinated strategic behavior are identical to those for coordinated price increases (and analogously for unilateral actions), however, is difficult to state with conviction at this point of our understanding. The mechanisms of competitive harm are fundamentally different, however, and for that reason strategic behavior is for now probably best considered as a separate category of competitive concern from merger.

## **MERGER GUIDELINES PRINCIPLES**

The Merger Guidelines describe what is said to be the methodology employed by the antitrust agencies as well as a process that private parties can use to anticipate agency action. Specifically, the Guidelines set out steps involving (a) product and geographic market definition, (b) identification of market participants, and (c) calculation of shares and concentration, after which attention is focused on the determination of either coordinated effects or unilateral effects as the likely mechanism of anticompetitive action.

It is difficult to reconcile the claim of analytical soundness of this approach with the above review. This review emphasizes that each theory of competitive harm implies different relevant factors, or at least factors of differing importance. Steps (a) and (b) and (c) are perfectly appropriate in an assessment of the likelihood of coordinated effects. High concentration and merging firms with nontrivial shares constitute legitimate grounds for concern over coordination, although that presumption can be outweighed by ease of entry or other factors of sufficient strength. But unilateral effects depend upon elasticities and diversion, factors which are at best partially informed by market shares but otherwise not closely related to traditional structural characteristics. Strategic behavior defies any such simple identification of causal factors, apart perhaps from the observation that most theories involve firms with nontrivial shares.

These observations suggest that in principle merger policy should perhaps involve an initial triage process, followed by a compilation of information relevant to the specifically identified concern. That is, a merger would undergo scrutiny in order to determine whether coordinated effects, unilateral effects, or strategic behavior is the issue. That determination in turn would imply the particular information required in order to assess the likelihood and effect of that competitive concern.

However appealing this triage approach to merger analysis may be, there are at least three practical difficulties with it. First, determination of the anticompetitive theory is often the most challenging aspect of an investigation—far more so than data collection. As a result, postponing the latter may be administratively inefficient. Second, data almost always help to assess the plausibility of various theories, so that simultaneous work on data and theory are mutually reinforcing. Finally, more than one possible anticompetitive effect may remain a plausible concern about a merger, whose actual effects are, after all, speculative. While there are costs associated with investigation two or more possible theories, in some cases no a priori choice between them can be made.

That said, the current Guidelines are organized in a manner that seems misleading. Their logical structure is strictly correct only for concern with coordinated effects, even as they note the importance of unilateral effects. They offer less guidance for analysis of the latter, and no guidance at all for concerns with strategic behavior that might be fostered by merger. There may be both legal and historical reasons for the current structure of the Guidelines, but accuracy and predictability would seem to be served by some clarification of the relationship among the theories of competitive harm and their determining factors.

#### **AGENCY ENFORCEMENT PRACTICE**

It is well understood that a gap exists between the Merger Guidelines as written and actual enforcement practice by the FTC and DOJ. The agencies have now released some data on the characteristics of markets in which both have challenged horizontal mergers, and the FTC has released additional data on their own investigations as well as cases brought.

Based on the the FTC/DOJ data on mergers between 1999 and 2003 that were subject to agency challenge,<sup>3</sup> several inferences can be drawn:

- Few mergers with HHIs less than 2000 are challenged. The lowest HHI for any challenged merger is said to be about 1400. The median HHI among these 1263 reported markets is approximately 4500.

- Few mergers with changes in HHI less than 300 are challenged. The smallest change in the data base is said to be 85. The median change is approximately 1200.

- More than three-fourths of all challenged mergers (991 out of 1263) involve markets with HHIs in excess of 2400 *and* simultaneous changes that are in excess of 500.

- These values vary by industry. Breakouts for the dairy, grocery, petroleum, telecommunications, banking, pharmaceutical, waste disposal, and other industries reveal significant differences in the frequency of challenge by HHI and changes in HHI.

These observations confirm that little enforcement activity occurs in what the Guidelines define as moderately concentrated industries (with HHIs between 1000 and 1800) or where HHI changes by less than 100 (the nominal threshold for some degree of concern for any HHI in excess of 1000). The Guidelines criterion of a change of 50 in the HHI for highly concentrated industries is simply not binding.

Variations in the industry-specific patterns are consistent with economic analysis and Guidelines principles that each industry is different in its entry conditions, product characteristics, nature of transactions, and other factors, and that those differences influence the significance of

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<sup>3</sup> Federal Trade Commission, Merger Challenges Data, December 18, 2003, Table 1.



concentration itself. Some variation may also be due to the fact that concentration is less closely related to the outcome in the case of unilateral effects than for cooperative effects. It would therefore be useful to have data on investigations and cases disaggregated according to type of competitive theory.

Since case-bringing frequencies are predicated on what mergers actually occur, those data cannot by themselves reveal much about agency decision-making. The release of additional data by the FTC helps fill this void.<sup>4</sup> These data cover essentially all investigations involving horizontal mergers of actual competitors for the years 1996 through 2003, with further indication as to how many resulted in enforcement action. Examination of the FTC data for all markets (Table 3.1) reveals the following:

- More than three-fourths (607 out of 780) of all investigations result in cases.
- Few investigations result in cases when HHI is less than 1800 *or* when the change in HHI is less than 200. Ever higher percentages characterize higher values of HHI or larger changes in HHI.
- Breakdowns into the grocery, oil, chemical, pharmaceutical, and other markets reveal some differences in frequencies, as would be expected based on differences in industry characteristics.

These data can be used to infer agency decision-making criteria in a more systematic manner. For each cell defined by HHI and change in HHI, I calculate the probability of an enforcement action arising from an investigation. These probabilities are then related to the

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<sup>4</sup> Department of Justice Antitrust Division, Horizontal Merger Investigations Data, February 2, 2004.

values of HHI and changes therein, to determine how influential each factor is in the agency's final decision to bring a case. Regression results are as follows:

$$\text{PROB} = 41.2 + .00575 \text{ HHI} + .00850 \Delta\text{HHI} \quad (1)$$

The t-statistic for HHI is 2.93, which is statistically significant, and that for  $\Delta\text{HHI}$  is 1.55, which is significant at about 6 percent in a one-tail test.  $R^2 = .30$ , not unusually low for such regressions, but indicating that other factors also play important roles.

Broadly speaking, the positive coefficients confirm that the probability of agency enforcement action is higher for industries characterized by higher levels of concentration and also by larger changes in concentration as a result of merger. The estimated coefficients imply that each 1000 point increase in HHI results in a 5.75 percentage point increase in the probability of challenge. Similarly, each additional 1000-point-greater increase in HHI is associated with a 8.50 percentage point rise in the probability of a challenge. The actual probability of agency action against any particular merger subject to investigation can be predicted simply by inserting that merger's values of HHI and  $\Delta\text{HHI}$  into equation (1). For example, in an industry with HHI of 3000, a merger causing an increase in HHI of 600 runs a 65.5 percent probability of challenge after investigation, other things equal.

These results further imply a trade-off between HHI and  $\Delta\text{HHI}$ , so that a somewhat larger HHI results in an unchanged likelihood of challenge if the change in HHI is smaller. A 1000 point higher HHI, for example, is offset by a change in HHI that is about 680 points smaller. As estimated in equation (1), this trade-off is linear since the relationship is additive in HHI and  $\Delta\text{HHI}$ . Alternatively, it is possible that at higher HHI, a given increase in HHI is *more* likely to trigger enforcement. This possibility can be tested directly by introducing the interaction term

HHI•ΔHHI into the empirical specification in Equation (1). A positive sign on the coefficient on HHI•ΔHHI would confirm an increased probability due to the joint effect of the two factors.

The actual results of this regression are as follows:

$$\text{PROB} = 28.0 + .00847 \text{ HHI} + .0344 \Delta\text{HHI} - .00000441 \text{ HHI} \cdot \Delta\text{HHI} \quad (2)$$

All t-statistics are now stronger—3.41, 2.16, and 1.73, respectively—and  $R^2 = .35$ . Most strikingly, however, the term HHI•ΔHHI appears with a negative sign. This implies that the probability of enforcement action for a merger with both a high HHI and a large change in HHI is actually *less* than the simple additive effect of high HHI plus the effect of a large change in HHI. Moreover, the actual magnitude is substantial.

To see this, suppose merger A arises in a market with HHI = 3000 and increases HHI by 1000, while merger B has HHI = 4000 and an increase in HHI of 1300. The estimated coefficient on HHI in equation (2) implies that merger B has a 8.47 percentage point higher probability of being challenged due to its HHI being 1000 points greater, and a 10.3 percent higher probability of being challenged because of the 300-point larger increase in HHI it causes. By themselves, these two factors suggest a greater overall probability of 18.8 percent that Merger B would be challenged relative to merger A. However, the last term in equation (2) implies that the actual probability is lower than this sum of the two effects. This offset is 9.7 percentage points, leaving a net increase in the probability of enforcement action of 9.1 percent (18.8 - 9.7). This is less than half the higher probability implied simply by the higher HHIs and ΔHHIs themselves. Whether such an offset represents good policy or even agency intentions are issues that would seem to merit further attention.

## CONCLUSIONS

The Merger Guidelines should reflect both contemporary understanding of merger theory and agency methods of analysis. Where significant discrepancies have arisen in the past, appropriate revisions have been made. Two discrepancies in the current Guidelines have been noted here—the inadequate matching of competitive concerns and determining factors, and actual practice that diverges from Guidelines concentration standards. These ought now to be given careful consideration to determine whether they warrant revision in the Merger Guidelines.