Vertical Mergers and Market Foreclosure With Differentiated Products

by Michael A. Salinger

Columbia Institute for Tele-Information
Graduate School of Business
Columbia University
809 Uris Hall
New York, NY 10027
(212)854-4222

Vertical Mergers and Market Foreclosure with Differentiated Products

Michael A. Salinger *

Assistant Professor

Columbia University Graduate School of Business

1986

* I have helpful comments from Severin Borenstein, Alan Fisher and Elizabethe Jensen.

August, 1986

Vertical Mergers and Market Foreclosure with Differentiated Products

Abstract

This paper analyzes a merger between a downstream monopolist and one of the two upstream brands that it purchases. The merger eliminates the successive mark-up for the merging brand, but has a foreclosure effect on the unintegrated brand. These "initial" effects induce further price changes. The end result can be a decrease in both prices, an increase in both prices, or a decrease in the merging brand price and an increase in the unintegrated brand price.

I

Introduction

Suppose a distributor or retail outlet that sells several competing brands merges with the manufacturer of one of the brands. Will the merged entity sell the other brands as vigorously as it had in the past? If not, is the merger harmful to competition or is it merely harmful to the unintegrated competitors? These questions were important issues in the Brown Shoe case,[1] in which the Supreme Court's decision said that the merger between Brown Shoe and Kinney would cause unintegrated shoe producers to be foreclosed from retail outlets. Those questions could have been raised with regard to some recent vertical mergers. For example, Pepsi recently acquired MEI, which operates several Pepsi bottling franchises. A Pepsi franchise contract forbids the bottler from distributing other brands of colas, but allows it to sell non-colas produced by other companies. Some Pepsi bottlers distribute Seven Up and/or Dr. Pepper, as well as a large number of minor brands. Does the merger create an incentive for Pepsi to raise the price of the non-Pepsi brands that MEI distributed in order to increase the sales of Pepsi? Indeed, could Pepsi use its control over the bottler to reduce competition from non-Pepsi brands so much that it would find it profitable to raise the price of Pepsi?

The economics literature on vertical integration seems to refute concerns that vertical mergers might be harmful. Spengler (1950) shows that a vertical merger between successive monopolists is beneficial to consumers because it results in a lower final good price. Also, given fixed coefficients technology in the production of the final good, a monopolist at one stage has no incentive to integrate into an adjacent competitive stage. This result is often interpreted to mean that only horizontal market power is harmful to consumers and that vertical integration does not extend horizontal market power.

The literature does contain cases when vertical mergers are in principle harmful. Schmalensee (1973), Warren-Boulton (1974), Mallela and Nahata (1980), and Westfield (1981), show that with variable proportions technology in the production of the final good, monopolization of a previously competitive downstream stage by an upstream monopolist is likely to raise prices. Perry (1978, 1980) argues that vertical mergers can facilitate price discrimination. Perry and Groff (1983a,b) show that vertical integration by a monopolist or oligopolists into a monopolistically competitive downstream stage can lower welfare.

Some or all of these cases are often cited as proverbial footnotes to the primary textual theme that vertical mergers are beneficial. For example, Bork (1978) dismisses the variable proportions literature as having "... no force in the broader context of the vertical mergers the law is preventing."[2] Warren-Boulton (1978) concludes, "[t]here has been too little regard for the efficiency incentives for vertical control, and too much emphasis on the amorphous concept of 'foreclosure'."[3]

To be sure, some antitrust interventionists are not willing to concede the point. Scherer argues that vertical mergers might raise entry barriers by making entry at only one stage infeasible.[4] The Department of Justice Antitrust Guidelines express a similar concern.[5] This distinction between the effect of vertical mergers on potential competitors and the effect on existing competitors is, however, completely artificial. In the absence of a theory of how vertical mergers can be harmful to competition by harming existing unintegrated competitors, concern about raising entry barriers is unwarranted. Scherer also cites some cases in which vertical integration appeared to be harmful. Yet, a skeptic's response to those cases would be that the vertical integration hurt competitors rather than competition.

Warren-Boulton's claim notwithstanding, foreclosure is not an amorphous concept. It occurs when unintegrated producers face an increase in the price of a complementary good. For a downstream producer, foreclosure means an increase in the price of an input. For an upstream producer, it means an increase in the difference between the downstream and the upstream price. At times, harm to firms created by increased competition has been misdiagnosed as foreclosure. Thus, concern that allegations of foreclosure are used to protect competitors rather than competition is well-founded. Nevertheless, actual foreclosure is harmful to competition.

One paper that deals explicitly with foreclosure is Allen (1971). He argues that while a vertical merger might cause some supply of an intermediate good or service to be removed from the market, it also causes an equal reduction in demand. Under such circumstances, the merger does not affect the equilibrium price of the intermediate good or service.

Allen's argument is based on the assumption that the intermediate good market is perfectly competitive. Most interesting antitrust questions arise, however, when markets are oligopolistic. Thus, the result that foreclosure does not occur when intermediate markets are competitive should not create the slightest presumption that foreclosure cannot occur.

Salinger (1985) shows that with fixed proportions technology in the production of a homogeneous final good and Cournot equilibria at both stages of production, a vertical merger can cause the price of the final good to increase. This increase is due to an increase in the price of the intermediate good, which makes the unintegrated producers less competitive. In that model, therefore, a vertical merger can cause market foreclosure, which in turn can cause a reduction in competition.

This paper presents another model in which vertical mergers can be harmful. The model is designed to capture the essential elements described in the first paragraph. A differentiated upstream duopoly sells to a downstream monopolist. The paper analyzes the effect of a merger between one of the upstream brands and the downstream monopolist.

The remainder of the paper is organized as follows. Section II presents the model with general demand curves. While it shows that a vertical merger cannot cause both the price of the merging brand to increase and the price of the remaining unintegrated brand to decrease, an increase in the price of both brands cannot be ruled out. Section III solves the model for linear demand curves in closed form and presents a numerical example in which a vertical merger causes the prices of both goods to increase. Section IV discusses functional forms for estimating the model. Section V contains some concluding comments.

II

General Case

Consider a two stage production process in which there are two upstream producers, whose products are differentiated, and a downstream monopolist. The downstream stage can be thought of as a distribution stage.

The demands for the two goods are given by:

$$(1) \quad Q_1 = Q_1(P_1,P_2) \qquad \frac{\partial Q_1}{\partial P_1} < 0 \quad \frac{\partial Q_1}{\partial P_2} > 0$$

$$(2) \quad Q_2 = Q_2(P_1,P_2) \qquad \frac{\partial Q_2}{\partial P_1} > 0 \quad \frac{\partial Q_2}{\partial P_2} < 0$$

where P_i and Q_i represent the price and quantity of good i respectively.

The downstream firm has to be a monopolist only in the sense that it is the sole seller of the two particular brands in question. Other upstream brands and downstream firms can exist, provided that the "monopolist" has an exclusive contract to handle the two upstream brands that are being modeled explicitly. If so, equations (1) and (2) represent residual demand curves, which embody assumed reaction functions as well as pure demand effects.

To clarify the exposition, assume that the final stage monopolist merely purchases and resells the intermediate good without incurring any additional costs. Extending the model to allow for more general cost conditions is trivial.

Let w_1 and w_2 be the prices for the upstream goods. How they are set is not important, provided that w_1 exceeds marginal cost (c_1). The profits of the downstream monopolist (Π) are given by:

$$(3) \quad \Pi = (P_1 - w_1)\, Q_1(P_1,P_2) + (P_2 - w_2)\, Q_2(P_1,P_2)$$

Now suppose the producer of good 1 merges with the downstream monopolist. Assuming constant returns to scale upstream, the profits of the new firm, Π', are given by:

(4) $\Pi' = (P_1 - c_1)\, Q_1(P_1,P_2) + (P_2 - w_2')\, Q_2(P_1,P_2)$,

where w_2' is the upstream price charged by the producer of brand 2 after the merger.

Equations (3) and (4) differ in two ways. First, the vertical merger causes the demand curve facing the producer of brand 2 to shift, which in turn might induce it to change w_2.[6] For the remainder of the formal analysis in this paper, however, assume that w_2 does not change. This assumption does not alter the qualitative conclusions of the paper. Second, before the merger, the vertically integrated firm must pay w_1 for good 1; after the merger, it gets good 1 for marginal cost. Thus, given the assumption that $w_2' = w_2$, we can analyze the merger by evaluating the effect of a reduction in w_1 on P_1 and P_2.

The first order conditions for profit maximization are:

(5) $$\frac{\partial \Pi}{\partial P_1} = Q_1 + (P_1 - w_1) \frac{\partial Q_1}{\partial P_1} + (P_2 - w_2) \frac{\partial Q_2}{\partial P_1} = 0.$$

(6) $$\frac{\partial \Pi}{\partial P_2} = Q_2 + (P_1 - w_1) \frac{\partial Q_1}{\partial P_2} + (P_2 - w_2) \frac{\partial Q_2}{\partial P_2} = 0.$$

The second order conditions for a maximum are:

(7) $$\frac{\partial^2 \Pi}{\partial P_1^2} < 0.$$

(8) $$\frac{\partial^2 \Pi}{\partial P_1^2} \frac{\partial^2 \Pi}{\partial P_2^2} - \left(\frac{\partial^2 \Pi}{\partial P_1 \partial P_2}\right)^2 > 0.$$

Totally differentiating (5) and (6) with respect to w_1 generates two equations, which can be written in matrix form as follows:

$$(9) \quad \begin{bmatrix} \frac{\partial^2 \Pi}{\partial P_1^2} & \frac{\partial^2 \Pi}{\partial P_1 \partial P_2} \\ \frac{\partial^2 \Pi}{\partial P_1 \partial P_2} & \frac{\partial^2 \Pi}{\partial P_2^2} \end{bmatrix} \begin{bmatrix} \frac{\partial P_1}{\partial w_1} \\ \frac{\partial P_2}{\partial w_1} \end{bmatrix} = \begin{bmatrix} \frac{\partial Q_1}{\partial P_1} \\ \frac{\partial Q_1}{\partial P_2} \end{bmatrix}$$

Solving (9) for $\partial P_1/\partial w_1$ and $\partial P_2/\partial w_1$ yields:

$$(10) \quad \frac{\partial P_1}{\partial w_1} = \frac{1}{D} \left[\frac{\partial^2 \Pi}{\partial P_2^2} \frac{\partial Q_1}{\partial P_1} - \frac{\partial^2 \Pi}{\partial P_1 \partial P_2} \frac{\partial Q_1}{\partial P_2} \right]$$

$$(11) \quad \frac{\partial P_2}{\partial w_1} = \frac{1}{D} \left[\frac{\partial^2 \Pi}{\partial P_1^2} \frac{\partial Q_1}{\partial P_2} - \frac{\partial^2 \Pi}{\partial P_1 \partial P_2} \frac{\partial Q_1}{\partial P_1} \right]$$

where $D = \frac{\partial^2 \Pi}{\partial P_1^2} \frac{\partial^2 \Pi}{\partial P_2^2} - (\frac{\partial^2 \Pi}{\partial P_1 \partial P_2})^2$.

Because the merger effectively lowers w_1, it lowers (raises) P_1 if (10) is positive (negative). Similarly, it lowers (raises) P_2 if (11) is positive (negative). Equation (8) says that D is positive. Equations (1), (7), and (8) imply that the first term in the brackets in equation (10) is positive. If $\partial^2\Pi/(\partial P_1 \partial P_2) \leqq 0$, then the second term is non-negative. Because $\partial^2\Pi/(\partial P_1 \partial P_2)$ can be positive, however, the sign of (10) is indeterminate. Similarly, equations (1) and (7) imply that the first term in (11) is negative. If $\partial^2\Pi/(\partial P_1 \partial P_2) \leqq 0$, the second term is non-positive. Again, however, the sign of (11) is indeterminate because $\partial^2\Pi/(\partial P_1 \partial P_2)$ can be positive.

The one case that cannot happen is $\frac{\partial P_1}{\partial w_1} \leqq 0$ and $\frac{\partial P_2}{\partial w_1} \geqq 0$. Rearranging equation (10), $\partial P_1/\partial w_1 \leqq 0$ implies:

$$(12)\quad \frac{\partial^2\Pi}{\partial P_1 \partial P_2} \gtreqless \frac{\partial^2\Pi}{\partial P_2^2} \frac{\partial Q_1}{\partial P_1} \Big/ \frac{\partial Q_1}{\partial P_2}$$

From (11), $\partial P_2/\partial w_1 \geqq 0$ implies:

$$(13)\quad \frac{\partial^2\Pi}{\partial P_1 \partial P_2} \gtreqless \frac{\partial^2\Pi}{\partial P_1^2} \frac{\partial Q_1}{\partial P_2} \Big/ \frac{\partial Q_1}{\partial P_1}$$

If $\partial^2\Pi/(\partial P_1 \partial P_2)$ is positive, equations (12) and (13) imply:[7]

$$(14)\quad \left(\frac{\partial^2\Pi}{\partial P_1 \partial P_2}\right)^2 \geqq \frac{\partial^2\Pi}{\partial P_1^2} \frac{\partial^2\Pi}{\partial P_2^2}$$

Equation (14) violates the second order condition in equation (8).

These results have intuitive explanations. Holding P_2 at its pre-merger level, the reduction in w_1 causes the downstream monopolist to reduce P_1. This effect of the merger is due to the elimination of the double mark-up in successive monopoly. I will refer to it as the successive monopoly effect. Holding P_1 at its pre-merger level, a reduction in w_1 causes the downstream monopolist to increase P_2 to induce customers to switch to good 1. I will refer to this effect as the foreclosure effect.

The term $\partial^2\Pi/(\partial P_1 \partial P_2)$ describes the shift in each first order condition due to a change in the other price. For example, if $\partial^2\Pi/(\partial P_1 \partial P_2)$ is positive, then an increase in P_2 causes $\partial\Pi/\partial P_1$ to shift up. Because $\partial\Pi/\partial P_1$ is a declining function of P_1, the upward shift causes $\partial\Pi/\partial P_1$ to equal 0 at a higher value of P_1. When $\partial^2\Pi/(\partial P_1 \partial P_2) \neq 0$, the reduction in P_1 due to the successive monopoly effect causes an additional change in P_2. This effect can be labeled the "competitive" effect, because it is due to increased competition from brand 1. Similarly, the increase in P_2 due to the foreclosure effect causes an additional change in P_1. This effect can be termed the "anti-competitive" effect.

When $\partial^2\Pi/(\partial P_1 \partial P_2)$ is positive,[8] the competitive effect causes P_2 to drop while the anti-competitive effect causes P_1 to increase. Because the effects go in the opposite direction of the foreclosure and successive monopoly effects, the signs of (10) and (11) are indeterminate. When $\partial^2\Pi/(\partial P_1 \partial P_2)$ is negative, the competitive effect and anti-competitive effects reinforce the foreclosure and the successive monopoly effects. Thus, $\partial^2\Pi/(\partial P_1 \partial P_2) < 0$ is sufficient for $\partial P_1/\partial w_1$ to be positive and $\partial P_2/\partial w_1$ to be negative.

Suppose the competitive effect dominates the foreclosure effect or, in other words, P_2 drops. In that case, the merger has a successive monopoly and a competitive effect on good 1. P_1 must drop since both effects go in the same direction. Thus, $\partial P_2/\partial w_1 > 0$ implies $\partial P_1/\partial w_1 > 0$, which is the result that was established by equation (14).

While a simultaneous increase in P_1 and decrease in P_2 as a result of a vertical merger can be ruled out on theoretical grounds, section III demonstrates that it is not possible to rule out $\partial P_2/\partial w_1 > 0$ or $\partial P_1/\partial w_1 < 0$. Thus, a vertical merger can have one of three effects. When the competitive effect outweighs the foreclosure effect, both P_1 and P_2 drop. The merger unambiguously benefits consumers in that case. On the other hand, if the anti-competitive effect dominates the successive monopoly effect, both prices increase. Thus, it is theoretically possible that the merged entity makes the unintegrated brand sufficiently uncompetitive that it raises the price of its own brand over the premerger level. Finally, in the intermediate case, the price of one brand drops while the price of the other brand increases. The welfare implications of that case are, of course, ambiguous.

III

Linear Case

The failure to prove that a vertical merger must cause P_1 to drop is not a proof that a vertical merger can cause P_1 to increase. The same point applies to the effect of the merger on P_2. This section solves the model in closed form for linear demand curves. The solution makes it obvious that a vertical merger can cause P_2 to drop or to rise. I then present a numerical example in which a vertical merger causes P_1 to increase.

The demand curves can be written as:

(15) $Q_1 = a_1 - b_{11}P_1 + b_{12}P_2 \qquad b_{11},b_{12} > 0$

(16 $Q_2 = a_2 + b_{21}P_1 - b_{22}P_2 \qquad b_{21},b_{22} > 0$

The profits of the downstream monopolist are:

(17) $\Pi = (P_1-w_1)(a_1-b_{11}P_1+b_{12}P_2) + (P_2-w_2)(a_2+b_{21}P_1-b_{22}P_2)$

The first order conditions are:

(18) $\dfrac{\partial\Pi}{\partial P_1} = a_1 - 2b_{11}P_1 + (b_{12}+b_{21})P_2 + b_{11}w_1 - b_{21}w_2 = 0$

(19) $\dfrac{\partial\Pi}{\partial P_2} = a_2 - 2b_{22}P_2 + (b_{12}+b_{21})P_1 + b_{22}w_2 -b_{12}w_1 = 0$

Solving (18) and (19) for P_1 and P_2 we get:

$$(20)\ P_1 = \frac{1}{D'}\ [k_1 + (2b_{11}b_{22}-b_{12}{}^2-b_{12}b_{21})w_1$$

$$+ b_{22}(b_{12}-b_{21})w_2]$$

$$(21)\ P_2 = \frac{1}{D'}\ [k_2 + (2b_{11}b_{22}-b_{21}{}^2-b_{12}b_{21})w_2$$

$$+ b_{11}(b_{21}-b_{12})w_1]$$

where: $D' = 4b_{11}b_{22} - (b_{12}+b_{21})^2$

$k_1 = 2b_{22}a_1 + (b_{12}+b_{21})a_2$

$k_2 = 2b_{11}a_2 + (b_{12}+b_{21})a_1$

From (21), it is obvious that $\partial P_2/\partial w_1$ can be positive, zero, or negative depending on whether b_{21} is greater than, equal to, or less than 0.

To see that $\partial P_1/\partial w_1$ can be negative, consider the following demand curves:

$$(22)\ Q_1 = 10-50P_1 + 15P_2.$$

$$(23)\ Q_2 = 10 + P_1 - 2P_2.$$

Substituting the parameters into (20) and (21), we get:

$$(24)\ P_1 = \frac{25}{18} - \frac{5}{18}\,w_1 + \frac{7}{36}\,w_2$$

$$(25)\ P_2 = \frac{145}{18} - \frac{175}{18}\,w_1 + \frac{73}{18}\,w_2$$

This example establishes that it is possible for a vertical merger to cause both prices to increase.

To examine this example further, substitute (24) and (25) into (22) and (23) to get:[9]

$$(26)\ Q_1 = \frac{1105}{18} - \frac{2125}{36} w_1 + \frac{170}{18} w_2.$$

$$(27)\ Q_2 = -\frac{17}{36} + \frac{170}{18} w_1 - \frac{85}{36} w_2.$$

While the merger causes the price of good 1 to increase, the negative coefficient on w_1 in (26) indicates that it causes the output of good 1 to increase as well. Thus, the increase in P_1 is not due to a restriction of output of good 1. Rather, the increase in P_2 makes it possible to increase P_1 and Q_1 simultaneously.

IV

Estimating the Model

Sections II and III established that a vertical merger between one upstream brand and a downstream monopolist selling competitive brands can have one of several effects, ranging from causing a decrease in all prices to causing an increase in all prices. For analyzing individual mergers, it would be useful to identify the conditions under which each of the effects occurs. In addition, in formulating a general policy toward vertical mergers, it would be useful to know which effect is most likely.

A natural approach might seem to be to solve the constant elasticity case. One could then estimate demand elasticities and cross-elasticities to predict the effect of a particular merger. Also, by solving for the range of elasticities and cross-elasticities that generates each of the three possible effects, one might get a sense of which effect is most likely.

Unfortunately, this approach has a severe limitation. Given constant elasticity (and cross-elasticity) demand curves, $\partial^2\Pi/(\partial P_1 \partial P_2)$ is always negative. As was demonstrated in section II, that condition is sufficient for $\partial P_1/\partial w_1$ to be positive and $\partial P_2/\partial w_1$ to be negative. Thus, if one estimated demand elasticities and cross-elasticities and then tried to predict the effect of a merger, one would necessarily conclude that P_1 would drop and P_2 would increase. Estimating demand elasticities to ascertain the direction of the effect of a particular merger would make no sense, therefore, since the assumption of constant elasticities rules out two of the three possible cases.

In section III, we showed that with linear demand curves, each of the three general effects can occur. Thus, one might estimate demand curves using a linear functional form. With linear demands, equations (20) and (21) indicate that P_1 drops and P_2 is unchanged when $b_{12} = b_{21}$. A basic result of consumer theory is that the matrix of substitution terms is symmetric. Hence, in the absence of income effects, $b_{12} = b_{21}$. Since most goods constitute a relatively small fraction of a consumer's budget, income effects are often quite small. Thus, estimating linear demand curves and substituting the parameters into (20) and (21) will generally lead to the conclusion that a vertical merger will be beneficial.

This approach would not be misguided if significant income effects were necessary for a merger to have anti-competitive effects. To see whether this is the case, substitute the second derivatives of the profit function into (10) and (11):

$$(28)\ \frac{\partial P_1}{\partial w_1} = \frac{1}{D}\ \{\frac{\partial Q_1}{\partial P_1}\ [2\ \frac{\partial Q_2}{\partial P_2} + (P_1 - w_1)\ \frac{\partial^2 Q_1}{\partial P_2^2}$$

$$+ (P_2-w_2) \frac{\partial^2 Q_2}{\partial P_2^2}] - \frac{\partial Q_1}{\partial P_2} [\frac{\partial Q_1}{\partial P_2} + \frac{\partial Q_2}{\partial P_1}$$

$$+ (P_1-w_1) \frac{\partial^2 Q_1}{\partial P_1 \partial P_2} + (P_2-w_2) \frac{\partial^2 Q_2}{\partial P_1 \partial P_2}]\}$$

$$(29) \quad \frac{\partial P_2}{\partial w_1} = \frac{1}{D} \{\frac{\partial Q_1}{\partial P_2} [2 \frac{\partial Q_1}{\partial P_1} + (P_1-w_1) \frac{\partial^2 Q_1}{\partial P_1^2}$$

$$+ (P_2-w_2) \frac{\partial^2 Q_2}{\partial P_1^2}] - \frac{\partial Q_1}{\partial P_1} [\frac{\partial Q_1}{\partial P_2} + \frac{\partial Q_2}{\partial P_1}$$

$$+ (P_1-w_1) \frac{\partial^2 Q_1}{\partial P_1 \partial P_2} + (P_2-w_2) \frac{\partial^2 Q_2}{\partial P_1 \partial P_2}]\}$$

With linear demand curves, all of the terms containing second derivatives of the demand curves are zero. There is no reason to believe that those terms are small relative to the terms that depend only on the first derivatives. Indeed, in the constant elasticity case, equation (28) is positive even when the sum of the terms that have only first derivatives is negative. Similarly, equation (29) is always negative even when the sum of the terms that have only first derivatives is positive. Thus, the assumption of linear demand curves appears to be overly restrictive.

A third approach is to estimate quadratic demand curves. Such estimates would provide all the demand parameters needed to determine the effects of a small change in w_1. Thus, of these three approaches, estimating quadratic demand curves is the most promising.

V

Conclusions

The theoretical case that vertical mergers result in lower prices is not nearly as compelling as the existing literature would lead one to believe. While the elimination of successive mark-ups lowers prices, a vertical merger can also have a foreclosure effect that increases prices. The prevailing view that vertical mergers are beneficial is based on models that ignore this effect. The models in this paper and in Salinger (1985) demonstrate that the foreclosure effect can dominate the elimination of the double mark-up.

Section IV discussed one way to determine whether this theoretical possibility can actually occur. One might estimate demand curves to see whether the conditions under which vertical mergers are harmful seem to exist.

Before using this approach, however, it would be important to recognize the effects ignored by this model. For example, the model is based on the assumption that the vertical merger does not affect w_2. Also, if other downstream producers exist, a vertical merger might cause the second brand to switch to another downstream firm or at least to threaten to switch.[10] The availability of alternative downstream producers limits the amount of damage that the merged firm can inflict on the unintegrated brand. These additional considerations, along with the difficulty in estimating residual demand curves with any precision, severely limit the potential usefulness of this procedure.

Fortunately, a much simpler approach is available. The theory that vertical mergers are beneficial has the refutable prediction that vertical mergers cause prices to drop. That prediction can be tested by examining how prices change when a vertical merger occurs. In addition, cross sectional evidence might be available when vertical market structure varies across different local markets.[11]

Testing these theories requires good price data. In addition, controlling for other factors is likely to be difficult in both time series and cross-sectional studies. Nevertheless, vertical mergers are now nearly per se legal. While that policy might be appropriate, even imperfect supporting evidence would help bolster its shaky theoretical underpinnings. By the same token, conflicting evidence might induce the FTC, the Justice Department, and the courts to modify their stance.

Footnotes

1. *Brown Shoe Co. v. United States*, 370 U.S. 294, 1962.

2. Bork (1978), pp. 230-1.

3. Warren-Boulton (1978), p. 169.

4. Scherer (1980), pp. 303-6.

5. "Merger Guidelines Issued by Justice Department, June 14, 1984, and Accompanying Policy Statement," *Antitrust & Trade Regulation Reporter*, June 14, 1984. Despite this point in the Guidelines, the Justice Department and the Federal Trade Commission have taken a benign view of vertical mergers.

6. Since the demand curve shifts back, we might generally expect w_2 to drop. The demand curve does not, however, have to become more elastic as it shifts back, so w_2 can remain constant or even increase.

7. We only need to consider this case, since $\partial^2\Pi/(\partial P_1 \partial P_2) \leqq 0$ implies that (10) is positive and (11) is negative.

8. Under this condition, Bulow, Geanakopolos, and Klemperer (1985) refer to goods 1 and 2 as strategic substitutes.

9. The negative intercept in equation (27) might seem problematic. To be rigorous, the demand curves should be specified to rule out negative sales; and, in the optimization, the possibility of corner solutions at 0 output for one of the goods should be examined. Thus, equations (26) and (27) are not correct for those parameters under which they predict a negative output of either good. On the other hand, the negative intercept in (27) is not particularly troublesome because, for sufficiently high values of w_1, the outputs of both goods are positive.

10. In the case of soft drinks, a syrup producer must approve any transfer of its bottling franchise. Thus, a brand would be allowed to switch to another bottler if its current bottler was purchased by another syrup producer.

11. McBride (1983) uses time series/cross section data to test the effect of vertical mergers between cement and concrete producers on cement prices. While the effect on concrete prices is what ultimately matters, his finding that vertical mergers caused cement prices to drop means that they did not cause foreclosure. More studies of this type are needed to ascertain whether foreclosure is empirically important.

References

Allen, Bruce T. (1971). "Vertical Integration and Market Foreclosure: The Case of Cement and Concrete," Journal of Law and Economics, 14, April, pp. 251-274.

Bork, Robert H. (1978). The Antitrust Paradox: A Policy at War with Itself (New York: Basic Books).

Bulow, Jeremy I.; John D. Geanakopolos and Paul D. Klemperer (1985). "Multimarket Oligopoly: Strategic Substitutes and Complements," Journal of Political Economy, 93, June, pp. 488-511.

Mallela, Parthasaradhi and Babu Nahata (1980). "Theory of Vertical Control with Variable Proportions," Journal of Political Economy, 88, October, pp. 1009-1025.

McBride, Mark E. (1983). "Spatial Competition and Vertical Integration: Cement and Concrete Revisited," 73, December, pp. 1011-1022.

Perry, Martin K. (1978). "Price Discrimination and Forward Integration," Bell Journal of Economics, 9, Spring, pp. 209-217.

Perry, Martin K. and Robert H. Groff (1983a). "Forward Integration by a Monopolist into a Monopolistically Competitive Industry," mimeo.

Perry, Martin K. and Robert H. Groff (1983b). "Forward Integration by Oligopolists into a Monopolistically Competitive Industry," mimeo.

Salinger, Michael A. (1985). "Vertical Mergers and Market Foreclosure," First Boston Working Paper No. FB-84-17.

Scherer, F. M. (1980). Industrial Market Structure and Economic Performance, 2nd Edition (Boston: Houghton Mifflin Company).

Schmalensee, Richard (1973). "A Note on the Theory of Vertical Integration," Journal of Political Economy, 81, March/April, pp. 442-449.

Spengler, Joseph J. (1950). "Vertical Integration and Antitrust Policy," Journal of Political Economy, pp. 347-52.

Warren-Boulton, Frederick R. (1974). "Vertical Control with Variable Proportions," Journal of Political Economy, 82, August/September, pp. 783-802.

Warren-Boulton, Frederick R. (1978). Vertical Control of Markets. Cambridge: Ballinger.

Westfield, Fred M. (1981). "Vertical Integration: Does Product Price Rise or Fall?", American Economic Review, 71, June, pp. 334-346.