Further Thoughts on Critical Loss

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In a recent issue of *The Antitrust Source*, David Scheffman and Joseph Simons presented their views on critical loss, responding to our earlier article and a closely related article by Daniel P. O'Brien and Abraham L. Wickelgren.[1] In the interest of advancing the debate on the use of critical loss in merger analysis, and to avoid any unnecessary confusion, we take this opportunity to respond to—and correct—Scheffman and Simons.

We and they are both concerned with comparing the Actual Loss and Critical Loss faced by a hypothetical monopolist as part of a market definition exercise. In our earlier article, we showed that high observed margins strongly suggest that the hypothetical monopolist would face a small Actual Loss (i.e., demand would be unresponsive to a price increase). Scheffman and Simons assert that the process by which firms set prices is so complex and poorly understood that any such inference is unwarranted except in very special cases.

As two professors of business strategy who have worked extensively with private clients as well as served in the Antitrust Division of the Department of Justice, we are well aware that firms often take many factors into account in setting prices, and actual pricing is more complex than can be explained fully by any simple model. However, we believe that the application of powerful economic logic combined with a careful examination of the facts in each case can allow us to make considerable headway in defining appropriate relevant markets and avoiding serious mistakes. More specifically:

- Scheffman and Simons fail to appreciate the generality of the analysis that leads to an equilibrium relationship in which high margins indicate low Actual Loss. As we show below, this analysis can readily incorporate strategic reactions by rival suppliers and applies perfectly well to bidding and bargaining situations.
- The analysis is not completely general, of course, and there are situations in which the equilibrium relationship between margins and demand elasticity is more complicated than in the fundamental model. Scheffman and Simons point to the kinked demand model of oligopoly as an example where they claim our methods break down. However, as we show below, the fundamental logic that we developed in our earlier article still applies to that setting. This example illustrates a more general point: it is not enough to say that the world is complicated. Before abandoning fundamental economic logic, one must identify and examine the precise nature of the complexities and study how they affect behavior.

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We thank David Majerus, Steve Salop, and John Woodbury for comments on an earlier version of this paper.

[1] *See* David T. Scheffman & Joseph J. Simons, *The State of Critical Loss Analysis: Let's Make Sure We Understand the Whole Story*, Antitrust Source, Nov. 2003, http://www.abanet.org/antitrust/source/nov03/scheffman.pdf; Michael L. Katz & Carl Shapiro, *Critical Loss: Let's Tell the Whole Story*, Antitrust, Spring 2003, at 49; Daniel P. O'Brien & Abraham L. Wickelgren, *A Critical Analysis of Critical Loss Analysis*, 71 Antitrust L.J. 161 (2003).

- Scheffman and Simons are inconsistent in their treatment of the complexities of actual business behavior. In particular, if they really believe that pricing is so complex that there is little relationship between a firm's pricing and the elasticity of the demand that it faces, then it is rather odd that they would put any stock whatsoever in Critical Loss analysis. After all, of what relevance are Actual Loss and Critical Loss in a world where firms' pricing is heavily based on unspecified, unobserved factors that go well beyond the profitability of current sales?
- Ultimately what matters are competitive effects. A combination of high observed margins and large Diversion Ratios between the merging firms is problematic (but, of course, not conclusive) in terms of competitive effects, and the logic underlying this conclusion is extremely robust. The market definition exercise should use these basic economic principles to structure what is necessarily a fact-intensive inquiry.

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In the end, this is not a debate about the use of facts versus theory. It is about how to use facts and theory *together* to understand markets and competition. Our fundamental point is that evidence that is alleged to show high margins and a low Actual Loss should be viewed skeptically because it appears inconsistent with premerger profit maximization.

Recognizing a Fundamental Economic Relationship

We described in our article a simple but potentially misleading "Defendants' Story" that makes arguments based on Critical Loss to support a broad market definition. The story goes as follows: With high margins, the Critical Loss is small, and thus a price increase is likely to lead to an Actual Loss greater than the Critical Loss. Because the Actual Loss is greater than the Critical Loss, a hypothetical monopolist would not find it profitable to raise price, and thus the market definition should be broadened. We emphasized in our article that this story is very incomplete because a high margin tends to imply a small *Actual Loss* as well as a small Critical Loss.[2]

Our analysis builds upon the observation that a profit-maximizing firm with a high margin must expect to gain very little business from lowering its price because, otherwise, the firm would find it profitable to lower price to garner additional unit sales at what would still be a high margin.[3] In other words, high margins go hand-in-hand with a supplier's having a perceived demand curve that is unresponsive to price decreases (i.e., demand is relatively inelastic). Absent reason to believe that demand is much more sensitive to price increases than it is to price decreases (i.e., absent a "kink" in demand), demand will be similarly unresponsive to price *increases*. High margins thus suggest a low value for the Actual Loss. Indeed, the firm will choose a price that equates its perceived Actual Loss with its Critical Loss.

This conclusion has very powerful implications for market definition. The market definition exercise involves comparing the Actual Loss and the Critical Loss for a hypothetical monopolist. We have just explained why the Actual Loss for an individual competitor approximately equals the Critical Loss for small price changes. But the Actual Loss for the hypothetical monopolist gener-

[2] We also outlined a simple approach that uses the Aggregate Diversion Ratio, which is the percentage of the total sales lost by a product when its price rises that are captured by all of the other products in the candidate market. Specifically, we established conditions under which an Aggregate Diversion Ratio greater than the Critical Loss creates a presumption that the candidate product market is in fact a relevant antitrust market.

[3] We repeat our earlier warning that one must take care to measure incremental costs properly when computing margins.

ally is smaller than the Actual Loss for an individual competitor. Further study is needed, of course, to see if Actual Loss is less than Critical Loss for, say, a five- or 10-percent price increase by the hypothetical monopolist.[4]

Scheffman and Simons disagree with this application of economic logic. They agree (p. 5) with us that the Actual Loss for the hypothetical monopolist typically will be lower than for an individual competitor. Where they and we part company is with their rejection of the prediction that Actual Loss faced by an individual competitor is approximately equal to Critical Loss in equilibrium.[5] Instead, they make two claims. First, they assert that the prediction that Actual Loss equals Critical Loss is the consequence of a very particular economic model (i.e., differentiated, static, Bertrand pricing competition). Second, they assert that Actual Loss often is substantially larger than Critical Loss for an individual competitor, which makes it impossible to form strong predictions about the relationship between Actual Loss and Critical Loss for a hypothetical monopolist.

The claims made by Scheffman and Simons indicate a misunderstanding of both economic logic and what we have said. In what follows, we will address each of these claims in turn. First, we will show that the result that an individual competitor will operate where Actual Loss is equal to Critical Loss has much more general applicability than Scheffman and Simons appreciate. Second, we will show that they have overstated the importance of kinks in the demand curve in practice and they have mischaracterized how we would treat evidence of kinks.

Beyond Bertrand: Strategic Behavior, Bargaining, and More

Consider first the disagreement over the generality of the claim that, in equilibrium, a profit-maximizing supplier will operate where the Actual Loss is equal to Critical Loss. This equilibrium relationship can be expressed algebraically by what is known as the Lerner Equation. A supplier's profit margin is defined as the percentage markup of price, P, over incremental cost, C, and is expressed algebraically as

$$M = \frac{P - C}{P}.$$

Profit maximization implies an inverse relationship between the firm's price/cost margin and its perceived elasticity of demand E. That is, profit maximization implies that $M = 1/E$ in equilibrium, which is the Lerner Equation. The elasticity of demand faced by a hypothetical monopolist generally will be lower than the firm-specific elasticity of demand. This is the reason we stated (p. 52) "[w]hen gross margins are large, defense claims that the elasticity of demand is high should be treated with a healthy dose of skepticism."

Scheffman and Simons claim (p. 6) that our analysis here relies on a specific, simple model of pricing:

> [T]here are a number of reasons, both theoretical and empirical, as to why these models may not be valid in a given industry setting. This is not a failing of economic theory, it is a failing of models that are too simplistic to capture the reality of the "real world" profit maximization. This is the basis of our broader concern—i.e., does the simple model of pricing . . . accurately reflect actual pricing in the industry being investigated?

[4] As we showed in our earlier article, the Aggregate Diversion Ratio can be central to that inquiry.

[5] Scheffman and Simons claim (p. 5) that "the Lerner Equation is not necessarily the result of the assumption of profit maximization; rather, it is the result of the assumption of profit maximization *and* imposition of a simple model that imposes some strong conditions."

Contrary to the assertions of Scheffman and Simons, no particular model of oligopoly pricing is required for the Lerner Equation to apply.[6] In criticizing use of the Lerner Equation, Scheffman and Simons (p. 6) list a number of factors that affect pricing: "opportunity cost, bargaining leverage, relationships, competition, longer-run considerations, etc." All of these factors are accounted for in the Lerner Equation properly applied and interpreted.[7]

We believe that the central source of Scheffman and Simons' confusion is that they fail to appreciate the generality of the Lerner Equation as a statement about the equilibrium behavior of a profit-maximizing firm. The key to seeing the generality is to recognize that the demand curve facing a single firm acting unilaterally accounts for the responses that firm anticipates its rivals will make if it changes its price. The rivals' responses can come in the form of price changes, quantity changes, product quality changes, or some other competitive variable. Moreover, rivals' anticipated reactions can be the results of highly complex competitive interactions that take place over time. In other words, the firm-specific demand curve can be viewed as a summary of how an individual supplier perceives its competitive environment. With this understanding and clarification, the Lerner Index indeed reflects nothing more than profit maximization.[8] Scheffman and Simons accept that antitrust analysis generally proceeds from the assumption of profit maximization. Thus, the lynchpin to their criticism of our work, namely our use of the Lerner Index to infer Actual Loss from observed margins, loses its force.[9]

Whatever label one puts on it, the following logic is clear. When one observes a firm with a high margin, one can infer that—given all of the considerations that the firm has taken into account in making its pricing decision—it believes that lowering its price would not lead to sufficiently greater sales to increase its profits. In other words, the individual competitor perceives relatively inelastic demand if its margin is high.

One way to see just how general is the Lerner Index relationship is to go back to the old price leadership formula.[10] When setting its price, P, the price leader recognizes that rivals will likely respond to higher prices by producing more output. Call R the elasticity of supply of the rivals, K the elasticity of the underlying (standard, market) demand curve, and s the market share of the leader. The price leadership formula tells us that the elasticity of demand facing the price leader,

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[6] As noted in our earlier paper, we do rely on the standard Bertrand pricing model with differentiated products when deriving results based on the Aggregate Diversion Ratio.

[7] In what follows, we address bargaining leverage, relationships, competition, and long-run situations. Whether or not one uses the methods described our paper, one should be very careful about measuring margins for use in Critical Loss analysis in order properly to account for opportunity cost, long-run considerations, reputation, and other factors. For example, benefits accruing to long-run relationships or the effects of positive impacts on sales of complementary products should be taken into account and will raise measured margins.

[8] A bit of notation may help some readers appreciate the economic logic. The demand facing an individual competitor can be written as $D(p,r)$ where p is the firm's price and r is a vector representing the actions of rival suppliers, including their prices. Suppose that the firm expects the actions of its rivals to vary with p according to $r = f(p)$. Then the demand facing the firm can be written as a function solely of p, namely $d(p) = D(p,f(p))$. Using this reduced-form demand curve, the firm maximizes profits using the Lerner Equation $M = 1/E$.

[9] Scheffman and Simons recognize (p. 6) that their criticism of our approach is based on their view that the Lerner Index depends upon a particular simply model of pricing. "Again, remember that economic theory does tell us that AL is at least as large as CL. Only making some strong additional assumptions can we infer, as do the two papers, that AL is approximately equal to CL, which is the fundamental weakness of the two critiques of CLA."

[10] William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 Harv. L. Rev. 937 (1981).

E, is given by

$$E = \frac{K + (1 - s)R}{s}.$$ [11]

Profit-maximization then involves setting $M = 1/E$ as usual, following the Lerner Equation relationship. A high elasticity of market demand, K, a high elasticity of rival supply, R, or a small market share, s, all lead to a high firm-specific elasticity of demand facing the price leader, E, and thus a small margin. In other words, the demand curve facing a price leader accounts for changes in supply by rivals if the firm raises (or lowers) its price.

Scheffman and Simons appear to believe that the Lerner Equation fails to apply to markets with bidding or negotiation.[12] Again, they have taken an overly narrow view of the Lerner Equation. Indeed, a simple derivation shows how the Lerner Equation applies when prices are negotiated. In a negotiating situation, ultimately the supplier must form beliefs about how the probability of winning the business varies with its bid or with the floor on what price it is willing to accept. We can denote the supplier's belief about the probability of winning the business as $g(P)$, where g declines with price, P. This function plays the role of the demand curve facing the firm. Expected profits are given by $g(P)(P - C)$, where C is the incremental cost of serving this customer. Maximizing expected profits now leads to the Lerner Equation, where the elasticity of demand reflects the supplier's perceptions that a higher price is more likely to lead to a loss of this customer's business.[13] We realize this is not the only possible model of bargaining. However, it is a rather general reduced-form approach to bargaining, and it surely reflects the very general point that the profit-maximizing price offered by a seller negotiating with a potential buyer must reflect both the danger of losing the business by refusing to offer a lower price and the margin associated with any such lost business. Moreover, the model is readily extended to cover bidding in auctions as well.

Kinky Economics

Now consider Scheffman and Simons' second objection to the prediction that Actual Loss is equal to Critical Loss in equilibrium. Scheffman and Simons (p. 6) state that "the price elasticity might be significantly different for price increases than for price decreases." In other words, they evidently believe that kinks in the demand curve at premerger prices are common. They go on to say (p. 6):

> Thus, kinked demand or cost models are one reason why the Lerner Equation, and therefore the models of the two papers, will not lead to correct results but will nonetheless produce results that are consistent with economic theory. Although we agree with two papers that *theoretical* arguments based on kinks are *ad hoc*, actual behavior by customers and/or competitors may have the effect crudely equivalent to a "kink."

Apart from mentioning markets in which prices are negotiated, Scheffman and Simons appear to argue that kinks are common based on evidence relating price changes to costs changes. They

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[11] This expression is derived as follows. Call total output X, the leader's output Z, and the rivals' combined output Y. By definition, $Z = X - Y$. Differentiate this equation with respect to P, and then multiply by $-(P/Z)$ to turn the left-hand side into elasticity form. Multiple and divide the dX/dP term on the right-hand side by X, and the dY/dP term on the right-hand side by Y. Then replace X/Z by $1/s$ and Y/Z by $(1 - s)/s$.

[12] Scheffman and Simons assert (p. 7) that "In particular, the 'price' negotiated with a major customer . . . cannot be presumed to result from setting a margin approximating 1.0 divided by the price elasticity of demand of that customer."

[13] In this negotiation setting, the Aggregate Diversion Ratio corresponds to the *probability* that such lost business will go to other firms in the candidate relevant market.

state (p. 6): "Evidence consistent with the existence of a 'kink' is that significant changes in incremental costs do not get translated into changes in prices." (footnotes omitted) As they point out (footnote 22): "It was this apparent empirical fact that was one of the reasons that led some economists years ago to propose the kinked demand model."

We agree that evidence regarding the relative movements of costs and prices can be highly informative in a merger investigation. Following our proposed methods, such evidence might be used to overcome a presumption that Actual Loss for a single firm approximately equals Critical Loss. However, as we now explain, application of the classic kinked demand curve model of oligopoly pricing would tend to lead to the conclusion that the products sold by the firms in that oligopoly *do indeed* constitute a relevant market! We do not see how appealing to that theory is likely to support a finding of a broader relevant market.

Under the kinked-demand curve theory of oligopoly, the demand curve facing an *individual competitor* is more elastic for price increases than for price decreases and thus displays a kink at the prevailing, premerger price. The reason the firm-specific demand curve is kinked in this theory is that rivals will respond to any price decrease by the firm in question with their own price cuts, but they will not match or follow price increases.[14] With this oligopolistic behavior, price increases will cause the firm to be pricing above its rivals and thus will lead to sharp losses in sales (since the other firms are assumed to sell reasonably close substitutes), but price decreases will be partially followed or even matched and thus will capture few additional sales. This theory is unlikely to apply in situations where price cuts are very difficult for rivals to detect, since (rapid) detection is necessary for (rapid) matching. Therefore, the theory seems most likely to apply in cases where coordinated behavior is of relatively greater concern. This observation will be important below.

Under the kinked-demand curve theory of oligopoly pricing, then, the relatively elastic demand curve facing the firm in question for price increases is not relevant for the hypothetical monopolist, which would have the power to raise the prices of *all* of the oligopolists. Indeed, the elasticity of the demand curve facing the hypothetical monopolist (i.e., the elasticity of the industry demand curve) is no more elastic than the less elastic side of the kink in the individual firm's demand curve. There is no kink in the underlying industry demand curve. And the underlying industry demand curve is the one that is relevant for the hypothetical monopolist. The individual firm's demand curve has a kink at the prevailing price, P, but the market demand curve does not.

Bearing this key point in mind, let us ask how the market definition exercise would proceed in an industry in which pricing was explained by the kinked-demand curve theory of oligopoly.[15]

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[14] Clearly, this is one rather specific model of oligopoly behavior, and a controversial one at that. In discussing this model, we do not mean to elevate this oligopoly theory above others; we are responding to Scheffman and Simons, who relied on this particular theory. We do note, however, that the demand curve facing the firm under this theory, reflecting as it does the anticipated responses of rivals to any price changes the firm might make, is a good example of the reduced-form demand curve we discussed earlier.

[15] Some readers may find a formal model helpful at this point. Here is a sketch of one such model. Assume (for ease of illustration) that the differentiated oligopolists are symmetrically placed. Suppose that rivals are not expected to change their prices in response to an individual supplier's price increases, but introduce a variable, θ, that measures the fraction by which rivals are expected to match the individual supplier's price reductions. In other words, if one firm initiates a \$1 price cut, the other firms are expected follow by cutting their prices by \$ θ. In the polar case where $\theta = 0$, we are back to the Bertrand model of pricing, there is no kink, and our methods apply without the need for any adjustments. In the other polar case, $\theta = 1$, the firm-specific demand curve for price reductions proportionately tracks the industry demand curve, i.e., the demand curve facing the hypothetical monopolist. For any given value of θ between 0 and 1, there can be a premerger kinked-demand curve oligopoly equilibrium for a range of prices bounded below by the competitive (Bertrand equilibrium) price level and bounded above by a highest price level such that no firm would want to lower its price given the partial matching by its rivals. The larger is θ, the higher are prices consistent with equilibrium in this theory. For $\theta = 1$, the range of possible equilibrium prices ranges all the way up to the monopoly (joint profit maximizing) price level.

If price cuts are expected to be matched only loosely by rivals,[16] the kink is relatively mild, and we are back in the standard situation discussed in our original article. Alternatively, if price cuts are expected to be matched closely by rivals, the firms are effectively coordinating their prices prior to the merger. This coordination may be tacit, and quite legal, or it may be express, and in violation of the antitrust laws. Either way, however, it seems to be a reasonable presumption that the firms in the oligopoly collectively have already found it profitable to set prices above competitive levels. Indeed, the point of this theory is that the firms have been able to elevate prices above the non-cooperative level (one-shot Nash equilibrium) by establishing a pattern of behavior in which price cuts are quickly detected and matched. This tells us directly that the firms are engaged in at least some degree of premerger coordination. An important part of the merger inquiry will involve an assessment of whether the merger is likely to increase the danger that such coordination will either continue or become even stronger, moving the industry close to the cartel outcome. This inquiry is likely to focus on the collection of firms that are already coordinating, which suggests a relevant market consisting of those firms. Certainly the presence of successful premerger coordination by a group of oligopolists tends to support the conclusion that the products sold by those firms constitute a relevant market.

Scheffman and Simons also appear to believe that kinks are common in industries in which prices are negotiated rather than simply posted by sellers. We certainly agree that prices in many industries are negotiated, and we have personally been involved in quite a few mergers in industries where prices were negotiated. But we see no reason to believe that kinks are especially common in such industries.

We agree that a kink due to customer behavior would be present if the supplier were negotiating with a customer and the supplier were confident that the customer would pay, say $100, and also confident that any higher price would lead that customer to pick another supplier. In that situation, the demand curve presented by this customer to this supplier is highly inelastic for prices below $100, and highly elastic for prices above $100.[17] We again question how common these situations are in practice. We would consider it unusual in a negotiating situation for the seller to have such a sharp and clear view on how its probability of winning varies with the price it offers, with a sharp kink at $100. If this relationship is smooth, then so is the expected profit function, and there is no kink.

If the situation above were shown to apply in a particular case, we agree with Scheffman and Simons that a somewhat different analysis would be needed. In this example, the key question for market definition (and competitive effects) would be *why* the customer will pay $100 but no more to the supplier in question. If the reason is that the customer would switch to another firm in the candidate market, then we know directly that the hypothetical monopolist would find a price increase profitable. The optimal price for the hypothetical monopolist would be (just below) the price at which this customer would shift to some product outside the candidate market. But this inquiry is just a variation on the Aggregate Diversion Ratio analysis we have described. The probability that the customer who walks away from the negotiation when faced with a price greater than $100 will turn to another firm in the candidate market is precisely our Aggregate Diversion Ratio.

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[16] That is, if θ from the previous footnote is relatively low.

[17] The extreme case of this demand is a right-angle demand curve with a kink at the price of $100 and the quantity associated with the amount of business involved in this particular negotiation.

We are unaware of any reason to believe that customers *generally* will be much more responsive to price increases than to price decreases for small changes in prices. Remember, technically a "kink" requires there to be a discontinuous change in the elasticity of demand facing the firm at the premerger price level. More generally, for the single firm's Actual Loss to be much larger than the Critical Loss for small price increases requires the elasticity of demand facing that firm to rise very sharply with price. So, while we would not rule out such possibilities, we stand by our suggestion that there be a presumption against such a kink, albeit one that is rebuttable based on evidence from the actual market in question.[18]

High Margins and Diversion Ratios Create a Narrow-Market Presumption

Especially if the world is complex, it is best to focus on what changes due to a merger. Holding aside efficiencies and more generally how a management team may change the acquired firm's strategy, the big change in terms of competition is the internalization of what had been competition between the two firms. If Firm *A* raises price, a certain percentage of lost sales are captured by Firm *B*. By applying Firm *B*'s margin to these sales, we can estimate the impact on Firm *B*'s profits, which will be accounted for post-merger by the combined entity in setting the prices of Firm *A*'s products. This fundamental economic logic tells us, very generally, that the magnitude of the effect of the merger on price is likely to be greater, the larger is the product of the Diversion Ratio and the Gross Margin. This observation is valid regardless of all the myriad factors that affect the pricing of Firm *A*'s products and do not change due to the merger. The methods described in our earlier article use this logic at the market definition stage of the inquiry.[19] Comparing Aggregate Diversion Ratio to Critical Loss, one finds that higher Diversion Ratios and higher Gross Margins tend to lead to narrower markets.

There Is More to Merger Analysis than Market Definition

We wish to emphasize that our entire analysis was directed at the task of defining relevant markets. This task should not be confused with the assessment of likely competitive effects and efficiencies. Indeed, we are concerned that in horizontal merger cases antitrust litigation sometimes places too much weight on defining relevant markets rather than on assessing the likely competitive effects and efficiencies of a proposed merger. Evidence relevant to assessing competitive effects includes evidence that is typically not part of the market definition exercise as described in the Horizontal Merger Guidelines, such as the ability of small firms to expand production, product repositioning, entry conditions, and efficiencies. It is incorrect for Scheffman and Simons to say (p. 8) of our analysis that "information on incremental margins and evidence consistent with 'significant' cross elasticity of demand leads immediately to a (rebuttable) presumption that the merger is likely to be anticompetitive." The presumption we propose applies only to market definition.

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[18] As we pointed out in our earlier article, kinks in the cost curve can be analyzed similarly. Such kinks usually are associated with sharp capacity limits, in which case great care must be taken in properly measuring incremental cost for the purposes of calculating margins. Also, because the market definition exercise involved a non-transitory increase in price, it is appropriate to look at the cost curve over a non-transitory time period, which may well, depending upon the industry, permit increases in capacity to take place, so there would be no kink in the relevant cost curve.

[19] *See* Carl Shapiro, *Mergers with Differentiated Products*, ANTITRUST, Spring 1996, at 23, for a discussion of how to use this same fundamental logic to structure the inquiry into competitive effects.

Is Critical Loss Analysis Misused?

Finally, we observe that Scheffman and Simons state that

> in our experience at the FTC (and outside the FTC), we have rarely seen parties make "serious" claims about market definition based simply on high margins and a corresponding low Critical Loss. In the few instances in which they did so, FTC staff quickly disabused them of the utility of that argument. (p.4)

We are encouraged to hear this, and we hope that the FTC and the DOJ will indeed reject the simple "Defendants' Story" that we have criticized. Based on our experience, however, we remained concerned that the courts may be susceptible to that story.

We therefore encourage the antitrust community to clarify this point to help courts properly use critical loss analysis in future merger cases. If this debate helps prevent the future misuse of critical loss analysis in litigated merger cases (e.g., by making it much harder for economic experts testifying on behalf of the merging parties to misuse critical loss analysis) we will consider this entire interchange highly productive. ●

Erratum

The formula in note 33 in our article (*Antitrust*, Spring 2003, at 49) giving a starting point for the predicted post-merger price increase is incorrect. We regret this error. With linear demand, the correct formula is given by

$$\frac{MD}{2(1-D)}.$$

With constant elasticity demand, the correct formula is given by

$$\frac{MD}{(1-M-D)}.$$

Derivations of these formulas are available at http://faculty.haas.berkeley.edu/shapiro. A discussion of these formulas can be found in Carl Shapiro, *Mergers with Differentiated Products*, *Antitrust*, Spring 1996, at 23.