The State of Critical Loss Analysis:
Let's Make Sure We Understand the Whole Story

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Over the past several years, what has come be to known as Critical Loss Analysis (CLA) has played an increasingly important role in antitrust. However, recent articles by prominent antitrust economists, Michael Katz and Carl Shapiro, and Daniel O'Brien and Abraham Wickelgren (two papers), appear to question the validity of that role.[1] We believe that these critiques of CLA might be misread as to its basic utility and applicability. Our goal here is to put Critical Loss Analysis in context. The significance and generality of CLA lies in its ease of practical application and from the fact that it is merely "arithmetic" based on the assumption that a rational firm will not change price unless it expects, as a result, that its profits will not fall. CLA is independent of any particular theoretical model of pricing. The analyses advanced in these two papers, on the other hand, depend on the applicability of their (too simplistic, in our view) economic models to the facts of a particular merger and industry.

A Short History of Critical Loss Analysis

Almost every merger investigation that has been conducted by the Federal Trade Commission and the Department of Justice over the last several decades has involved a determination of whether various products are sufficiently close substitutes to justify including them in the same relevant antitrust market. For many years, this often determinative question of how to bound the market was answered without any degree of rigor. Courts generally stated that the question turned on the extent of the cross-elasticity of demand or the reasonable interchangeability of the products in question. Unfortunately, nowhere was there a suggestion as to how high the cross-elasticity must be or how much interchangeability was reasonable.

This unfortunate state of affairs began to change with the issuance of the Department of Justice 1982 Merger Guidelines and their articulation of a hypothetical monopolist paradigm. This paradigm answers the question of how to bound the market. That is, an antitrust market should be no broader than the group of products and geographic areas such that a single seller of those products in those areas would find it profitable to impose a small, but significant and non-transitory price increase.

[1] 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. 161–84 (2003). *See also* James Langenfeld & Wenqing Li, *Critical Loss Analysis in Evaluating Mergers*, 46 ANTITRUST BULL. 299 (2001).

The test was first criticized as non-operational and too theoretical. But within a relatively short time, it became obvious that the implementation of the hypothetical monopolist test could be facilitated with a very basic type of "break-even" analysis.[2] In other words, the Guidelines' market definition paradigm required only some basic arithmetic, first described in an article by Harris and Simons, who termed it "Critical Loss Analysis."[3] Subsequently, Critical Loss Analysis has been widely used by both the Federal Trade Commission and the Department of Justice, and in many litigated cases.

It is now well recognized that CLA is also very useful for assessment of competitive effects. For example, coordinated interaction theories may focus on whether a group of specific competitors (rather than all competitors) would find it possible to raise their prices even though competitors outside the group would not participate in "coordination." CLA is the analysis relevant to answering this question. Similarly, if different competitors have substantially different costs and/or face substantially different Actual Losses arising from a coordinated price increase, CLA might demonstrate that some competitors would not find it in their interest to participate in a coordinated price increase. Finally, CLA analysis is also useful in assessing unilateral effects theories.[4] The primary focus of the two papers that we discuss here is unilateral effects analysis rather than market definition. As we discuss below, we have significant disagreements with the papers with respect to both market definition and unilateral effects analysis.

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It's Just "Arithmetic"

The two papers raise concerns on our part that readers might misinterpret the implication of those articles as to the utility of CLA—possibly by losing sight of what is merely "arithmetic" (and indisputable) and what is theory (which requires factual support in order to be applied). One of the greatest strengths of CLA is that it is "just arithmetic," and completely neutral as to the appropriate theoretic model that best explains any real life market.[5] In our experience, perhaps because of equations and diagrams in various papers discussing CLA, some merger analysts mistakenly believe that CLA is based on economic theory, beyond the simple assumption of profit-maximization.

In short, CLA involves the following three steps:

1. Estimate the incremental margin and calculate the volume the hypothetical monopolist would have to lose to make the hypothesized price increase unprofitable (the "Critical Loss" or "CL");

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[2] Gregory J. Werden, *The 1982 Merger Guidelines and the Ascent of the Hypothetical Monopolist Paradigm*, 71 Antitrust L.J. 253, 266 (2003) (An early criticism of the 1982 Merger Guidelines approach to market delineation was that it could not be rigorously applied through the analysis of data. It was quickly realized, however, that the criticism was dead wrong. The hypothetical monopolist paradigm can be implemented in an entirely straightforward manner through a "critical elasticity of demand" or "critical loss" analysis" (footnotes omitted).)

[3] Barry C. Harris & Joseph J. Simons, *Focusing Market Definition: How Much Substitution Is Enough*? 12 Research in L. & Econ. 207 (1989).

[4] *See* David Scheffman, "Critical Loss" Analyses, Presentation to EU Merger Task Force (2003), http://www.ftc.gov/speeches/other/criticalloss.pdf [hereinafter Scheffman, "Critical Loss" Analyses.]

[5] We are concerned that footnote 5 of O'Brien and Wickelgren, *supra* note 1, may cause some confusion ("Our criticism is directed at the application of the formula without regard to whether the assumptions and conclusions in the application are consistent with standard economic theory"). There is *no* issue whether CL Analysis is right (again, it is just arithmetic). In particular, it is quite consistent with economic theory for Actual Loss to be significantly greater than Critical Loss, even when incremental margins are large. However, the two papers use simple models of pricing to argue that such a result should be presumed unlikely.

2. Separately determine as a factual matter what the Actual Loss in volume is likely to be as a result of the hypothesized price increase (the "Actual Loss" or "AL");[6] and
3. Compare estimates of Actual Loss with Critical Loss. If the former is larger than the latter, then the market must be expanded.

We illustrate basic CLA in the following example. We provide this example to make clear that CL Analysis does not involve economics equations or diagrams—it is just arithmetic. Suppose that you are a middleman who resells widgets. You purchase widgets for $5 a piece and you have no other costs of reselling widgets. Suppose you are able to resell widgets at retail at $10, i.e., you make a margin of $5 per widget, and you are currently selling 100 units. Suppose, finally, that you have not changed the retail price for quite awhile, and you are thinking about raising the retail price by $1 to $11. Would that raise your profits? Obviously, if your sales would remain at 100 units, the $1 price increase would increase your profits by $100. However, it is likely that at least some retail widget customers will reduce their purchases in the short and/or long run as a result of the 10 percent price increase. Given your prices and margins, the extent of sales lost due to the $1 price increase determines the impact of the price increase on profits. Suppose, for example, you lose sales of 10 widgets when you increase the price by $1. Profits before the price increase were $500 ($5 per unit for 100 units). After the price increase, profits will be $540 ($6 per unit for 90 units). In this case the price increase of $1 would increase profits by $40. However, notice that if sales fell to 83 units or lower, the price increase would lower profits to $498 or less.

This simplicity and ease of practical application is the reason why Critical Loss Analysis has been readily "adopted" by courts and used frequently by the federal antitrust agencies.

Note that we need no equations or graphs, and there are no elements of economic theory in the calculation. It is simply arithmetic.[7] In the example, CL is 17 units (a post price increase level of sales of 83). That is, for a price increase from $10 to $11, if sales in fact fall by 17 or more (17 percent or more) units (i.e., if the AL is at least 17 units or 17 percent), the price increase will lower profits to $498 or less. It is important to be clear that the CL arithmetic tells you nothing about what the magnitude of the Actual Loss would be. That determination must come from evidence bearing on what customers would actually do in response to a price increase. However, the two papers would impose simple pricing theory to make presumptions about Actual Loss—i.e., move from just arithmetic to (simplistic) theory. In our view this is a mistake.

Because CLA is just arithmetic and the arithmetic identifies factual issues highly relevant to the determination of market definition and potential competitive effects—facts that a fact finder or decision maker can resolve (incremental margin and AL)—CLA is highly practical.[8] This simplicity and ease of practical application is the reason why Critical Loss Analysis has been readily "adopted" by courts and used frequently by the federal antitrust agencies. As discussed above, the key factual issues are: (1) what is the (incremental) margin on sales at the current level and "new" level

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[6] This cannot be determined from incremental margin. It must be determined from evidence bearing on the responsiveness of sales to prices, i.e., from the "demand side."

[7] We have found that for many attorneys (and MBA students) going through the CLA with a simple Excel spreadsheet is more illuminating that using equations or formulas. For a discussion of CLA with simple spreadsheets, see Scheffman, "Critical Loss" Analyses, *supra* note 4. A spreadsheet version is available from the author.

[8] In addition, analyses equivalent to Critical Loss Analysis (generally called, "break-even," or "stay even" analyses) have long been taught in marketing courses and are widely used by businesses in considering the financial implications of changing prices. *See, e.g.*, Sam R. Goodman, Techniques of Profitablility Analysis 43 (1970); Thomas T. Nagle, The Strategy & Tactics of Pricing 28–57 (1987). The actual use of analyses equivalent to CL Analysis by many businesses to analyze price changes, itself, provides significant support for the use of CL Analysis.

of sales; and (2) what will be the AL relative to the CL for a given hypothetical price increase.[9] Resolving these key factual issues typically requires substantial input from economists, in estimating incremental margins, and in estimating AL, for example, through demand-elasticity analyses, customer-switching analyses, etc. These key factual issues may not be easily resolved, but they are the sort of issues that fact finders regularly address in other contexts, for example, in determining damages.

Critiques of CL

The Katz/Shapiro and O'Brien/Wickelgren papers raise two concerns. First, both suggest that CL is often used to argue that industries with large margins (implying a low Critical Loss) have so much to lose from a reduction in sales volume that the hypothesized price increase associated with a merger (either for the candidate market as a whole or for the merging parties themselves) will be unprofitable. In other words, these authors believe that parties arguing for broader markets frequently do only the first step of the Critical Loss Analysis, or implicitly assume without any proof that Actual Loss is greater than Critical Loss for high margin industries. Second, the two papers argue, based on simple models of pricing theory, that Actual Loss (i.e., the response of customers to a hypothetical price increase) can be inferred simply from incremental margins, and that large margins necessarily mean that Actual Loss is low. We have concerns regarding both of these points.

As to the first point, 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. Rather, parties generally utilized the basic analysis correctly, by putting forward evidence they argued established that Actual Loss was greater than the Critical Loss.[10] Sometimes their arguments prevailed and sometimes they did not. The determinative factor, as it should be, is the totality of the evidence bearing on estimates of Actual Loss relative to Critical Loss (and estimates of incremental margins).[11]

As to the second point, it is important to be clear that because Critical Loss Analysis is just arithmetic, there is no dispute that Critical Loss is low if the (correctly estimated) incremental margins are high. The main thrust of the critiques of CLA for high incremental margin industries are theoretical arguments (not arithmetic) indicating that in high incremental margin industries the Actual Loss will also be low. Of course antitrust law, and Section 7 specifically, are based on economic

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[9] There is also an issue of what hypothetical price increase to use, since whether or not Actual Loss exceeds Critical Loss in some cases depends on the hypothetical price increase.

[10] Typical evidence put forward included customer-switching analyses, analyses of marketing and market research documents, third-party pronouncements or analyses of demand elasticities, and estimates of demand elasticities or analyses relevant to demand elasticities put forward by the parties' economists. For example, in the Cruise Ship investigations, outside and Bureau of Economics staff analyses led to a conclusion that demand was too elastic to pass an across-the-board price increase test based on CLA. Nonetheless, the FTC concluded that Cruise Ships were a market, based on yield management pricing theories. *See* Mary T. Coleman, David W. Meyer & David T. Scheffman, Empirical Analyses of Potential Competitive Effects of a Horizontal Merger: The FTC's Cruise Ships Mergers Investigation, *available at* http://www.ftc.gov/be/riocruise0703.pdf.

[11] In hospital merger cases brought by the federal antitrust agencies over the past several years, the government has lost, generally on market definition, based in significant part on CLA-based arguments. To the extent there were problems in the resolution of those cases, it was with the facts used to implement Critical Loss Analysis, rather than CLA itself. For example, in most instances, patient migration patterns probably shed little, if any, light on the Actual Loss that would result from the transactions overwhelmingly at issue, i.e., those between hospitals and third-party payers.

theory—among other things that a monopolist protected from entry will raise prices above "perfectly" competitive levels (if the price increase passes the CLA test). Thus, we agree, absent compelling evidence to the contrary (e.g., prices set directly or indirectly by regulation), that it is reasonable to presume that the existing price/output combination (and level and nature of promotion, characteristics of product, etc., that may be determined in conjunction with pricing) for individual competitors is the outcome of rational decisions on their part. We also agree that it is reasonable to presume that a competitor does not believe that a price *significantly* above or below the premerger level for that competitor would significantly increase its profitability overall.[12]

The implications of this profit maximization logic for Critical Loss Analysis are key and cannot be understated. That is, for any particular competitor it is reasonable to assume that Actual Loss is *at least as large* as Critical Loss (assuming there are no regulatory or other significant constraints on pricing). However, Actual Loss may be substantially larger than Critical Loss.

Furthermore, it is reasonable to assume that the Actual Loss for the hypothetical monopolist (or for a merged entity with a significant cross elasticity between the products of the two parties) will be lower than for an individual competitor. However, again, Actual Loss may also be substantially greater than Critical Loss. Thus, we part company with the two papers attempting to infer, with greater specificity, a value of AL from incremental margins and (too simple an) economic theory.

Stripped down to their basic theoretical elements, the critiques take the simplest economic model of pricing, which produces the result that price is set where the percentage gross margin M[13] is equal to 1.0 divided by the price elasticity of demand ($M = 1/E$).[14] This is the so-called "Lerner Equation." In such a model, for small changes in price, Critical Loss equals Actual Loss.[15] Thus, if the "Lerner Equation" ($M = 1/E$) is correct, it is necessarily the case that high margins mean low *Actual* Loss and AL will be close to CL, since E measures actual demand responsiveness to price changes. Katz and Shapiro misstate economic theory when they say "an economically rational firm acting unilaterally sets its price so that its gross margin is inversely related to its elasticity of demand: $M = 1/E$ . . ."[16] That is, 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.

To clarify this point, let us return to our example. In the two papers, the Lerner Equation would be used to infer that the incremental margin of 50 percent implies that the demand elasticity facing our widget manufacturer for a hypothetical price increase is approximately 2.0 (1/.5). What might be wrong with such an inference? Suppose that our widget manufacturer would actually lose 30 percent of its sales for the proposed 10 percent price increase, i.e., that the price elasticity for this price increase would be 3. This would be consistent with our assumption that a price higher than $10 would not be profitable. However, using a simple model of pricing, the logic of the two papers would lead one to the conclusion that this cannot be consistent with profit maximization, by reasoning as follows: If the price elasticity for a price increase is 3, then is not the price

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[12] It would generally be naïve to presume that firms are able to "determine" with precision the "demand elasticity" they face.

[13] M equals price minus incremental cost divided by price. *See* Katz & Shapiro, *supra* note 1, at 50.

[14] *See id.* at 51; O'Brien & Wickelgren, *supra* note 1, equation (9) and discussion, at 170.

[15] The Lerner Equation condition is actually the condition CL = AL, for small price changes. For those remembering their economics, profit maximization occurs where price is at the level where the volume lost on a small change in price is at the level that the change in profits is approximately zero, which is the CL = AL condition for small changes in price.

[16] Katz & Shapiro, *supra* note 1.

elasticity for a price decrease also approximately 3, i.e., a 10 percent reduction in price would lead to a 30 percent increase in units demanded? And if the price elasticity for a price decrease is about 3, our widget manufacturer should have a lower price than $10, since it could increase his profits with a lower price,[17] i.e., the assumption that the initial price was profit maximizing is violated.

But the price elasticity might be significantly different for price increases than for price decreases. There are various reasons, put forward by economists over many years, why price elasticities for increases might be different from those for price decreases (e.g., demand curves may have "kinks").[18] Both papers discuss at length arguments about kinks.[19] (In our example, if demand and/or costs are kinked, the Lerner Equation will not hold. We could have constructed our example with, say a price elasticity of 3.0 for price increases and a price elasticity of 1.5 for price decreases—this would be consistent with $10 being a profit-maximizing price). Thus, kinked demand or costs 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 the two papers that *theoretical* arguments based on kinks are ad hoc, actual behavior by customers and/or competitors might have the effect crudely equivalent to a "kink."[20] Evidence consistent with the existence of a "kink"[21] is that significant changes in incremental costs do not get translated into changes in prices.[22] Thus, although the simple pricing models of the two papers are theoretically rigorous, they are also ad hoc, in the sense that there 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 "real world" profit maximization.

This is the basis of our broader concern—i.e., does the simple economic model of pricing employed in both papers accurately reflect *actual* pricing in the industry being investigated? Again, remember that economic theory does tell us that AL is at least as large as CL. Only by 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.

As just one example, in the typical industrial or commercial product or service industry subject to a merger investigation, competitors have a relatively small number of major customers that account for the lion's share of their business. In those industries, prices are *negotiated*,[23] and it is

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[17] If the price elasticity for a price decrease is 3, a cut in price by 10% would increase total sales to approximately 130 units, for which profits would be approximately $520 (i.e., the new margin of $4 times 130 units), which is greater than $500 at the price of $10.

[18] Visualize a demand curve that is a straight, relatively flat line down to a price of $10 and then becomes a significantly more steep line for prices below $10. For a price increase demand is more elastic than for a price decrease, starting with a price at the kink, i.e., Actual Loss (gain in the case of a price decrease) is significantly greater (in absolute value) for price increases than for price decreases.

[19] Katz & Shapiro, *supra* note 1, at 52; O'Brien & Wickelgren, *supra* note 1, at 178–79.

[20] For example, sophisticated customers shift a lot of business away from a competitor attempting to take an unwarranted price increase. A hypothetical monopolist might not face that source of customer pressure, but may face other sources of buyer power. *See, e.g.*, David Scheffman & Pablo Spiller, *Buyers' Strategies, Entry, and Competition*, 30 Econ. Inquiry, July 1992, at 418–36. But buyer power is not the only reason why individual or market-level demand may have significantly higher price elasticity for price increases than for price decreases, as discussed below in the text.

[21] The "kink" might be a simplified term or concept for a situation in which price elasticities are substantially larger for price increases than for price decreases.

[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.

[23] Even in consumer products industries, manufacturers of consumer products sell to large chain retailers (and/or large wholesalers) and negotiate about shelf space, promotions, etc.

probably not reasonable to "shoehorn" an explanation of pricing based upon the simple economic model of pricing. In particular, the "price" negotiated with a major customer (typically, there are a number of things negotiated besides price) cannot be presumed to result from setting a margin approximating 1.0 divided by the price elasticity of demand of that customer. Rather, prices and margins are determined by opportunity costs, bargaining leverage, relationships, competition, longer-run considerations, etc.

[W]e agree completely with FTC Chairman Muris that models of pricing and competition (and of the potential competitive effects of mergers) must be soundly based in the institutions and actualities of pricing.

Finally, it has long been accepted by economists that pricing in high-margin industries, particularly concentrated industries, is probably not explainable by simple economic models of pricing (or oligopoly). Put simply, we agree completely with FTC Chairman Muris that models of pricing and competition (and of the potential competitive effects of mergers) must be soundly based in the institutions and actualities of pricing.[24] It would certainly be helpful to have an economic model of pricing that actually fits a given situation. But the great strength of CLA is that if CL and AL are determined correctly based on the evidence, you will get the right answer even without a sophisticated economic model. And AL must necessarily be determined by the totality of evidence on how sales will respond to hypothetical price increase, not by theoretical presumptions.

Authors of both papers agree that the facts and industry setting might rebut the predictions of the simple pricing model. But they apparently would reverse the burden of proof—i.e., require the defendants to disprove the plaintiff's alleged market definition. We agree completely with Judge Hogan's opinion in *FTC v. Swedish Match North America, Inc.*[25] that, as a matter of both economics and law, you should not infer Actual Loss (or shift the burden of proof) based upon margins.

Furthermore, the models in the Katz/Shapiro and O'Brien/Wickelgren papers predict that if there is a positive cross elasticity between the parties to the merger, then prices will go up as a result of the merger based simply on their margins, evidence of cross elasticity, and economic theory alone![26] This result obtains because if the Lerner Equation holds, CL = AL (for small price changes), and a positive cross elasticity reduces the loss in total margin resulting from the price increase because margin is earned on sales diverted to the merger partner.[27] Put differently, a significant cross elasticity undoubtedly makes a hypothetical price increase more profitable, but it cannot be inferred that the price increase would increase profits relative to the status quo. The change in profitability can only be determined by an analysis of AL (relative to CL), which must come from evidence bearing on how much sales will be lost, and to which competitors, as a result of a price increase.

Consider, for example, the Katz/Shapiro proposed new test for market definition and potential competitive effects based on what they define as the "Aggregate Diversion Ratio" (ADR). We do not want to get into the technical details here (which are the subject of another paper), but we argue strongly against supplanting CL Analysis with ADR analysis. Unlike CLA, the ADR analysis is not arithmetic. It imposes and extends the Lerner Equation analysis, which has the same

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[24] *See* Timothy J. Muris, FTC Chairman, Improving the Economic Foundations of Competition Policy, Speech Before Geo. Mason L. Rev. Winter Antitrust Symposium (Jan. 15, 2003), *available at* http://www.ftc.gov/speeches/muris/improveconfoundatio.htm.

[25] 131 F. Supp. 2d 151, 160–62 (D.D.C. 2000).

[26] "[H]igher margins typically make it *more* likely that a price increase by merging firms will be profitable." O'Brien & Wickelgren, *supra* note 1, at 164. The models of the two papers are the basic (simple) models underlying unilateral effects analysis for differentiated products.

[27] Or mixing units of widgets and gadgets, loss of widget units is partially "made up" by gain in gadget units.

[W]e argue that evidence on actual competition between the parties to a proposed merger and its effects is much more probative than evidence bearing on cross elasticities of demand.

defects for unilateral effects analysis as for market definition.[28] This analysis is particularly "dangerous" when applied to unilateral effects theories. According to their analyses, 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.[29] Although this is a matter for another paper, we argue that evidence on actual competition between the parties to a proposed merger and its effects is much more probative than evidence bearing on cross elasticities of demand.

Litigation should be and generally is determined by facts and fact-based analysis. Economic theory has a role, but the more specific the economic theory employed, the greater the requirement that the economic theory be valid in the specific setting.[30] That should continue to be the case, particularly for something as important in an antitrust investigation or case as market definition. As discussed above, we believe that economists have the burden of establishing that a simple pricing model actually is applicable to a specific situation before it can be used to make very strong and important inferences. Of course, if economists could show in a specific instance that actual pricing is suitably "explained" by the simple pricing models, then it would be reasonable to apply those models and results to that specific matter.

Finally, the Katz/Shapiro and O'Brien/Wickelgren critiques focus on high (incremental) margin industries, but their theoretical arguments are independent of the level of margins in an industry because their models predict price increases for all mergers among firms with positive cross-elasticities, whether margins are low or high. (The only difference is that the predicted post-merger price from their models would be smaller, other things equal, in the low margin industries.)

We hasten to add that we are not anti-economic theory. Sound application of sound economic theory is fundamental to sound antitrust policy and sound resolution of antitrust investigations and cases. The authors of the two papers are prominent antitrust economists, and their technical economic analysis is correct. However, imposition of theory that may not comport with the institutions and reality of a real market, and real competitors will not lead to better policy or case resolutions. We agree with both papers that we need to be (and the agencies are) cognizant of the arguments as to why high margins may indicate narrow markets. But we cannot agree that the simple economic theory of pricing should reverse the burden of proof on market definition.

Conclusion

The papers by Katz and Shapiro, and O'Brien and Wickelgren, make useful contributions in identifying potential misuses of Critical Loss Analysis. They correctly point out that high margins do not in themselves suggest broader markets, and, indeed, high margins are, in themselves, quite

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[28] Consider our example above, where incremental margins on widgets are 50%, and a 10% price increase would reduce *actual* widget unit sales by 30%. The CL percentage is 17%. By assumption (discussed above), the AL percentage is 30%. The Katz/Shapiro ADR condition says that if the acquired gadget manufacturer picks up more than 17% of the actual loss in sales then the price increase is profitable. However, simple CL arithmetic shows that for the 10% price increase to be profitable, an acquired gadget producer would have to pick up approximately (13/30)% = 43% of the lost sales of widgets for a 10% price increase in widgets to have no change in profits. (This assumes that incremental margins on gadgets are the same as incremental margins on widgets.) Again, the Katz/Shapiro ADR condition *only* holds if the Lerner Equation approximately holds.

[29] With a significant cross price elasticity with the merger partner, the profitability of a hypothetical price increase is greater than if the cross elasticity is zero. As a matter of theory or fact, however, this does not necessarily mean that the hypothetical price increase is profitable.

[38] Again, as a general matter, all economic theory can tell us is that (absent price regulation or other impediments to profit maximization with respect to price) Actual Loss for a specific competitor is at least as large as Critical Loss for that competitor.

consistent with narrow markets. The papers also show that economic theory might be able to push farther than CLA in placing bounds on the Actual Loss. It is up to economists, however, to demonstrate that these price theories adequately explain pricing in a given industry setting.

In this regard, much more work, both theoretical and especially empirical, on pricing in high-margin, concentrated industries (and for basis of comparison, unconcentrated industries) is needed. This subject was a major focus of economic research in the 1930s and 1940s. The economists of that era were conversant with the model of monopoly pricing and of the Cournot and Bertrand oligopoly models and they also understood at least some of the deficiencies in those models for explaining the reality they observed.

What those economists observed appears equally relevant today, i.e., that it is common to find that apparent shifts in demand or costs sometimes, if not often, do not produce changes in prices. These are facts difficult to reconcile with simple price theory. (For example, simple theory predicts that significant increases in incremental costs should be reflected in higher prices). Furthermore, for decades, research on actual business pricing has generally not found business conduct to be consistent with simple price theory. (For example, the most common pricing "strategies" involve pricing based on average *total* costs and/or "market," rather than price sensitivity/elasticity.[31] This does not mean the managers are irrational or do not have as an objective long-run profit maximization. Rather pricing in real world markets adds complexities that are often not adequately captured by simple price theory. This may be particularly true in concentrated, high margin industries.

We need models and analyses that can be shown to adequately explain actual pricing in such industries that can be reliably applied in specific situations. Economists involved in merger investigations can advance the ball by developing to the extent possible the determination of prices in the industries under investigation. Doing this specifically in connection with Critical Loss Analysis would be very helpful. ●

[31] *See, e.g.*, V. Govindarajan & R.N. Anthony, *How Firms Use Cost Data in Price Decisions*, MGMT. ACCOUNTING, July 1983, at 30–36; E. Shim & E.F. Sudit, *How Manufacturers Price Products*, MGMT. ACCOUNTING, Feb. 1995, at 37–39. Other research questions whether the simple pricing economic models that are the basis of the two papers criticizing CL Analysis capture reality. *See, e.g.*, J. Dalen & R. Thurik, *A Model of Pricing Behavior: An Econometric Case Study*, 36 J. ECON. BEHAV. & ORG. 14, 177–95 and bibliography (1998).