

# WORKING PAPERS



**MERGERS, MARKET POWER, AND PROPERTY RIGHTS:  
WHEN WILL EFFICIENCIES PREVENT PRICE INCREASES?**

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When Will Efficiencies Prevent Price Increases?**

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\* Bureau of Economics, Federal Trade Commission, Washington, DC 20580. The opinions in this paper are solely those of the authors and do not necessarily express the views of our colleagues, the Bureau of Economics, the Commission, or any individual Commissioner.

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**I. Introduction**

Some mergers may be "substantially" likely to raise market power yet also offer a significant possibility of yielding important efficiencies. With both increased market power and reduced costs, net effects on price and on economic efficiency are ambiguous. We have already presented the case that until recently neither the Government nor the courts would have given much consideration to efficiencies as a potential offset to anticipated market-power effects.<sup>1</sup> The Government has recently become more receptive to efficiency considerations. In their 1982 Merger Guidelines, both the U.S. Department of Justice<sup>2</sup> and Federal

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<sup>1</sup> See generally Alan A. Fisher & Robert H. Lande, Efficiency Considerations in Merger Enforcement, 71 Calif. L. Rev. 1580 (1983).

<sup>2</sup> U.S. Dep't of Justice, Merger Guidelines, 47 Fed. Reg. 28,493 (1982), reprinted in 2 Trade Reg. Rep. (CCH) ¶ 4501, at 6881-6 (Aug. 9, 1982) (hereinafter cited as 1982 Merger Guidelines).

Trade Commission <sup>3</sup> endorsed raising the structural levels for a probable challenge, primarily to capture additional merger efficiencies on average, but both declined to permit a case-by-case efficiencies defense, except under unusual and rare conditions (and then only as a matter of prosecutorial discretion rather than in litigation).

By 1984, both enforcement agencies had become more receptive to a case-by-case evaluation of efficiencies. The Justice Department, in revising its Guidelines, endorsed consideration of virtually every type of efficiency. <sup>4</sup> Similarly, the first time that respondents raised efficiencies as an offset to increased market power, the Federal Trade Commission held that decisionmakers should consider expected cost savings explicitly in merger litigation. <sup>5</sup>

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<sup>3</sup> Federal Trade Commission, Statement Concerning Horizontal Mergers (June 14, 1982), reprinted in Trade Reg. Rep. (CCH) No. 546, at 73 (June 16, 1982) (special supplement to 2 Trade Reg. Rep. ¶ 4225 (Aug. 9, 1982)) (hereinafter cited as FTC Statement).

<sup>4</sup> U.S. Dep't of Justice, Justice Department Merger Guidelines, 49 Fed. Reg. 26,823 (1984), reprinted in 2 Trade Reg. Rep. (CCH) No. 655, ¶¶ 4490-95 (June 18, 1984) (hereinafter cited as 1984 Merger Guidelines). The Justice Department, however, would like to keep such consideration to prosecutorial discretion, a policy that may not be viable in the long run. Respondents would probably argue that the Government did not consider them capably or fairly in a given case and that the court was equally or better qualified to evaluate efficiencies. Some courts would probably agree.

<sup>5</sup> In re American Medical International, Inc. 47-52, Doc. 9158 (July 2, 1984), slip opinion (by Commissioner Calvani) (hereinafter cited as AMI opinion). This holding was consistent with former FTC Chairman Miller's dissenting position in the FTC Statement, supra note 3, at §IV n.22, Trade Reg. Rep. (CCH) No. 546, at 81 n.22. The Bureau of Economics had already been evaluating efficiencies in individual cases, and the Bureau of Competition had also started this policy at the staff level before the AMI decision.

Moreover, the Secretary of Commerce has tried to institutionalize an efficiencies defense by proposing an amendment to Section 7 of the Clayton Act to incorporate an efficiencies defense explicitly. 6 Any of these approaches would permit a merger likely to result in net efficiencies, even if it were likely to lead to significantly higher prices. 7

These approaches follow in part from two basic assumptions: that economic efficiency is the sole goal of antitrust enforcement and that it is the only workable standard. We dispute both these contentions. We maintain that in passing the antimerger statutes, Congress intended to define and preserve consumers' property rights, not to maximize economic efficiency,

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6 Bureau of National Affairs, Commerce Department is Examining Ways to Permit Mergers Yielding Efficiencies, 47 Antitrust & Trade Reg. Rep. 659 (Oct. 11, 1984). The impetus behind the proposed amendment was that Supreme Court and appellate court decisions, although somewhat old, seem not to permit consideration of efficiencies as a defense to anticipated increases in market power from mergers once the dispute reaches the courts. See Fisher & Lande, supra note 1, at 1593-99, for a discussion of the case law; however, see the AMI opinion, supra note 5, at 47-52, for a contrary interpretation.

7 Scholars typically phrase the question in Williamson's formulation: By what percentage must costs decrease to compensate for expected allocative inefficiency from market-power effects? See Oliver E. Williamson, Economies as an Antitrust Defense: The Welfare Tradeoffs, 58 Amer. Econ. Rev. 18 (1968). Antitrust scholars have differed widely in the amount of efficiencies that they consider necessary to compensate for allocative inefficiency effects. For example, Timothy J. Muris, The Efficiency Defense Under Section 7 of the Clayton Act, 30 Case Western L. Rev. 381 (1980), would require 1.5% efficiencies; Phillip Areeda & Donald F. Turner, 4 Antitrust Law 147-48 (1980), 5%. The specific tradeoff values are highly sensitive to details of the modeling, even under the simplest assumptions; see Fisher & Lande, supra note 1, at 1630-44, for details.

and that this goal led it to establish a merger standard based on price and not on efficiency. This standard is equivalent to a desire to prevent anticompetitive restrictions in output.<sup>8</sup> We also maintain that a price standard is more workable than an economic efficiency standard in situations of policy relevance.

Given the standard, how great must expected cost savings be to offset the effects of increased market power from a merger? By developing a "theoretically neutral" model of the simultaneous effects of increased market power and efficiencies in oligopoly, we demonstrate that the requisite level of efficiencies is extremely sensitive to underlying assumptions. The complexities of an accurate case-by-case efficiencies defense lead us to conclude that regardless of standard, an individual case approach is too complex for the courts and that the best way to incorporate efficiencies is through the choice of threshold values in the Merger Guidelines.

## **II. The Intent of Congress: Property Rights (Price) Versus Economic Efficiency**

Nearly all consideration of the tradeoff between market power and efficiencies has followed Williamson's methodology, viewing economic efficiency as the central concern of merger

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<sup>8</sup> This interpretation harmonizes the antimerger statutes with the Sherman Act's prohibition against anticompetitive "restraint[s] of trade." 15 U.S.C. §1 For a cogent argument that this primary concern of the Sherman Act is equivalent to preventing artificial restrictions of output, see Nolan Ezra Clark, *Antitrust Comes Full Circle: The Return to the Cartelization Standard*, 38 Vand. L. Rev. \_\_\_\_ (1985, forthcoming).



enforcement.<sup>9</sup> Advocates of this approach argue that the sole concern of Congress in passing the antimerger (and other antitrust) laws was with economic efficiency.<sup>10</sup> Recent articulations of this approach have argued further that "economic efficiency provides the only workable standard from which to derive operational rules and by which the effectiveness of such rules can be judged."<sup>11</sup>

By contrast, virtually every scholar who has analyzed the legislative history of the antitrust laws has concluded that the primary concern of Congress was that mergers (and other potentially anticompetitive practices) might enable companies to

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<sup>9</sup> See Williamson, supra note 7; see also Oliver E. Williamson, Economies as an Antitrust Defense Revisited, 125 Penn. L. Rev. 699 (1977), for an extensive restatement with some reconsideration. For example, former Assistant Attorney General for Antitrust Paul J. McGrath stated that the first among the major goals of the Division during his and Baxter's tenures was ". . . to reinforce the notion that the sole basis of antitrust enforcement should be that decisions should be based on economic efficiency notions . . ." J. Paul McGrath, Statement of Mr. McGrath, 54 Antitrust L. J. 131 (1985).

<sup>10</sup> See, e.g., Robert H. Bork, Legislative Intent and the Policy of the Sherman Act, 9 J. L. & Econ. 7 (1966); William F. Baxter, Responding to the Reaction: The Draftsman's View, 71 Calif. L. Rev. 618, 619-20 (1983) (hereinafter cited as Draftsman's View), and Separation of Powers, Prosecutorial Discretion, and the "Common Law" Nature of Antitrust Law, 60 Texas L. Rev. 661, 691-93 (1982).

<sup>11</sup> Baxter, Draftsman's View, supra note 10, at 621. See also Terry Calvani, An Antitrust Policy for Consumer Welfare (1985) (unpublished speech to the Antitrust and Trade Regulation Sections of the State Bar of Texas and Dallas Bar Association, Federal Trade Commission, Washington, DC).

restrict output and raise prices. 12 The dispute in the literature on the legislative history centers on which aspect of the price rise Congress believed caused harm. Some scholars 13 identify allocative inefficiency as the harmful component; we, however, agree with other analyses 14 that point to wealth transfers. 15

Congress was surely unaware of even an intuitive version of

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12 As Judge (then Professor) Bork stated so eloquently, "The touchstone of illegality is raising prices to consumers. There were no exceptions." Bork, supra note 10, at 16. Bork also stated, "A rule against monopolistic mergers . . . derived in large measure from a desire to protect consumers from monopoly extortion. . . . Where producer and consumer welfare might come into conflict, . . . Congress chose consumer welfare as decisive." Id. at 11. While Judge Bork wrote in the context of the Sherman Act's legislative history, his summary aptly describes the Congressional intent in passing the antimerger laws as well. Robert H. Lande, *Wealth Transfers as the Original and Primary Concern of Antitrust: The Efficiency Interpretation Challenged*, 34 *Hastings L. J.* 65, 126-42 (1982). See also Clark, supra note 8, for an analytically equivalent interpretation of the Sherman Act.

13 See, e.g., Robert H. Bork, *The Antitrust Paradox* 91 (1978); Richard A. Posner, *Antitrust Law, An Economic Perspective* 8-22 (1976). Judge Bork seems somewhat inconsistent; compare supra note 12 to supra text at note 10. It seems hard to believe that "monopoly extortion" means nothing more than allocative inefficiency.

14 See, e.g., Lande, supra note 12; F. M. Scherer, *The Posnerian Harvest: Separating Wheat from Chaff*, 86 *Yale L. J.* 974, 979 (1977). See also Louis Kaplow, *The Accuracy of Traditional Market Power Analysis and a Direct Adjustment Alternative*, 95 *Harv. L. Rev.* 1817, 1822-23 (1982); Eleanor M. Fox, *The Modernization of Antitrust: A New Equilibrium*, 66 *Cornell L. Rev.* 1140, 1160-61 (1981).

15 George J. Stigler, *Economists and Public Policy*, 6 *Regulation* 13 (1982), has generalized this analysis of Congressional intent and asserts that Congress virtually always passes laws because of wealth-transfer and not efficiency considerations.

the concept of allocative inefficiency in 1914; the notion that this concept could have caused Congress to pass the antimerger laws 70 years ago is hardly credible. <sup>16</sup> Although economists' understanding of allocative efficiency increased dramatically by 1950, even the legislative history of the Celler-Keftauver Amendment is devoid of any mention of it. <sup>17</sup>

The most logical explanation of Congressional intent is that in passing the antitrust laws Congress was defining certain property rights or entitlements for the first time. It in effect declared that consumers' surplus was the property of consumers. Congress clarified who owned these rights and condemned any mergers substantially likely to lead to supracompetitive pricing and thereby "unfairly" transfer this property to firms with market power. In passing the antitrust laws, Congress attempted to give consumers the right to purchase competitively priced goods. <sup>18</sup> The most faithful way to implement this concern is to prevent mergers substantially likely to lead to higher prices or reduced output.

Figure 1 contrasts these standards for evaluating a merger.

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<sup>16</sup> Id.; Stigler, The Economists and the Problem of Monopoly, 72 Amer. Econ. Rev. Papers & Proc. 1 (1982); Scherer, supra note 14, at 977 n.20, Lande, supra note 12, at 88.

<sup>17</sup> Lande, Id., at 130-42; Muris, supra note 7, at 393-402.

<sup>18</sup> The concern was not over the distribution of wealth between the rich and the poor; Congress here was only concerned with the more limited issue of the fair distribution of consumers' surplus among sellers and buyers. See Fisher & Lande, supra note 1, at 1588-93.

Assume a merger that simultaneously increases market power and creates efficiencies. Area D, the deadweight loss from reduced output, is the allocative inefficiency cost of (new or increased) market power; area C, the reduced cost of production, is the gain from efficiencies; area S, a wealth transfer from consumers to firms acquiring market power, is irrelevant to those who focus on allocative efficiency.<sup>19</sup> The economic efficiency criterion would permit a merger likely to result in higher prices if anticipated efficiencies were sufficiently large -- i.e., if the expected efficiency gain, C, exceeded the anticipated deadweight loss, D.<sup>20</sup>

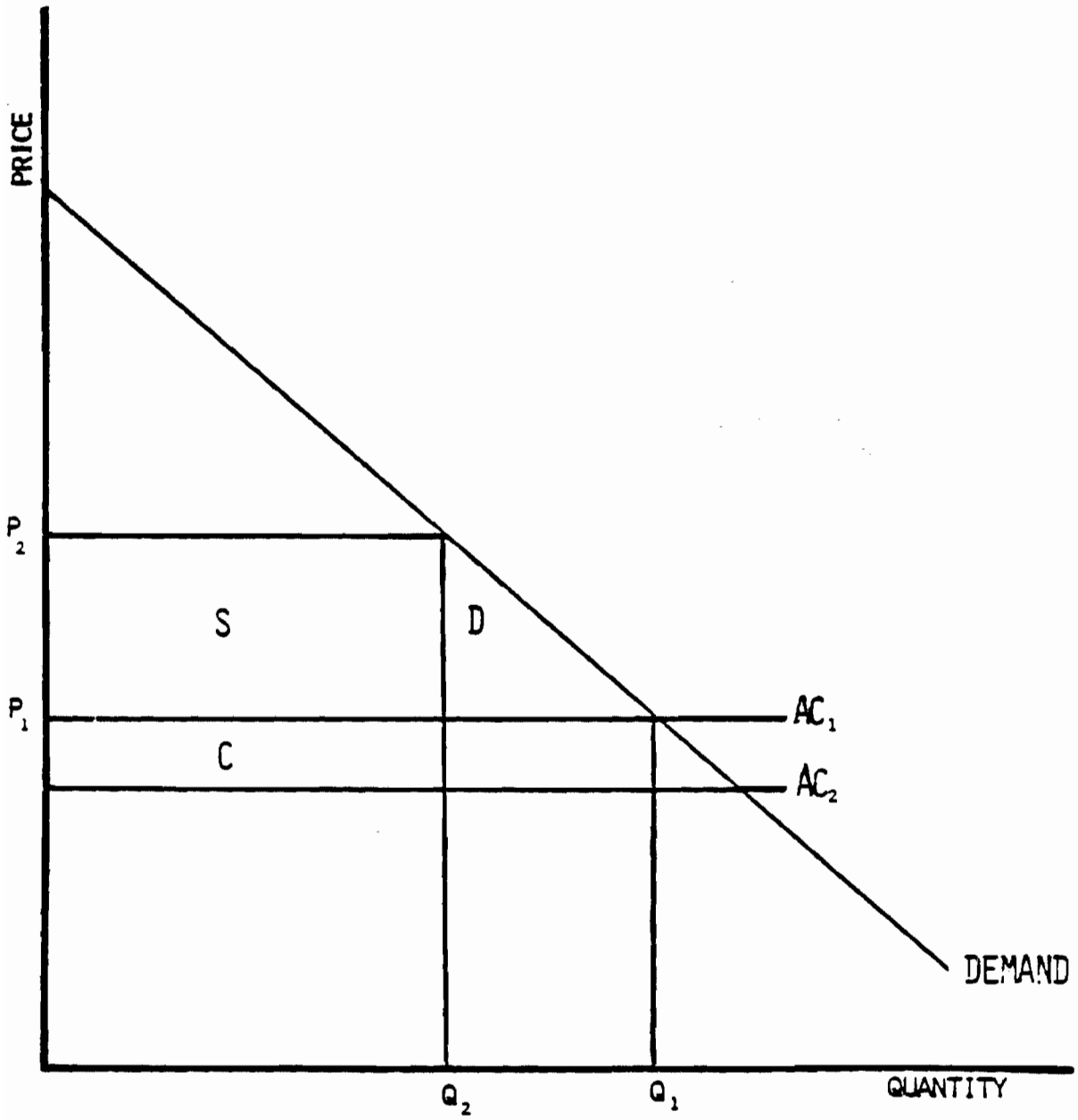
The legislators who passed the antimerger statutes would have disagreed with this approach. Congress wanted to prevent price increases to supracompetitive levels because of a concern

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<sup>19</sup> See Id. at 1624-51 for a discussion of a host of ambiguities and qualifications to this "naive" formulation of the tradeoff problem.

<sup>20</sup> Williamson, supra note 9, at 709, argued that this burden would not be very heavy, because cost savings of 2% would offset market-power effects from the vast bulk of mergers that one might expect. For other assessments, see supra note 7.

FIGURE 1





with area S, <sup>21</sup> did not realize that area D existed, <sup>22</sup> and either ignored area C or assumed that it would be of negligible size. <sup>23</sup> Rather than allowing price to rise to  $P_2$ , as Williamson's formulation would do, a standard consistent with the intent of Congress would require price not to rise above  $P_1$ ; mergers that would induce a new wealth transfer from consumers to

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<sup>21</sup> Rent-seeking behavior could consume part or all of area S. If rent-seeking activity wasted some or all of area C, price might have to fall before a merger would enhance efficiency.

<sup>22</sup> A proper consideration of legislative intent includes analysis of ". . . our best judgement as to what Congress would have wished if these problems had occurred to it." *Bersch v. Drexel Firestone, Ind.*, 519 F.2d 974, 993 (2d Cir.), cert. denied sub nom. *Bersch v. Arthur Andersen & Co.*, 423 U.S. 1018 (1975) (opinion of Judge Friendly). We must therefore ask what Congress would have done if it had known of the existence and importance of allocative efficiency. We believe that Congress would have included it as one of the factors in its analysis and that courts should therefore do so as well.

<sup>23</sup> For a more extensive discussion, see Fisher & Lande, supra note 1, at 1587-93. The majority in Congress felt that mergers would reduce competition and lead to inefficient, lazy monopolists -- what we would now call x-inefficiency. The majority view, then, was that there was no tradeoff: increased competition (disallowing mergers that might threaten competition) would mean lower, not higher, costs!

firms should be prohibited. 24 We call this criterion the consumers' property rights standard. However, one could equally well characterize it as either a price or an output standard. Thus, the proper formulation of the tradeoff is, "How much must

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24 Id. at 1587-98. A reasonable way to interpret the Justice Department's 1982 and 1984 Guidelines is to think of them as defining a de minimis exception to permit a price increase of less than 5%. Following this reasoning, it would be interesting to investigate the percentage change in marginal costs necessary to ensure that price not rise by more than 5%, as did Alan A. Fisher, Robert H. Lande & Walter Vandaele, Afterword: Could a Merger Lead to Both a Monopoly and a Lower Price? 71 Calif. L. Rev. 1697, 1704 (1983). We have not done so here, largely because it would be enormously complex to do so with our model. By focusing on equilibrium price and output and restricting the changes to keep the equilibrium values constant, we limit our examination to first-order conditions for the merging firms. To consider a price increase would require solving the structural model for a new equilibrium, a task that in general would be very complex unless one made overly simplifying assumptions (such as constant marginal cost).

We can, however, easily obtain an upward-bound estimate of the percentage price increase that a merger could create if it did not lead to collusion. Assume that firms 1 and 2 merge and close down firm 1 completely. If none of the remaining firms respond by increasing output, then

$$\% \text{ increase in } P = s_1 / |\eta|, \text{ where}$$

$s_1$  is the market share of firm 1 and  
 $|\eta|$  is the absolute value of the elasticity of demand.

Thus, for example, with  $s_1$  of 10% and  $|\eta|=2$ , the most one could expect price to increase would be 5%. In general, one would expect remaining firms to respond to a price increase by raising their outputs. Also, one would generally expect an acquiring firm not to eliminate the acquired firm's output completely. Both these factors would typically prevent price from increasing by anywhere near as much as the equation in this note suggests. However, if a merger increased the probability of successful collusion -- i.e., if the remaining firms reacted to the merged firm's output restriction by reducing their outputs -- the percentage increase in price could be greater; see infra note 42 and the accompanying text.



costs decrease to offset a given increase in market power and ensure that prices not increase?"<sup>25</sup> Under this approach, efficiencies would be relevant to the extent that one expected them to affect final product prices. By contrast, a standard based only on economic efficiency could allow substantial wealth transfers and thereby understate the efficiencies that Congress' criterion would require to offset a given increase in market power.<sup>26</sup>

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25 The FTC may have adopted a similar standard:

Assuming that these cost savings can be realized, AMI does not establish that they will necessarily inure to the benefit of consumers; in fact AMI's own economic expert . . . has suggested the contrary . . . it is unlikely that AMI can show that "market forces will oblige [AMI] to pass [cost saving efficiencies] on to consumers." See Sullivan, Antitrust 631 (1977)

AMI opinion, supra note 5, at 52-53; parenthetical material and citation in the original.

26 Although the top Reagan administration antitrust enforcers state that they evaluate mergers solely on the basis of economic efficiency, in practice it is difficult to know whether they are in fact using economic efficiency or price as their standard. For example, the 1982 and 1984 Merger Guidelines both focus on the ability of an imaginary monopolist or cartel to impose a "'small but significant and nontransitory' increase in price" as the basis for market definition, entry barriers, collusion, and other factors in the analysis of a merger. Neither the Antitrust Division nor the FTC has ever publicly stated that it had declined to challenge a particular merger, despite the expectation of higher prices, because of sufficient anticipated efficiencies. Even if the Assistant Attorney General or the FTC decided not to challenge a particular merger on this basis, admitting so publicly would entail obvious political risks. Alternatively, the decisionmakers may consider themselves unable to predict market-power and efficiency effects accurately enough to distinguish between the two standards on a case-by-case basis. A third possibility is that some decisionmakers gloss over the distinction.

This assessment of legislative intent would be of no practical value if, as Bork, Baxter, et al. argue, 27 no criterion other than economic efficiency were workable. We therefore demonstrate in section V that in situations of policy relevance (oligopoly) the consumers' property rights criterion is actually more workable than that of maximizing economic efficiency. 28 Given sufficient information about a market, one can derive the tradeoff between market power and efficiencies based on the criterion that a merger be expected not to permit an increase in consumer prices. The same tradeoff calculations based on the criterion of maximizing economic efficiency would be substantially more complex. This demonstration, however, is only theoretical. In practice, either standard would require very detailed industry information to know exactly how great the anticipated increase in market power and requisite cost savings

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27 See, e.g., supra text at note 11.

28 The debates over workability have ignored a consumers' property rights, or price, standard. Bork, Baxter, et al. have instead convincingly demonstrated that an antitrust standard based on "big is bad, small is good" or other similar platitudes is unworkable. See, e.g., Bork, supra note 13, at 69-71; Baxter, Draftsman's View, supra note 10, at 621. Judges Posner and Easterbrook, however, recommend an approach analytically equivalent to our property rights standard because of workability problems of an economic efficiency standard. Richard A. Posner, The Next Step in the Antitrust Treatment of Restricted Distribution: Per Se Legality, 48 U. Chi. L. Rev. 6, 21 (1981) (hereinafter cited as The Next Step), and The Rule of Reason and the Economic Approach: Reflections on the Sylvania Decision, 45 U. Chi. L. Rev. 1, 16-17 (1977) (hereinafter cited as Reflections); Frank H. Easterbrook, The Limits of Antitrust, 63 Texas L. Rev. 1, 31-33 (1984).

would be -- more extensive information than one could obtain in a litigation context. In the remainder of this paper, we explore how much a merger must enhance efficiency if it is not to raise prices and restrict output and thereby disrupt Congress' initial allocation of property rights. In doing so, we clarify why a case-by-case balancing of efficiencies and market power is unworkable under either criterion.

### III. The Effects of Efficiencies on Price

Given the focus of antitrust law on preventing higher prices and their attendant wealth transfers, how should we incorporate efficiencies into merger analysis? We start by distinguishing four types of efficiencies that mergers may yield and discussing them in terms of their likely effects on output and final product prices.<sup>29</sup> We argue that two types should count as an offset to increased market power, one would have negligible effects, and the fourth would have only second-order effects.

Not all types of efficiencies would offset an increase in market power sufficient to keep price from rising and output from falling. For example, efficiencies that only reduce fixed costs (overhead) benefit a firm but in the short run do not affect marginal costs and therefore have no impact on output or pricing

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<sup>29</sup> Mergers can also lead to inefficiencies, which also have varying effects on final product prices. These inefficiencies are usually unanticipated, so we cannot analyze their probable effects of prices, even in theory, except in hindsight. See Fisher & Lande, supra note 1, at 1599-1604, for a more extensive discussion of efficiencies and inefficiencies.

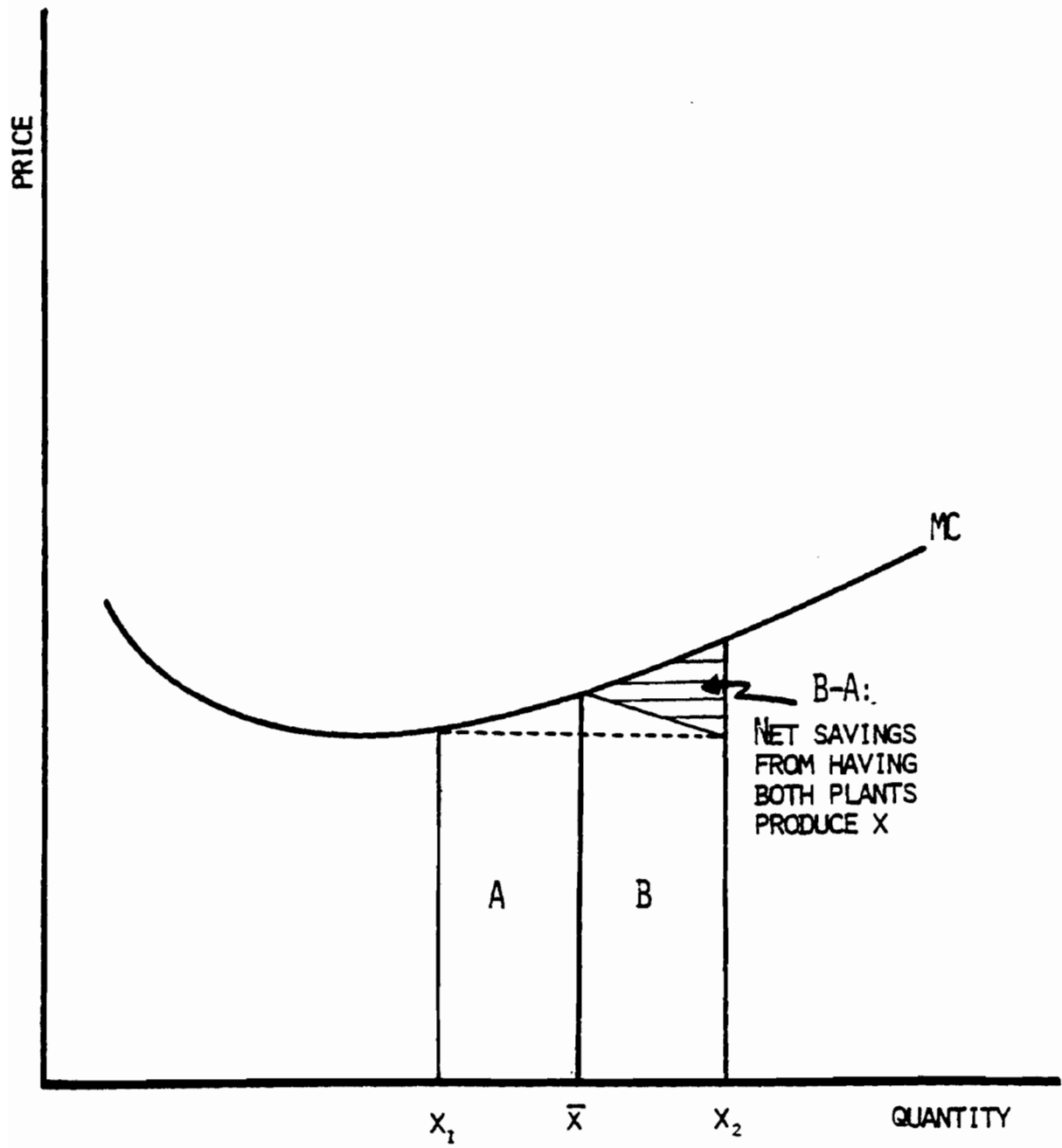
decisions. Although savings in overhead may reduce longrun marginal costs, any output-enhancing effects are delayed and thus of less importance in offsetting increases in market power.

A second type of efficiency from merger is rationalization of production. Firms maximize profits by choosing a level of output where marginal revenue equals marginal cost. Under most oligopoly models, firms generally face different marginal revenue curves. A merger that did not raise exploitable market power would allow the merged firm to produce the same amount at lower total cost by shifting output to the plant with the lower marginal costs.<sup>30</sup> A merger could therefore increase efficiency even without lowering the marginal cost schedules of a given plant. However, any such efficiency gains would be small, as Figure 2 demonstrates. Suppose that both of the merging firms faced the same marginal cost curve but that firm 1 had initially perceived a lower marginal revenue than had firm 2. As a consequence, firm 1 would have produced output  $x_1$  and firm 2,  $x_2$ , such that  $x_1 < x_2$ . Rationalization of their joint output would require each to produce  $\bar{x} = (x_1 + x_2)/2$ . Firm 1's costs would increase by area A; firm 2's would fall by area B. The shaded area approximates the net savings, B-A. The two firms'

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<sup>30</sup> Further, if (given imperfect information) two firms perceived marginal cost differently, they would not produce at the same marginal cost even if they perceived their marginal revenues to be the same. If the two firms merged and decided to produce the same level of output, they could do so at lower total cost by shifting relative outputs to equalize marginal costs at the two plants.

FIGURE 2





perceptions of marginal revenue would probably not differ substantially so any savings from rationalization would tend to be small. 31

Most discussions of efficiencies from mergers seem to assume a third type of cost saving: a downward shift in marginal costs. In essence, the merging firms may be able to combine the best attributes of each parent and thereby lower the marginal cost schedules. 32 We examine this type of efficiency more closely in section IV below.

A fourth type of efficiency involves economies of scale. These economies involve no change in marginal costs. However, by combining production, firms whose output would otherwise have

31 For example, suppose that firms 1 and 2 face the same MC curve but have different perceptions of MR and thus have [output, MC] combinations of  $[x_1, MC_1]$  and  $[x_2, MC_2]$ . Observation of Figure 2 reveals that the savings in total cost from output rationalization would approximate:

$$\text{Savings} = 1/4 \Delta MC \Delta x$$

where  $\Delta MC = (MC_2 - MC_1)$  and  $\Delta x = (x_2 - x_1)$ . Total cost is  $ATC \cdot x$ ; if  $MC=ATC$ , then  $MC \cdot x$  approximates total cost. The ratio of cost savings to total cost is approximately:

$$\frac{1}{4} \epsilon_s \left( \frac{\Delta MC}{MC} \right)^2$$

where  $\epsilon_s = \frac{\Delta x}{x} \cdot \frac{\Delta MC}{MC}$  is the elasticity of the MC curve.

Consequently, even a large difference between  $MC_1$  and  $MC_2$  will generate very small cost savings from output rationalization. If, for example,  $MC_2$  exceeded  $MC_1$  by 20%, the cost savings would be only 1% for  $\epsilon_s = 1$ .

32 For example, merger may provide opportunities for efficiencies from organizational changes within the combined firm. For an excellent summary with extensive citations, see Oliver E. Williamson, *The Modern Corporation: Origins, Evolution, Attributes*, 19 J. Econ. Literature 1537 (1981).

been small in relation to minimum efficient scale can decrease their marginal costs. In a slightly different scenario, multiproduct firms with large economies of scale in relation to demand may use a merger to generate overall savings by having each plant specialize in part of the overall product line. Although our focus is on downward shifts in an upward-rising marginal cost curve, scale economies are an equally valid benefit from merger. <sup>33</sup> Our tradeoff calculations in section IV below therefore apply to scale economies as well as to other types of efficiencies that reduce the level of marginal costs for a firm's actual level of output. <sup>34</sup>

#### **IV. A Property Rights (Price) Approach to the Market Power-Efficiencies Tradeoff**

##### **A. Overview**

To evaluate the tradeoff between efficiencies and market power requires both a criterion and a specific model. Williamson and virtually all subsequent commentators used the criterion of

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<sup>33</sup> Exploitation of economies of scale may not always be convenient, at least in the short run. For example, if the plants of two firms were both too small to exploit economies of scale, the combined firm would need to replace the existing facilities with a new, larger facility to exploit scale economies. Unless brand preferences prevented it, one of the firms might have been able to expand on its own, without a merger, and force smaller, inefficient plants out of the market. Thus, merger is not always necessary or sufficient to exploit economies of scale.

<sup>34</sup> We defer until section V consideration of a fifth type of efficiency: improvement in quality or product variety for the same level of costs. We consider tax savings and evasion of regulations not to be efficiencies.



maximizing economic efficiency. In lieu of specifying a model of market structure and behavior, Williamson assumed an initial percentage price increase and calculated the percentage that marginal costs would have to decrease to have total cost savings equal the deadweight loss. The methodology in his "naive" model and the tradeoff calculations that people have quoted from his articles apparently assumed implicitly that marginal costs would decrease for all firms in the industry, not only for the merging parties, <sup>35</sup> although Williamson himself proposed a weighting adjustment to account for differences in the percentages of the industry subject to the price and cost changes. <sup>36</sup>

Our approach differs from Williamson's in two important respects. First, we use the criterion of protecting consumers' property rights and thus require that efficiencies be sufficient to prevent price from rising and output from falling. Second, we assume explicitly that any efficiencies accrue only to the merging firms.

The tradeoff between market power and efficiencies obviously depends on the nature of and changes in market structure and behavior. If a merger creates no exploitable market power in an essentially competitive industry, there is neither a wealth transfer nor an allocative inefficiency cost. If an industry already has and is likely to maintain essentially monopolistic

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<sup>35</sup> Fisher & Lande, supra note 1, at 1627-28, n.175.

<sup>36</sup> Williamson, supra note 7, at 27.

pricing, a merger may do little additional harm. Intermediate cases, in which a merger may shift an industry from one oligopolistic equilibrium to another, are of primary interest.

If one knows the model that best describes an industry, it is relatively straightforward to calculate how much marginal costs must fall to keep price from increasing and output from falling after a merger. Unfortunately, there is no consensus on oligopoly models,<sup>37</sup> and different models can generate widely divergent predictions. For example, theoretical models generally predict a gradual increase in market power and thus in price as the number of firms decreases. Some empirical results, in contrast, tentatively suggest a range of essentially competitive pricing followed by an abrupt increase to essentially monopolistic pricing.<sup>38</sup> Further, relatively small changes in the underlying assumptions or in values of important parameters can change the predictions substantially. Even if we knew the model, we would rarely know the correct parameter values and

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37 For one example, F. M. Scherer, *Industrial Market Structure and Economic Performance* (2d ed. 1980) devotes four chapters and more than 100 pages to a discussion of oligopoly, including extensive citations to the literature up to 1980.

38 John E. Kwoka, Jr. and David Ravenscraft, *Cooperation vs. Rivalry: Price-Cost Margins by Line of Business* (1985) (unpublished manuscript, Federal Trade Commission); John E. Kwoka, Jr., *The Effects of Market Share Distribution on Industry Performance*, 61 *Rev. Econ. Statistics* 101 (1979); F. T. Dolbear, L. B. Lave, G. Bowman, A. Lieberman, E. Prescott, F. Rueter, & R. Sherman, *Collusion in Oligopoly: An Experiment on the Effect of Numbers and Information*, 82 *Q. J. Econ.* 240 (1968); Laurence E. Fouraker & Sidney Siegel, *Bargaining Behavior* (1963).

could therefore rarely predict the effect of a merger on price with any degree of precision. In the remainder of this section, we explore several possibilities.

B. Competitive and Monopolistic Models of Merger

1. Competition. A merger in an industry with essentially competitive pricing might leave pricing unaffected. Under the reasonable assumption that this situation is the most common in mergers, the Merger Guidelines set out zones where the Government is highly unlikely ever to challenge a merger.<sup>39</sup> Indeed, the Government has investigated fewer than 10 percent of all mergers reported under the Hart-Scott-Rodino (HSR) requirements<sup>40</sup> and challenged or negotiated restructurings in only a small proportion of those it has investigated.<sup>41</sup>

2. Merger to Monopoly. The opposite extreme is when a merger transforms an industry from competitive to perfectly

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<sup>39</sup> See, e.g., 1984 Merger Guidelines, supra note 4, at §§ 3.11 and 3.3, for the obvious examples of unconcentrated markets and markets where entry conditions are easy. The present antimerger standards are below the levels at which researchers have found anticompetitive effects; see generally Paul A. Pautler, A Review of the Economic Basis for Broad-Based Horizontal Merger Policy, 28 Antitrust Bull. 571 (1983). However, Congress was also concerned about preventing price effects in their incipiency. For a discussion, see Alan A. Fisher & Richard Sciacca, An Economic Analysis of Vertical Merger Enforcement Policy, 6 Res. L. & Econ. 1 (1984), at 47-48.

<sup>40</sup> Hart-Scott-Rodino Act, 15 U.S.C. §18a (1976).

<sup>41</sup> For a discussion of the number of HSR filings, requests for additional information, and Governmental challenges or induced restructurings in recent years, see Thomas M. Jorde, Restoring Predictability to Merger Guideline Analysis (1985) (unpublished manuscript, Univ. Calif.), at 17 n.37.

collusive (monopolistic) pricing. This case gives a maximum estimate of the percentage reduction in marginal costs necessary to offset any possible increase in market power and keep price constant. The percentage reduction in marginal costs is equal to  $1/|n|$ , where  $|n|$  is the elasticity of demand, evaluated at the

competitive price. 42 Thus, to guarantee that no merger could

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42 For a graphical/algebraic proof in the special case of linear demand and constant marginal cost, see Fisher, Lande & Vandaele, supra note 24. For a more general proof: Suppose that a merger transforms an industry from competitive to monopolistic pricing and also lowers the marginal costs of the remaining firm(s). Under competition,

$$(i) \quad p^c = MC^0, \text{ where}$$

$p^c$  is the competitive price and

$MC^0$  is marginal cost from the initial marginal cost curve.

Under monopolistic pricing,

$$(ii) \quad p^m + Q(dP/dQ) = MC^1, \text{ where}$$

$p^m$  is the monopolistic price and

$MC^1$  is marginal cost from the new marginal cost curve.

For efficiencies to be sufficient to keep price constant as market structure changes requires

$$(iii) \quad p^c = p^m. \text{ Thus,}$$

$$(iv) \quad MC^0 = MC^1 - Q(dP/dQ).$$

Since  $p^c = MC^0$ , we can rewrite (iv) to obtain

$$(v) \quad (MC^0 - MC^1) / MC^0 = - (Q/p^c) (dP/dQ).$$

Equation (v), however, is equivalent to

$$(vi) \quad \% \Delta MC = - 1/\eta, \text{ where}$$

$\eta$  is the elasticity of demand ( $\eta < 0$ ), evaluated at the initial equilibrium (with price =  $p^c$ ).

If we assume instead a merger creating monopoly pricing for the entire industry but cost savings only for the merging firms, the requisite decrease in the weighted average marginal costs becomes:

$$(vii) \quad \% \Delta MC = (-1/\eta) S, \text{ where}$$

$S$  is the sum of the market shares of the merging firms.

permit price to increase, a merger would have to lower industry average marginal costs by as much as 91 percent for  $|n|=1.1$ , 67 percent for  $|n|=1.5$ , 50 percent for  $|n|=2$ , and 33 percent for  $|n|=3$ .<sup>43</sup> For an industry with unitary or inelastic demand at the competitive output, marginal costs could not fall enough to keep output from falling and price from rising.

### C. Oligopoly: A "Theoretically Neutral" Approach

One would rarely expect a merger to transform an industry from competitive to monopolistic pricing, especially given current merger enforcement. However, a merger may still increase market power. It is difficult to calculate how great efficiency gains would have to be to offset a given increase in market power, because price and output effects of a merger are hard to predict. Different theoretical models of oligopoly give widely divergent predictions, and no single model or class of models has strong empirical support. We use what we characterize as a "theoretically neutral" approach to try to provide the most general answer to the question of how large efficiencies must be.

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<sup>43</sup> If one interpreted the DOJ Guidelines as defining a de minimis exception for price increases of up to 5%, see supra note 24, the cost savings necessary to offset a change from competitive to monopolistic pricing would be less. For example, the estimates of requisite cost savings reported in Fisher, Lande & Vandaele, supra note 24, at 1704, would fall by 10 percentage points at each elasticity of demand. However, if a merger created efficiencies for only part of the industry, the condition would be even more extreme. If, for example, the merger combined firms with a total market share of 60%, the cost reduction required to yield a 50% decrease in costs for the industry as a whole would be  $50/.6$ , or 83.3% for the merging firms. A more sophisticated analysis would weigh both market power and efficiency effects by the probabilities of their occurring.

We abstract from many common (and often questionable) assumptions, such as specific values of conjectural variations or specific shapes of marginal revenue (MR) and marginal cost (MC) curves. However, the price for such neutrality is less precise answers than we might otherwise generate.

A firm chooses a level of output (call it  $x^*$ ) such that MR equals MC at that output. Conceptually, with no change in industry demand, an increase in market power for a firm implies a downward shift in the firm's MR curve. All else equal, the new intersection of the MR and MC curves would lie to the left of the initial intersection, implying a lower level of output and, consequently, a higher price to consumers. To calculate the new output, one would have to know the shapes of both the MC and the new MR curves over their relevant ranges -- a formidable amount of requisite information.

Fortunately, our characterization of the problem minimizes the amount of information we need to determine the effects of a merger. We want to know how great efficiencies would have to be to offset any price effects of a merger. Equivalently, how much would the MC curve have to shift down to intersect the new MR curve at the initial output level  $x^*$ ? This formulation narrows the focus of what we need to know: we need only compare equilibrium conditions at output  $x^*$ ; we do not need to know anything about the rest of the MR or MC curves. Our results therefore generalize over all possible combinations of MC and MR curves whose intersection at  $x^*$  is consistent with profit maximization.

Nevertheless, one large informational problem remains: how does a firm perceive its MR, and how does this perception change with a merger? To answer this question, we assume a market of  $n$  firms producing a homogeneous product, with no prospect of new entry.<sup>44</sup> Marginal revenue for a typical firm is

$$(1) \quad MR_i = P \left[ 1 + \frac{s_i}{\eta} (1 + k_i) \right] \quad , \text{ where}$$

$P$  is price,

$s_i$  is firm  $i$ 's market share,  $0 < s_i < 1$  ,

$\eta$  is the industry's price elasticity of demand ( $\eta < 0$ ), and

$k_i$  is firm  $i$ 's conjectural variation,<sup>45</sup> where

$$k_i = \sum_{j \neq i} \frac{\partial x_j}{\partial x_i} .$$

Suppose that firms 1 and 2 merge. Their new MR becomes:

$$(2) \quad MR' = P \left[ 1 + \frac{s_1 + s_2}{\eta} (1 + k') \right] ,$$

where  $k'$  is the merged firm's conjectural variation.

The parameters in equations (1) and (2) are fairly

<sup>44</sup> When entry is quick and easy, the market will ensure that there are no antitrust problems. In the immortal words of Sen. Sherman, originator of the Sherman Act, "[I]f other corporations can be formed on equal terms a monopoly is impossible." 21 Cong. Rec. 2457 (1890).

<sup>45</sup> To simplify the presentation, we treat  $k_i$  as a constant. More generally,  $k_i$  may vary with  $x_i$ . For our analysis, it is immaterial whether  $k_i$  be a constant or a function of output, because we examine changes in MR at a single level of output, not over a range of outputs.



straightforward to estimate, with the exception of the conjectural variations  $k$  and  $k'$ . There is no general consensus in the literature on the numerical values of conjectural variations in oligopoly situations, although economists frequently use two rather extreme values for computational simplicity. One, in which the merged firm anticipates no output response from its competitors ( $k=0$ ), generates the Cournot model;<sup>46</sup> the other, in which the merged firm anticipates complete and exactly offsetting output responses ( $k=-1$ ), generates the competitive model. Except under competitive conditions, firms in otherwise similar circumstances would normally be unlikely to have similar conjectural variations, since these parameters are primarily subjective phenomena (guesses). Hence, it would be silly to argue for any particular value of  $k$  as a general case. Instead, we examine conjectural variations over the entire range from competitive to

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<sup>46</sup> Stephen W. Salant, Sheldon Switzer, & Robert J. Reynolds, Losses from Horizontal Merger: The Effects of an Exogenous Change in Industry Structure on Cournot-Nash Equilibrium, 98 Q. J. Econ. 185 (1983), demonstrate that in a Cournot model with constant MC, no two firms would have an incentive to merge as long as there were three or more price-searching firms in the industry. Intuitively, in that situation, the gains from the increase in market power would all go to the nonmerging firms. These results raise the question of the legitimacy of a Cournot model for simulating merger behavior. Martin K. Perry & Robert H. Porter, Oligopoly and the Incentive for Horizontal Merger, 75 Amer. Econ. Rev. 219 (1985), however, relax the assumption of constant MC and show that merger can be profitable in a Cournot model with more than two firms. Our simulations do not make any assumptions about the shape of the MC curves, because our concern is only with how much MC would have to decline at a specified output level.

Cournot (i.e.,  $-1 \leq k \leq 0$ ) and report the range of outcomes.

We must still model how firms change their conjectural variations (from  $k$  to  $k'$ ) when they merge. There are two parts to this question. First, how do the merging firms' perceptions of  $k$  change? Second, how do the remaining firms in the industry alter their own perceptions? We assume that the remaining firms do not change their actions or perceptions as long as the merging firms do not alter their combined output. This assumption is consistent with the initial vector of industry outputs being a Nash equilibrium.

We consider four separate models of how  $k$  for the merging firms changes after the merger. In each of these models,  $0 \geq k' \geq k$ .

Model A:  $k' = k$ . The simplest model is that  $k$  does not change at all.

Model B:  $k' = k_1 (1 - s_1 - s_2) / (1 - s_1)$ . This relation follows from a model in which a firm's conjectural variations are proportional to the percentage of the market that it does not control.

$$(i) \quad k_1 = \alpha(1 - s_1) ;$$

$$(ii) \quad k' = \alpha(1 - s_1 - s_2) \\ = k_1 (1 - s_1 - s_2) / (1 - s_1)$$

Model C:  $k' = k_1 (HHI - s_1^2 - s_2^2) / (1 - s_1^2)$ . This model is similar to Model B, except here  $k$  is proportional to the sum of squared shares of the other firms in the market.

Model D:  $k' = k(n-2)/(n-1)$ , where  $n$  is the number of firms in the industry. In this model, the firms' shares do not matter. Instead,  $k$  changes as the number of firms changes.

For any given model and initial value for  $k$ , we can compare the bracketed terms in equations (1) and (2) for each of

the merging firms and calculate the percentage decrease in each firm's MR at its initial output level. 47

$$(3) \quad \% \Delta MR_i = 100 [(MR' - MR_i) / MR_i] \\ = 100 \frac{(s_1 + s_2)(1+k') - s_i(1+k_i)}{s_i(1+k_i)}$$

If their MCs decrease by the same percentage, the merging firms will maintain their initial levels of production. Therefore, equation (3) also determines the magnitude of efficiencies necessary exactly to offset the price effects of a merger.

Table 1 and Figure 3 show our estimates of how much MC must fall (as a percentage of the original level of MC) to

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47 One can demonstrate that MR always decreases as a result of a merger when  $k' \geq k$  and may decrease when  $k' < k$ . A decline in MR implies that the term  $\% \Delta MR$  in equation (3) is negative. The denominator is negative whenever MR is positive (see equation (1)), as would clearly be true at the profit-maximizing level of output  $x^*$ , given positive MC. Similarly, the numerator is positive, since

$$(s_1 + s_2) / s_i > 1 \quad \text{for } i = 1, 2, \text{ and} \\ 1 \geq (1 + k_i) / (1 + k'), \quad \text{since } k' \geq k_i. \quad \text{Hence, } MR < 0.$$

offset any price and output effects from a merger. 48 We simulated  $\% \Delta MC$  for different values of  $k$  over the interval  $[-1,0]$  -- i.e., from competitive to Cournot assumptions. In all cases, the relationship between  $\% \Delta MC$  and  $k$  was monotonic; in all but a few extreme instances in Model D, 49  $\% \Delta MC$  was largest at  $k = 0$  (Cournot) and smallest at  $k = -1$  (competitive). 50 Table 1 reports the maxima and minima for  $\% \Delta MC$  for the four

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48 In most cases, the two merging firms would have to realize disproportionate reductions in  $MC$  for each to continue to produce at its premerger level. The figures for  $\% \Delta MC$  reported in Tables 1 and 2 are the averages for both firms, with each firm's requisite cost savings weighted by its premerger output. This single figure is more meaningful than the two separate figures, because our primary concern is with the net output of the merged firm, not the individual outputs of the constituent plants. We require  $\% \Delta MC < 100\%$  for each merging firm. Inspection of equation (3) demonstrates that this condition is equivalent to requiring  $|s_1 - s_2| < |n|$  under Cournot assumptions. Since we considered only cases with  $|s_1 - s_2| < |n|$  and our models generated  $\% \Delta MC$  no greater than those generated by a Cournot model, this restriction was not binding on our simulations.

49 In some instances, the minima in Model D were the Cournot solutions. However, these situations only occurred when the underlying model was unrealistic. The reversals occurred when there were few firms (a small  $n$ ) and one of the merging firms was very small. For example, there was a Cournot minimum when there were 3 firms and the merging firms' shares were 25 and 1%. It would be unrealistic to expect both firms to have the same conjectural variations in this case, as the model implies. Model D therefore makes sense only when the merging firms have similar market shares.

50 We iterated the computations at intervals of 0.05 over this range. When possible, we assumed that both merging firms had the same values of  $k$ . However, this assumption would be inconsistent with the restriction in Models B and C that both firms have the same value of  $k'$  after they merged. In our simulations of Models B and C, we therefore selected initial values of  $k_1$  for the larger of the merging firms and then selected a consistent value of  $k_2$  for the other firm.

Table 1

**Cost Savings Needed to Prevent Merger from Raising Price in Oligopoly:  
Minimum and Maximum Values Generated  
by Four Models of Conjectural Variations**

Read headings as follows:  $\min[A]$  means the minimum percentage weighted average decrease in marginal cost necessary to keep price constant if the change in conjectural variations is generated under model A. The range from  $\min[A]$  to  $\max[A]$  arises as one raises conjectural variations from  $k=-1$  to  $k=0$ .  $\min[A,C]$  means both Models A and C have the same minimum.

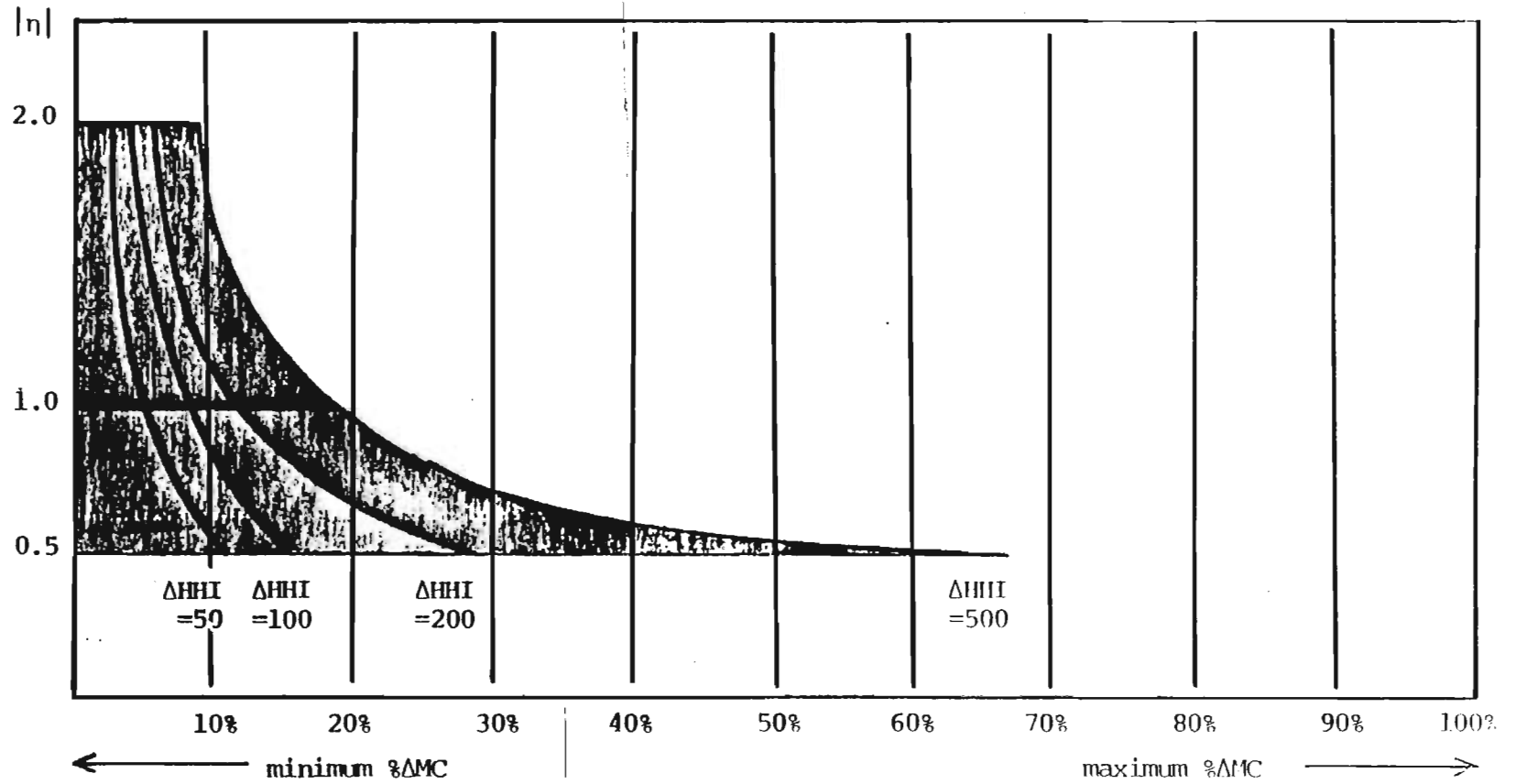
Shares, $\Delta$ HHI	$ \eta $	$\min[A,C]$	$\min[B]$	$\min[D]^1$	maximum (all models)
$s_1 = 5\%$ $s_2 = 5\%$ $\Delta$ HHI = 50	0.5 1.0 2.0	0.0 0.0 0.0	1.1 0.5 0.3	4.0 2.0 1.0	11.1 5.3 2.6
$s_1 = 10\%$ $s_2 = 2.5\%$ $\Delta$ HHI = 50	0.5 1.0 2.0	0.0 0.0 0.0	1.4 0.7 0.3	5.0 2.5 1.3	9.2 4.3 2.1
$s_1 = 7.1\%$ $s_2 = 7.1\%$ $\Delta$ HHI = 100	0.5 1.0 2.0	0.0 0.0 0.0	2.2 1.1 0.5	5.7 2.8 1.4	16.6 7.6 3.7
$s_1 = 20\%$ $s_2 = 2.5\%$ $\Delta$ HHI = 100	0.5 1.0 2.0	0.0 0.0 0.0	3.0 1.5 0.7	9.0 4.5 2.3	12.1 5.1 2.4
$s_1 = 20\%$ $s_2 = 5\%$ $\Delta$ HHI = 200	0.5 1.0 2.0	0.0 0.0 0.0	5.7 2.8 1.4	10.0 5.0 2.5	22.2 9.2 4.3
$s_1 = 25\%$ $s_2 = 10\%$ $\Delta$ HHI = 500	0.5 1.0 2.0	0.0 0.0 0.0	14.2 6.9 3.4	14.0 7.0 3.5	46.4 17.5 7.8

1. For Model D we assumed  $n=6$  (6 firms premerger).



Figure 3

Cost Savings Required to Keep Price from Rising  
Range by Change in the Herfindahl Index







models A-D for various representative combinations of market shares and elasticities of demand. <sup>51</sup> We selected a few combinations of market shares near the trigger values of the Merger Guidelines <sup>52</sup> and some for larger mergers. <sup>53</sup> Figure 3 summarizes the full range of maxima and minima over a wider set

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<sup>51</sup> The relationship between  $\% \Delta MC$  and  $k$  was very close to linear. A linear interpolation between the minimum and maximum values of  $\% \Delta MC$  would therefore enable the reader to approximate  $\% \Delta MC$  for any desired value of  $k$  over the interval  $[-1,0]$ .

<sup>52</sup> For highly concentrated industries (defined as having a Herfindahl Index (HHI) of at least 1800 postmerger), the trigger is a change in the HHI (equal to twice the product of the market shares of the merging firms) of 50 points; for moderately concentrated industries (defined as having a HHI of 1000 to 1800 postmerger), the trigger is a change of 100 points.

<sup>53</sup> In a recent paper, Daskin used a Cournot model to investigate the tradeoff between market power and efficiencies; see Alan J. Daskin, Efficiency, Market Shares, and Mergers (1985) (unpublished manuscript, Boston Univ.). His model yields the same results as ours for the special case of  $k=0$ . He also presents results for a larger selection of market shares than we do. Because the requisite level of efficiencies in our simulations always ranged from zero to whatever value the Cournot assumptions generated, one can refer to his paper for what will probably be the upper range of the tradeoff values for additional market share combinations.

of simulations than reported in Table 1. 54

For the parameter values that we selected, a merger would require a weighted average decrease in marginal costs of from zero to approximately 11 percent to offset the increase in market power for a merger at the threshold of the Merger Guidelines for highly concentrated industries and zero to approximately 17 percent for a merger at the threshold for moderately concentrated industries. 55 Mergers yielding above-Guideline changes in the HHI (where efficiency defenses would be relevant) may require even greater levels of cost savings. For example, for a merger with a change in the HHI of 200, the requisite cost savings could be as much as 28.5%; for one with a change in the HHI of 500,

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54 Denote the shares of the merging firms as  $[s_1, s_2]$ . For  $\Delta \text{HHI}=50$ , we selected 5 mergers from  $[5, 5]$  to  $[25, 1]$ ; for  $\Delta \text{HHI}=100$ , 7 mergers from  $[7.1, 7.1]$  to  $[40, 1.25]$ ; for  $\Delta \text{HHI}=200$ , 6 mergers from  $[10, 10]$  to  $[40, 2.5]$ ; for  $\Delta \text{HHI}=500$ , 4 mergers from  $[15.8, 15.8]$  to  $[40, 6.25]$ . In some cases, more disparate market shares would have widened the range of requisite cost savings. However, even including mergers involving acquired firms with market shares as low as 1 to 2% stretches credibility of the underlying assumption that the merging firms both affect price. To calculate the effects of a merger involving firms with smaller market shares, one should probably use a different model, such as the dominant firm model. For a discussion of some properties of such a model, see the discussion of the Mallela & Nahata model, Parthasardhi Mallela & Babu Nahata, Effects of Horizontal Merger on Price, Profits, and Market Power in a Dominant-Firm Oligopoly (1985) (unpublished manuscript, Univ. Louisville), infra in the text at note 58. As noted supra at note 49, Model D generated higher maxima than the other models under some unrealistic assumptions. We did not include these outliers in Figure 3.

55 The counterintuitive result of greater cost savings required for moderately concentrated than for highly concentrated industries arises because the permissible change in the HHI is greater for firms in moderately concentrated industries; see supra at note 52.

possibly 66.4% or more.<sup>56</sup> These mergers, however, do not represent "average" efficiencies that merging firms would have to realize to keep price from rising. Rather, they cover a range of efficiencies that might be necessary depending on how the merging firms viewed the degree of competition in the market. Values for efficiencies at either the lower or upper ends of the range are plausible if the underlying assumptions on conjectural variations are valid. Other models of conjectural variations may extend the range of possible requisite cost savings.

Nevertheless, our simulations support three implications. First, the less elastic the market demand in the relevant range, the greater the cost savings must be to keep price from increasing and output from falling. Second, the larger the market shares involved, the greater the required efficiencies. Third, while some mergers at the Guideline thresholds might not require any cost savings to prevent price rises, we cannot rule out the possibility that for some particular mergers substantial efficiencies would be required.

#### D. Oligopoly: Varying the Assumptions

In our analysis of oligopoly so far, we have assumed that remaining firms do not alter their views of how the merging firms (and each other) would react to changes in output. If other

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<sup>56</sup> For  $\Delta HHI=500$  and  $|\eta|=0.5$ , the maximum value of 66.4% arose from the merger of firms with premerger shares of 40 and 6.25%. More disparate market shares (to a limit of 50% for the larger firm) would require even greater efficiencies to prevent a price increase and output restriction in the industry.

firms instead saw the merging firms as less rivalrous than the two firms were independently, the other firms might reduce their production. The merging firms would then need greater cost savings than those predicted in Table 1 and Figure 3 to induce them to expand output to compensate for their rivals' reductions. Alternatively, the remaining firms could view the merged firm as more rivalrous and therefore react by expanding output. If so, the merging firms would need smaller cost savings than those predicted in Table 1 and Figure 3 to ensure that industry output and price remain constant. Indeed, a merger that increased rivalry could result in price remaining constant or even falling.

Even if the remaining firms did not change their conjectures after a merger, the merging firms might change their attitudes and become more rivalrous. Ordover, Sykes, and Willig investigated this possibility in a paper examining the sensitivity of market power to changes in  $k$ .<sup>57</sup> For example, under their model, if  $k$  fell from  $k=0$  to  $k=-0.5$  and firms' costs remained unchanged, price would remain constant if two equal-sized firms merged and would actually fall if firms of unequal size merged.

Another approach would be to start with a dominant firm

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<sup>57</sup> Janusz A. Ordover, Alan O. Sykes, & Robert D. Willig, Herfindahl Concentration, Rivalry, and Mergers, 95 Harv. L. Rev. 1857 (1982). Analytically, they modeled an increase in rivalry as a decrease in  $k$ . Our models A-D imply that  $k$  either remains constant or increases as a result of a merger.

model. Mallela and Nahata <sup>58</sup> demonstrated that if a dominant firm acquired a fringe firm and transferred its lower costs to its acquired assets, price could increase, decrease, or remain constant. They showed that the greater the number of fringe firms, the greater the possibility that such an acquisition would lead to a decrease in price.

The analysis in this section demonstrates the difficulty of assessing the impact of a merger on market power. Without excellent information about all aspects of the relevant market model, we can say very little about the cost savings needed to offset market-power effects. Under the models that we discussed, the range of possible tradeoff values is very broad. For example, with an initial  $|n|$  of 2, a merger of two firms with initial market shares of 10 percent each might require no cost savings to keep price from increasing or might require as much as a 50 percent decline in marginal costs to offset increased market

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58 Mallela & Nahata, supra note 54.

power, depending on underlying conditions. 59

Although the range of results is large, not all values are equally probable. The antitrust enforcers have judged that most mergers are unlikely to raise price or restrict output. 60 The assumptions underlying the models that we discussed further limit the likelihood of mergers requiring cost savings near the upper limits of the tradeoff values. The models explicitly assume no possibility of entry; also, for values of  $k$  approaching zero (where the requisite efficiencies usually reach maximums), they implicitly assume a minimal ability of fringe firms to expand. Dropping the assumption of no entry is equivalent to adopting an assumption of  $k=-1$  (i.e., that entry will frustrate any

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59 The required decrease in marginal costs would be 0 if the merger left an industry with essentially competitive pricing essentially unchanged. Under our oligopoly models, the requisite efficiencies would range from a minimum of 0 (with  $k=-1$  under models A and C) to 25% (all four models under Cournot assumptions, i.e.,  $k=0$ ). If a merger increased rivalry sufficiently, it could keep price from increasing even if the firms' costs rose somewhat. Alternatively, if the merger created collusive coordination, the requisite level of efficiencies could exceed 25%. In the limit, the required cost savings would be 50%, if the merger transformed an industry with competitive pricing to perfectly collusive pricing, assuming that both the price and efficiency effects extended throughout the industry. If the merger enhanced collusive potential for the entire industry but led to efficiencies for only part of the industry (the merging parties), the required cost savings could even exceed 50%.

60 For the experience under HSR filings, see the text at notes 40-41 *supra*. Even under an economic efficiency standard, the first step would be to assess the probability of an increase in market power leading to an increase in price. The record on second requests under HSR indicates that the enforcers have judged this probability to be minimal in more than 90 percent of reported mergers in recent years.

attempts of the merging firm to restrict output and raise prices). Moreover, entry barriers tend to be highest under the narrowest market definitions, where one considers firms to inhabit narrow niches, competing somewhat indirectly with similar products. Following this analysis, high entry barriers, narrow product markets, and numerous (imperfect) substitutes tend to occur together. However, numerous substitutes usually corresponds with relatively elastic demand, where the requisite cost savings tend to be much less than the maximum values. This reasoning suggests that the requisite efficiencies would typically be near the bottom of the estimated ranges.

#### V. Policy Considerations: Workability and Implementation

The modeling and simulations in section IV demonstrate that oligopoly makes the tradeoff between efficiencies and market power very complex. The discussion leads to two obvious questions that we address here: would an economic efficiency standard be more workable, as many scholars claim?<sup>61</sup> And how can antitrust enforcers and the courts best incorporate efficiency considerations?

##### A. Workability Considerations

1. Relative workability. We maintain that the property rights (price) standard is actually more workable than the economic efficiency standard, because the modeling for the former is more straightforward. If one knew the proper model and the

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<sup>61</sup> See supra note 11 and the accompanying text.

values of a few underlying parameters, one could quickly determine how large cost savings would have to be to prevent price from rising or output from falling. The economic efficiency standard, however, is much more complex. Because the postmerger socially optimal output would fall under this standard, a tradeoff analysis would require one to know the shapes of the MC and MR curves over the relevant output ranges -- vastly more information than our model would require.

Empirically, the property rights standard has an additional advantage over the economic efficiency criterion. For situations where one can evaluate the effects after the fact, it is relatively simple to observe whether price rose and output fell. By contrast, the economic efficiency test, whether marginal costs fell sufficiently to offset the adverse effects of reduced output, eludes hindsight as well as foresight.

2. Absolute workability. The relative advantage of the property rights standard is largely pyrrhic. In practice, two necessary informational problems of a case-by-case analysis would be far beyond the ability of the merging parties, the enforcers, or the courts. First, the decision makers would need to know the correct model and values of the important parameters to determine



the tradeoff values. <sup>62</sup> Second, one would need to assess the likelihood that the requisite cost savings would actually arise. <sup>63</sup> The litigation context complicates the search for truth. Each side will have experts with very different opinions of the appropriate model and values of the parameters. Each side will try to convince or confuse a judge whose training and experience will typically be neither in economics nor in business. <sup>64</sup>

These considerations only hint at the complexities of a case-by-case tradeoff analysis. One complexity arose the first time that the Commission attempted to consider efficiencies in a merger decision. <sup>65</sup> In that case, the respondents had argued:

In addition to saving costs, consolidation is expected to improve the quality of medical services by aggregating at a single facility patient volume that is now divided between the two hospitals. . . . Higher volumes enhance quality by making it economically feasible for a hospital to upgrade its equipment and to recruit and train expert support personnel.

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<sup>62</sup> Indeed, in practice, it would be difficult to distinguish the requisite cost savings under one standard from those under the other. There is one safe generalization, probably more important in theory than in practice. Because cost savings would only need to be sufficient to offset the deadweight loss of allocative inefficiency, the requisite efficiencies from merger would be less under the economic efficiency than the property rights standard.

<sup>63</sup> Experts have tended to make grossly inaccurate predictions of both efficiencies and inefficiencies from mergers; see Fisher & Lande, supra note 1, at 1619-24.

<sup>64</sup> For a thorough exposition, see Id. at 1651-77.

<sup>65</sup> See AMI opinion, supra note 5. This case involved the merger of two hospitals in San Luis Obispo, California.

Moreover, increased volume provides greater opportunities for physicians and staff to sharpen their skills. . . . Mr. Derzon, who has been involved in the hospital field for twenty-five years, testified that the quality enhancements flowing from consolidation are of even greater significance than the cost savings. <sup>66</sup>

Once one allows for product heterogeneity (quality and variety changes), the tradeoff becomes vastly more complex: "How much of a decrease in costs would compensate for a given increase in market power and ensure that price (for a given level of quality) not increase, if we also expected quality to increase by x percent (or decrease by y percent)?" <sup>67</sup> However, whenever one could expect quality and either price or cost to change in the same direction, it would be enormously difficult to determine whether the change in quality were sufficient to compensate for

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<sup>66</sup> Brief in Support of Respondents' Proposed Findings of Fact and Conclusions of Law, In re American Medical International, Inc., Doc. 9158 (May 9, 1983), at 74. Emphasis in original; citations to transcript omitted. Neither the Administrative Law Judge nor the Commission found the arguments convincing. See Initial Decision (July 27, 1983) (by Judge Barnes), at 166-76; AMI opinion, supra note 5, at 52-53.

<sup>67</sup> The same unanswerable question could equally well arise under an economic efficiency standard, with "ensure that rectangle C equal triangle D in figure 1" replacing "ensure that price . . . not increase."

the change in price or cost. 68

The complications extend beyond product heterogeneity. Even when a merger creates efficiencies, the adjustment period can be stormy, and it may take a lengthy period before the efficiencies arise. 69 Moreover, the firms might have achieved the same or comparable efficiencies through less anticompetitive means, such as a licensing arrangement or joint venture. 70 Alternatively,

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68 This statement applies equally for an economic efficiency or a property rights standard. Suppose one expected both price and quality to decrease. Without careful hedonic testing to which both parties in litigation could agree (probably a hopeless task), it would be impossible to determine whether the decrease in costs were sufficient to offset lower quality of any known (let alone predicted and therefore unknown) magnitude. Otherwise, there could be higher costs (diseconomies) from the merger, with a deterioration in quality and a lower price to mask that deterioration. Similar factual questions arise when both price and quality increase. One can make the same arguments whenever product variety changes. If one had to anticipate in advance whether a proposed merger's expected efficiencies and lower price would be sufficient to compensate for anticipated reductions in product variety, the task might be impossible and would certainly be impossible of resolution in a litigation context. Whoever had the burden of proof would almost certainly lose; see Fisher & Lande supra note 1, at 1634-35, for a more extensive discussion.

69 See, e.g., Myron Magnet, *Acquiring without Smothering*, 110 *Fortune* 22 (Nov. 12, 1984); Frederick Rose, *Occidental's Purchase of Cities Service Does Little to Increase U.S. Oil Reserves*, *Wall St. J.* 24 (Dec. 5, 1984); Ken Wells & Carol Hymowitz, *Takeover Trauma: Gulf's Managers Find Merger Into Chevron Forces Many Changes*, *Wall St. J.* 1 (Dec. 5, 1984).

70 For some discussion of how members of the FTC staff have been evaluating these and other issues in practice, see Robert D. Stoner, *Merger Enforcement at the FTC Under the New Merger Guidelines* (1985) (unpublished manuscript, Federal Trade Commission); Charles Pidano and Louis Silvia, *Analysis of Efficiencies in Horizontal Mergers and Joint Ventures at the FTC's Bureau of Economics* (1984) (unpublished manuscript, Federal Trade Commission).

even if a merger involved two multiproduct firms with only partial horizontal overlaps, it could create synergies or benefits for other products. These and other considerations 71 clearly imply that the tradeoff calculations will typically be horribly complex in practice.

### B. Policy Options

The policy options for merger enforcers range along a spectrum from case-by-case, rule-of-reason evaluations to rigid adherence to formal rules. 72 In theory, society can capture enormous gains by selectively permitting socially desirable mergers that would not pass basic rules and attacking undesirable acquisitions that would pass the basic test of legality. This potential, however, requires that enforcement agencies and courts decide most cases "properly." To use a case-by-case methodology, the basic question is how great expected decreases in marginal costs must be to offset anticipated market-power increases. Even if one could predict efficiencies accurately, small changes in behavioral assumptions (and thus in the values of parameters such as elasticity of demand and conjectural variations) can change the tradeoff calculations substantially; altering the choice of

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71 For an extensive discussion, see Fisher & Lande, supra note 1, at 1624-50.

72 There are intermediate policies that try to limit the area of subjective evaluation. However, although one can frequently carve out useful exceptions to rules, unstructured or unclear approaches frequently degenerate into full-blown investigations (rule of reason at its worst). See generally, e.g., Posner, The Next Step, supra note 28, and Reflections, supra note 28; Easterbrook, supra note 28.

oligopoly model can change them even more. Once one allows for additional factors, especially product variety and quality differences, the tradeoff calculations become yet more complicated. Our analysis has led us to conclude that decision makers and courts are unlikely to perform this analysis very successfully on a case-by-case basis.

Litigation of a complex rule-of-reason case (such as an efficiencies-market power tradeoff would involve) often costs millions of dollars and takes years, especially with appeals, to establish the ultimate legality of the transaction. The consequent uncertainty over the legal status of a business plan creates additional problems. Any firm whose merger was under antitrust attack could not make long-term plans without allowing for contingencies in case of being forced to divest. Perhaps more important, uncertainty over the legality of a class of potential mergers makes long-term planning more costly for all firms, both those considering acquisitions and those anticipating having to react to others' mergers. The intractability of the tradeoff for litigation has led most antitrust scholars to argue against even attempting to balance market power and efficiencies

in individual mergers. <sup>73</sup> We agree and expect that most disputes would be over close decisions, where expected net social benefits from the merger would be small and possibly negative. <sup>74</sup>

Therefore, the litigation costs and the uncertainty costs imposed on business would dominate any expected benefit of case-by-case analysis. <sup>75</sup>

These concerns notwithstanding, the current approach to antitrust is shifting from a rule-oriented to a more subjective,

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<sup>73</sup> See Fisher & Lande, supra note 1, at 1651-69, for citations to Bork, Posner, and Easterbrook, and to other scholars, and for some discussion. The two major exceptions are Areeda & Turner, supra note 7, at 146-99, who would make the conditions so strict that very, very few mergers could qualify, and the current administration's policy of considering efficiencies in every merger context. Many courts have agreed that it was too complex to consider efficiencies as an offset to anticipated market-power effects, except perhaps in rare cases of extraordinary anticipated efficiencies; see Fisher & Lande, supra note 1, at 1656-59. For discussion and extensive citations in the closely related context of nonprice vertical restraints, see Frank H. Easterbrook, Vertical Arrangements and the Rule of Reason, 53 Antitrust L. J. 135 (1984), at 153-57.

<sup>74</sup> Judge (then Professor) Easterbrook expressed this sentiment very well in recommending a simple screen based on output changes for evaluating the legality of vertical restraints: "F. M. Scherer's demonstration . . . that the output test could be inaccurate in some cases does not affect the point. If these cases are sufficiently rare, as his own analysis suggests they will be, then the output filter still has value. We are searching for useful filters, not perfect ones." Easterbrook, supra note 28, at 31 n.64 (emphasis in the original).

<sup>75</sup> Any decent rule would permit mergers whose net social benefit (constrained by the Congressional allocation of property rights) would most probably be positive and disallow those whose net social benefit would very likely be negative. Remaining cases would tend to be those about which experts would disagree and/or those whose expected net social benefit would be close to zero. For a detailed analysis, see Fisher & Lande, supra note 1, at 1651-77; for a formalization, see Fisher & Sciacca, supra note 39, at 72-75.

rule-of-reason approach, in both enforcement practice and court decisions. The 1984 Merger Guidelines state that the Antitrust Division will always consider every type of efficiency <sup>76</sup> -- without specifying how it will do so -- and the Commission's opinion in AMI <sup>77</sup> suggests that it too will follow a similar course. Naturally, defendants' attorneys now routinely present efficiency arguments and attempt to justify mergers that firms would probably not have attempted a few years ago. <sup>78</sup> The Government will probably eventually permit a number of mergers at levels significantly above the Guideline thresholds because of anticipated efficiencies. At least in theory, researchers will then be able to evaluate whether predicted cost savings and quality enhancements arise and compensate for allocative efficiency or price effects. Studying the impact of the more subjective rule-of-reason approach on business planning costs will be far more difficult. Perhaps the best prediction today is that antitrust experts will differ widely in their assessments of the wisdom of the experiment.

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<sup>76</sup> U.S. Department of Justice, supra note 4, at §3.5.

<sup>77</sup> AMI opinion, supra note 5.

<sup>78</sup> For example, see Id. The Commission discussed two possible geographic market definitions and two different units of measurements. The acquiring firm's share ranged from 52.2 to 57.8%; the acquired firm's share, from 19.1 to 29.2%. The postmerger HHI ranged from 5507 to 7775, with a change of 1989 to 3405; Id. at 28. Compare these figures to the standards, supra note 52.

