

# Afterword: Could a Merger Lead to Both a Monopoly and a Lower Price?

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Economists and Congress frequently speak at such cross purposes in merger analysis that they might as well be speaking different languages. Economists typically analyze merger effects solely in terms of efficiency and tend not to consider final product price explicitly.<sup>1</sup> Congress, however, enacted the antimerger laws largely to prevent firms from using mergers to obtain greater market power, raise prices, and thereby acquire some consumer surplus from purchasers of the products.<sup>2</sup> Efficiency was a much lower priority for Congress; the most im-

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1. Economists focus on maximizing allocative efficiency—determining the rate of output that maximizes the total wealth of society—regardless of whether consumer prices increase or decrease. *See, e.g.,* E. MANSFIELD, MICROECONOMICS THEORY AND APPLICATIONS 438-42 (1982). Indeed, as Professor Williamson observed, "This transformation of benefits from one form (consumers' surplus) to another (profit) [i.e., wealth transfer] is treated as a wash under the conventional welfare economics model." Williamson, *Economies as an Antitrust Defense Revisited*, 125 U. PA. L. REV. 699, 711 (1977).

Even attorneys who have analyzed the market-power/efficiencies tradeoff have used the economists' framework. *See, e.g.,* 4 P. AREEDA & D. TURNER, ANTITRUST LAW ¶ 939, at 147-48 (1980); R. BORK, THE ANTITRUST PARADOX 107-12 (1978); Liebel, *Market Power and Competitive Superiority in Concentrated Industries*, 25 U.C.L.A. L. REV. 1231, 1260-66 (1978); Muris, *The Efficiency Defense Under Section 7 of the Clayton Act*, 30 CASE W. RES. L. REV. 381 (1980).

2. *See generally* Fisher & Lande, *Efficiency Considerations in Merger Enforcement*, 72 CALIF. L. REV. 1580 (1983). For a more extensive treatment, see Lande, *Wealth Transfers as the Original and Primary Concern of Antitrust: The Efficiency Interpretation Challenged*, 34 HASTINGS

portant consideration was that firms not use mergers to enable them to raise consumer prices.<sup>3</sup>

This communications gap permeates what has become known as Williamsonian tradeoff analysis.<sup>4</sup> Suppose that a merger simultaneously created both efficiencies and increased market power. Economists debate how much of a decrease in costs (increased productive efficiency) would exactly compensate for the allocative inefficiency of increased monopoly power, ignoring the effect of primary interest to Congress in passing the antimerger laws: the wealth transfer from consumers to the business firms gaining increased market power. Since Congress cared little about efficiency and was unwilling to tolerate increased market power sufficient to transfer wealth from consumers to the business sector, it is not surprising that the courts have refused to consider an efficiency justification for mergers likely to result in higher consumer prices.<sup>5</sup>

In this Afterword, we reverse the analysis and focus on the question of interest to Congress: What are the cost savings and other conditions necessary to guarantee that a merger that created a monopoly would not raise prices and thus would involve no wealth transfer from consumers to producers?<sup>6</sup> In other words, we derive the conditions under which a merger transforming an industry from competitive to monopoly pricing could sufficiently decrease marginal costs to lead to a

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L.J. 65 (1982). Even Professor Bork stated in the closely related context of the legislative history of the Sherman Antitrust Act, "The touchstone of illegality is raising prices to consumers. There were no exceptions." Bork, *Legislative Intent and The Policy of The Sherman Act*, 9 J.L. & ECON. 7, 16 (1966).

3. Congress also had incipency and other concerns. For simplicity, we ignore these considerations. See Fisher & Lande, *supra* note 2, at 1587-1599; Lande, *supra* note 2, at 126-40.

4. Oliver Williamson made the first effective argument that efficiencies should count in favor of rather than against the legality of a merger in his landmark article, Williamson, *Economies as an Antitrust Defense: The Welfare Tradeoffs*, 58 AM. ECON. REV. 18 (1968). For additional discussion, including citations to much of the literature that developed from Williamson's analysis and used his methodology, see Fisher & Lande, *supra* note 2.

5. For a history of the judicial treatment of merger efficiencies under Section 7 of the Clayton Act, see Fisher & Lande, *supra* note 2, at 1593-1599.

6. If consumer prices did not increase, net efficiency would increase without adversely affecting consumers (i.e., there would be no wealth transfer to the business sector). Since a merger that left unchanged or lowered final product price would not make any consumers worse off, it would meet the one welfare criterion that economists almost universally accept: Pareto optimality. A market situation is Pareto optimal if no person can be made better off (according to his preferences) without simultaneously making someone else worse off. Mansfield, *supra* note 1, at 440. Of course, competitor firms not achieving similar cost savings would be worse off after such a merger—unless they could also merge and obtain comparable efficiencies. Congress, however, was more concerned with consumer welfare than with the welfare of specific business firms. Lande, *supra* note 2, at 101-05, 120-21, 139-40. Mergers that improve allocative efficiency but transfer wealth from consumers to producers are not Pareto optimal. Although in theory the producers could compensate consumers for their lost wealth and still have a net gain, such payments would involve transaction and political costs so high that they would be impractical.

new monopoly price as low as or lower than the premerger competitive price.<sup>7</sup>

For simplicity, we adopt the extreme assumption that the merger will transform a fully competitive market into a single-firm monopoly or cartel.<sup>8</sup> For any merger likely to be attempted in the present antitrust environment, such a transformation would have only a modest probability of occurring. Since we assume the maximum possible anticompetitive potential of any merger, our calculations vastly overstate both the probable anticompetitive effect of a merger and the cost savings required to keep prices from rising. Naturally, the calculations also greatly overstate the cost savings necessary to offset any possible market-power effects if, contrary to the wishes of Congress, one used the conventional economic criterion of maximizing allocative efficiency and ignored any wealth-transfer effects.

Consider Diagram 1.<sup>9</sup> For any point C along demand curve AB, one can calculate the elasticity of demand,  $\eta$ , as  $\eta = \frac{\overline{BC}}{\overline{AC}}$ , where the bar indicates linear distance.<sup>10</sup> The lower the price, the lower the elasticity of demand; the higher the price, the higher the elasticity of demand. Therefore, one can address the question of when the competitive price would exceed the postmerger monopoly price by asking when the competitive elasticity of demand would exceed the monopoly elasticity of demand.<sup>11</sup> In the equations below, superscripts C, M, and \*, respectively, denote "premerger competitive," "postmerger monopolistic," and "hypothetical postmerger competitive." To demonstrate when the premerger competitive elasticity would exceed the postmerger monop-

7. Williamson, in contrast, assumed that a merger creating market power would raise price; he never addressed the question that we address here. Williamson, *supra* note 4; Williamson, *Economies as an Antitrust Defense: Correction and Reply*, 58 AM. ECON. REV. 1372 (1968); Williamson, *Allocative Efficiency and the Limits of Antitrust*, AM. ECON. REV. PAPERS & PROC., May 1969, at 105; Williamson, *Economies as an Antitrust Defense: Reply*, 59 AM. ECON. REV. 954 (1969); WILLIAMSON, *supra* note 1.

8. Given present merger enforcement, the relevant concern is collusion rather than monopolization. For a discussion of the effects of alternative assumptions on the tradeoff between price increases and efficiencies, see Fisher & Lande, *supra* note 2, at 1624-51.

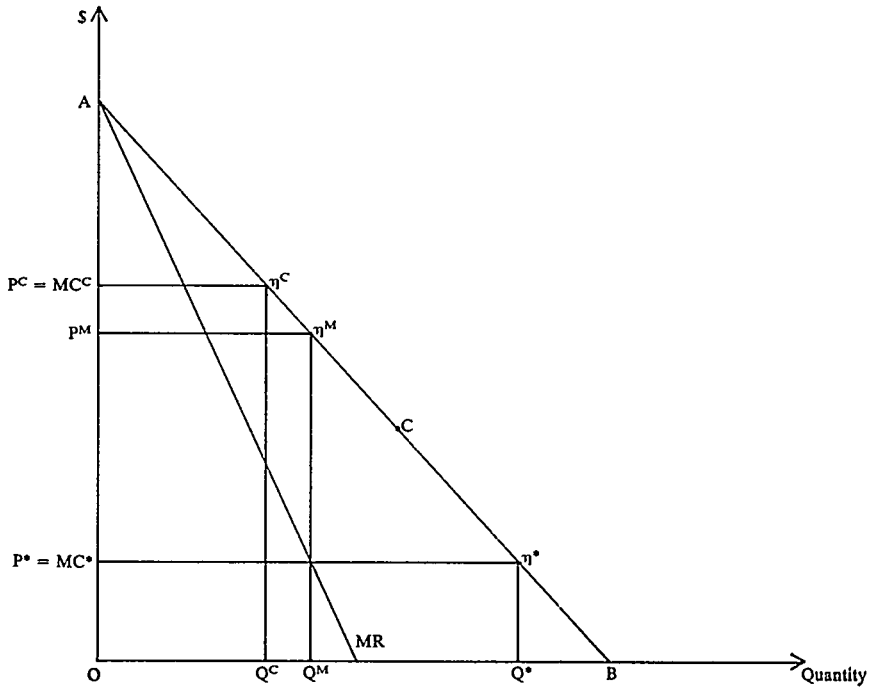
9. To simplify the analysis, we assume straight-line demand, constant marginal costs, and significant barriers to entry.

10. J. HIRSHLEIFER, PRICE THEORY AND APPLICATIONS 119 (1976). We define  $\eta$  as the absolute value of the elasticity of demand.

11. This statement holds for a concave or a linear demand curve, or for a convex demand curve not more convex than unitary elasticity. Concave and linear demand curves both imply that at some sufficiently high price, consumers would not purchase any of the product in question, and that at a zero price consumers would purchase a finite quantity. A convex demand curve implies that consumers would purchase some of the product even at an infinitely high price and would want an infinite amount of the good at a zero price. For a technical explanation of the properties of concave and convex functions, see A. CHIANG, FUNDAMENTAL METHODS OF MATHEMATICAL ECONOMICS 255-56 (1974).

oly demand elasticity, we must derive the relationships among these parameters; these, in turn, depend on the relationships among marginal costs in each case. We define the proof with respect to Diagram 1.

Diagram 1



From simple geometry and the definition of price elasticity of demand,<sup>12</sup> we obtain:

$$(1a) \quad \eta^C = \frac{P^C}{\overline{AP^C}}$$

$$(1b) \quad \eta^M = \frac{P^M}{\overline{AP^M}}$$

$$(1c) \quad \eta^* = \frac{P^*}{\overline{AP^*}}$$

For an  $x$ -percent decrease in marginal costs, we can express the new marginal costs as:

$$(2) \quad MC^* = (1-x)MC^C = (1-x)P^C = P^*,$$

where  $P^*$  indicates a hypothetical, nonobserved competitive price (since a monopolist would not charge as low a price as  $P^*$ ).

12. J. HIRSHLEIFER, *supra* note 10, at 113-16.

Profit maximization for a monopolist occurs at the output where  $MR = MC^*$ ; we use the well-known relationship to express marginal cost in terms of elasticity of demand at the profit-maximizing rate of output:<sup>13</sup>

$$(3) \quad MR = MC = P^M \left(1 - \frac{1}{\eta^M}\right), \text{ or}$$

$$(4) \quad \frac{MC^*}{P^M} = \frac{\eta^{M-1}}{\eta^M}, \text{ or } P^M = MC^* \frac{\eta^M}{\eta^{M-1}}$$

To facilitate deriving the relationship between  $\eta^M$  and  $\eta^C$ , it is convenient to derive and use the relationships between  $\eta^M$  and  $\eta^*$  and between  $\eta^C$  and  $\eta^*$ :

$$(5) \quad \eta^M = \frac{P^M}{\overline{AP^M}} = \frac{P^M}{P^M - P^*}$$

$$(6) \quad \eta^* = \frac{P^*}{\overline{AP^*}} = \frac{P^*}{2(P^M - P^*)}$$

(using (1b), (1c), and properties of congruent triangles).<sup>14</sup> Using (5), (6), and (4), we can then derive:

$$(7) \quad \frac{\eta^M}{\eta^*} = \frac{2P^M}{P^*} = \frac{2\eta^M}{\eta^{M-1}}; \text{ thus}$$

$$(8) \quad \eta^M = 2\eta^* + 1$$

Similarly, using (1c), (2), and the definition of an  $x$ -percent decrease in marginal cost, we obtain:

$$(9) \quad \eta^* = \frac{(1-x)P^C}{\overline{AP^C} + xP^C}$$

From (9), dividing numerator and denominator by  $\overline{AP^C}$  and using (1a), we obtain:

$$(10) \quad \eta^* = \frac{(1-x)\eta^C}{1+x\eta^C}$$

From (8) and (10), we derive:

$$(11) \quad \eta^M = \frac{2(1-x)\eta^C}{1+x\eta^C} + 1, \text{ or, solving for } \eta^C,$$

$$(12) \quad \eta^C = \frac{\eta^{M-1}}{2 - (\eta^M + 1)x}$$

We can now ask under what conditions a merger leading to a decrease of  $x$  percent in marginal costs and transforming an industry from competitive to monopoly pricing would lead to a lower price. As we

13. E. MANSFIELD, *supra* note 1, at 129.

14. *Id.* at 125; J. HIRSHLEIFER, *supra* note 10, at 119.

noted at the beginning of the Afterword, this search is equivalent to inquiring under what conditions  $\eta^C > \eta^M$ , or when

$$(13) \quad \eta^C > \frac{2(1-x)\eta^C}{1+x\eta^C} + 1, \text{ or, using (11) and solving for } x,$$

$$(14) \quad x > \frac{1}{\eta^C}$$

Thus, as long as the percentage decrease in MC (denoted  $x$ ) is larger than  $\frac{1}{\eta^C}$ —that is, as long as the percentage decrease in MC is larger than the reciprocal of the premerger price elasticity—the monopoly price will be less than the competitive price.<sup>15</sup> Since  $x$  cannot exceed 1 (i.e., 100%), this condition can only arise when  $\eta^C > 1$ .

A merger would have to produce extraordinarily large cost savings to permit the same or lower prices from monopoly than from a premerger competitive situation. For example, for an initial industry elasticity of demand ( $\eta^C$ ) of 1 at the competitive output, cost savings would have to equal or exceed 100% (an impossible result); for  $\eta^C$  of 1.5, cost savings would have to equal or exceed 67%; for  $\eta^C$  of 2, 50%; for  $\eta^C$  of 3, 33%; for  $\eta^C$  of 4, 25%. If one were to follow the congressional dictate of not permitting any merger reasonably likely to raise consumer prices, and one believed that the elasticity of demand for an industry at the competitive level would rarely exceed 4,<sup>16</sup> the optimal policy would be to oppose any mergers reasonably likely to transform an industry from competitive to monopoly pricing. Cost savings of 25% to 100% seem too large to expect, except under truly remarkable circumstances.<sup>17</sup>

In his characterization of the market-power/efficiencies tradeoff, an approach that all subsequent analysts have followed, Williamson

15. Rewriting equation (14) as  $x\eta^C > 1$ , we can give the following interpretation. The quantity  $x\eta^C$  equals the percentage change in the competitive output due to an  $x$ -percent decrease in marginal cost, for the simple case of constant marginal costs. Given that for a linear demand the monopoly output is always one-half of the competitive output, E. MANSFIELD, *supra* note 1, at 126, for the monopoly output after cost reduction to be larger than the old competitive output, the new competitive output must be at least twice the old competitive output. Under this condition, the ratio of the hypothetical new output to the competitive output,

$$\frac{Q^* - Q^C}{Q^C},$$

with  $Q^* > 2Q^C$ , will be larger than one.

16. Empirical work shows elasticities of demand for successful brands of consumer products to be in the 1 to 15 range, with the majority between 2 and 5. L. TELSER, *COMPETITION, COLLUSION AND GAME THEORY* 274-306 (1972). The interpretation of this evidence is very controversial, however, and industry demands are less elastic than demands for individual brands. For a discussion, see Fisher & Lande, *supra* note 2, at 1642-43 nn.212-14.

17. See Fisher & Lande, *supra* note 2, at 1599-624. Further, the historical record is that predictions of efficiencies from mergers have been extremely unrealistic. *Id.* at 1609-24.

assumed that a merger would raise price and looked at the cost savings necessary to offset allocative efficiency losses, ignoring any wealth-transfer effects.<sup>18</sup> A switch in focus to the congressional concern with price itself, including an allowance for the possibility that a merger might facilitate industrywide collusion, changes the results dramatically. For example, for an elasticity of demand of 2, Williamson calculated that cost savings of 0.27% to 5.76% would offset the allocative inefficiency of price increases of 5% to 20%.<sup>19</sup> In sharp contrast, for a demand elasticity of 2, marginal cost would have to fall by 50% to ensure that a merger facilitating industrywide collusion did not permit prices to increase. To state these results somewhat differently, if one performs the market-power/efficiencies tradeoff in accordance with congressional intent, the anticipated cost savings necessary to compensate for monopoly power increase greatly: by a factor of close to 3 at high elasticities of demand and by a factor of 40 as the demand elasticity approaches 1.

The assumptions underlying Equation (14) are admittedly very extreme. One departure would be to predetermine a certain amount of acceptable price increase for mergers expected to result in important efficiencies.<sup>20</sup> For example, the Justice Department's 1982 Merger Guidelines<sup>21</sup> essentially consider anticipated price increases of less than 5% too small to merit antitrust intervention.<sup>22</sup> Based on this kind of reasoning, how much would marginal costs have to decrease to prevent a firm gaining monopoly power from raising price more than some stated percentage? Our model allows us to answer this question, using the same assumptions. To proceed, we start by deriving R, the maximum permissible percentage price change:

$$(15) \quad R \equiv \frac{P^M - P^C}{P^C}$$

We start with

$$(16) \quad P^M = (1-x) P^C \frac{\eta^M}{\eta^M - 1}$$

$$(17) \quad \frac{P^M - P^C}{P^C} = \frac{1-x\eta^M}{\eta^M - 1}$$

18. Williamson, *supra* note 4.

19. Williamson, *supra* note 1, at 709 table 1, reprinted in Fisher & Lande, *supra* note 2, at 1630 table IV-1.

20. For an argument that this policy would be unwise, see Fisher & Lande, *supra* note 2. For an opposing view, see Muris, *supra* note 1.

21. 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).

22. *Id.* § II(A), 47 Fed. Reg. at 28,494, 2 TRADE REG. REP. (CCH) ¶ 4502, at 6881-8.

using (2) and (4), subtracting  $P^C$  from both sides of (16), and dividing by  $P^C$ . Then (17), (11), and simplification yield

$$(18) \quad \frac{P^M - P^C}{P^C} = \frac{1 - x\eta^C}{2\eta^C}$$

By setting (18) equal to  $x$ , we can derive the percentage decrease in marginal costs as a function of the percentage price change,  $R$ :

$$(19) \quad x = \frac{1 - 2\eta^C R}{\eta^C}$$

Equation (19) underlies the figures in Table 1.

Table 1  
The Relationship Between Cost Savings and Final Price:  
Maximum Estimates for Merger to Monopoly\*

Percentage Change in Price	Elasticity of Demand at the Competitive Price			
	4	3	2	1
+30%	NA	NA	NA	40
+20%	NA	NA	10	60
+10%	5	13.3	30	80
+5%	15	23.3	40	90
0	25	33.3	50	100
-5%	35	43.3	60	-
-10%	45	53.3	70	-
-20%	65	73.3	90	-
-30%	85	93.3	-	-

\* This table shows the percentage decrease in marginal costs necessary to result in the indicated percentage changes in price, for various elasticities of demand, under the extreme assumption that the merger in question transforms the industry from perfectly competitive to monopoly (or perfectly collusive) pricing.

Notes:

1. NA indicates that for the elasticity of demand in question (measured at the competitive price), a monopolist would not raise price by that great a percentage above the competitive price.
2. - indicates that no reduction in marginal costs would be sufficient to induce a monopolist to reduce price to this extent below the competitive price, given the elasticity of demand.
3. The required cost savings as shown refer to industry costs. Therefore, for a merger permitting price changes for all firms but cost savings for only the merging firms, the figures in this table must be divided by the merging firms' combined market share. In such a case, the cost savings required to yield price changes as shown could be much greater than indicated by the table.

Source: Equation (19).



To illustrate Equation (19), suppose that antitrust enforcers followed the spirit of the 1982 Merger Guidelines and agreed to permit an acquisition likely to confer a monopoly on the merging parties as long as the enforcers could confidently predict that the price increase would not exceed 5%. Equation (19) shows that such a merger would have to yield 15% cost savings for  $\eta^c$  of 4; 23% for  $\eta^c$  of 3; 40% for  $\eta^c$  of 2; and 90% for  $\eta^c$  of 1. Table 1 performs this analysis for maximum permissible price increases of 0% to 30% and for more interventionist decision rules that would only permit mergers to create a monopoly if price were expected to fall by 5% to 30%.

In summary, this Afterword extends the antitrust literature on the market-power/efficiencies tradeoff by switching the focus. Economic analysis of enforcement policy is most likely to influence the courts if it operates within the methodology imposed by the congressional mandate in the enabling legislation. The antitrust laws impose a wealth-transfer constraint; decisionmakers must maximize economic efficiency subject to this constraint. We therefore compute the cost savings necessary to guarantee that a merger with the maximum possible anticompetitive effect (transforming an industry from competitive to monopoly pricing) would not raise consumer prices, or would not raise prices more than some predetermined maximum percentage. Although it is possible under our extreme assumptions for a merger creating a monopoly to have sufficient efficiencies to lead to lower consumer prices, such a result would require impossibly large efficiencies and rather large elasticities of demand. Under less extreme assumptions, however, a merger that increased market power could lead to lower consumer prices with much smaller efficiencies, at a level that one could expect under more normal conditions.<sup>23</sup>

Although our analysis directly concerns only merger policy, it has profound implications for many other areas of antitrust law, such as monopolization/predation, in which the literature ignores effects on final consumer prices and wealth transfers.<sup>24</sup> Our analysis also applies to other areas of law and economics, such as regulation, in which

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23. For a very simple example, if we believed that there was a 20% probability that a merger would transform an industry from competitive to monopoly pricing and an 80% probability that the industry would remain competitive, the required efficiencies would be 80% smaller, assuming that we were willing to base policy on expected values of wealth transfers and efficiencies and were willing to ignore inaccuracy concerns. For a discussion of the results under less extreme assumptions, see Fisher & Lande, *supra* note 2, at 1624-51.

24. For example, the lengthy volume ten of *The Journal of Reprints for Antitrust Law and Economics*, which was devoted to predation, contained no analysis of a methodology to weigh wealth transfers and efficiencies in this context. For a rare exception, see Zerbe and Cooper, *An Empirical and Theoretical Comparison of Alternative Predation Rules*, 61 TEX. L. REV. 655 (1982).

policymakers frequently face tradeoffs between efficiencies and wealth-transfer effects.

The calculations in this Afterword provide definite amounts of cost savings necessary to follow the dictates of Congress. The precision in the numbers, however, is purely theoretical and illustrative. In practice, all the parameters in the equations are subject to imprecision and require estimation or informed guesses. Whether the theoretical models and the skills of antitrust enforcers and courts are sufficiently reliable to form the basis for case-by-case balancing of efficiencies and market power is another, far more complex issue.<sup>25</sup>

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25. For the case in favor of a case-by-case efficiencies defense, see *Muris*, *supra* note 1, at 416-31; for the case against a case-by-case approach, see *Fisher & Lande*, *supra* note 2.