Interview with FTC Director of the Bureau of Economics Michael R. Baye

Editor's Note: In this interview with The Antitrust Source*, Dr. Michael Baye discusses his views on horizontal merger analysis, econometrics, and recent activities in consumer protection. Dr. Baye began his job as the Director of the Bureau of Economics in July 2007. He is at the FTC on leave from Indiana University's Kelly School of Business, where he has been the Bert Elwert Professor of Business since 1997. Dr. Baye's academic research focuses on pricing strategies and their impact on consumer welfare and firm profits and has applied tools from game theory and industrial organization to evaluate network industries, mergers, auctions, and online markets. The interview was conducted on February 5, 2008, by Editor Elizabeth M. Bailey for* The Antitrust Source*.*

THE ANTITRUST SOURCE: You joined the Federal Trade Commission in the summer of 2007 as the Director of the Bureau of Economics. How has the transition been from academics to the FTC?

Michael R. Baye

MICHAEL BAYE: It's been the experience of a lifetime. The number of interesting questions that come across my desk each day is pretty astounding.

One big difference between what I do here and my life as an academic is the scope of the issues that I deal with. As you probably know, most academic research tends to be highly specialized. Many academics spend a lot of time working on very narrow technical questions that we hope might be useful or policy-relevant some day. Academic contributions tend to be fairly incremental, which means that the direct relevance of any one academic contribution to a real-world problem is pretty small relative to the cumulative effect of all the research over, say, fifty years.

But here at the FTC, the story is a whole lot different, and that's part of what makes the job so exciting. Every issue that comes across my desk is policy relevant *today*. It's clear that the decisions ultimately made by the Commission are actually going to affect competition and consumer welfare.

ANTITRUST SOURCE: How has your academic research informed your work at the FTC?

BAYE: My research in oligopoly and game theory, as well as my knowledge of competitive and online markets, has been very helpful to me in a number of merger cases. For instance, in our review of the Google-DoubleClick merger,[1] we considered a number of horizontal and vertical theories of potential competitive effects. My academic thinking shaped how I approached this and other cases.

ANTITRUST SOURCE: Can you provide a little more detail on how your academic thinking came into play in that transaction?

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[1] The FTC's announcement closing their investigation of the Google/DoubleClick transaction is available at http://www.ftc.gov/opa/2007/12/googledc.shtm.

BAYE: I know from my own academic work in oligopoly, game theory, and online markets that there are a lot of different theories that might be relevant in any given merger case in the Internet arena—each with different implications for competitive effects—but it is critically important to carefully examine the assumptions underlying these competing theories against the underlying facts. Only by carefully examining the facts against alternative theories can one determine whether a given merger is likely to have competitive effects.

In Google/DoubleClick, we did just that. We considered a number of theories of potential competitive harm, including ones advanced by competitors, and tested them against the facts. My knowledge of game theory and online markets helped me test relevant theories against the facts.

ANTITRUST SOURCE: Before coming to the FTC, had you been involved in any consulting work?

[A] big priority of mine

. . . has been to foster

BAYE: My primary focus has been academic research, but I've done some consulting over the years, including several cases for the Antitrust Division at the U.S. Department of Justice. I've also served as an expert in private litigation. But I am primarily an academic and am not hooked up with a consulting shop.

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ANTITRUST SOURCE: One thing that our readers may find useful is a summary of your responsibilities as the Director of the Bureau of Economics and how you see your role in that position.

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relevant economic

BAYE: That's a great question. I suspect different Directors come in with different perceptions about the job. The thing that I find really exciting is that there are so many different facets to the job that it makes each new day different than the previous day.

research.

One of my responsibilities is serving as the chief economist, where I advise Chairman Majoras and other Commissioners on matters and work with my deputies and staff in the Bureau of Economics (BE) to ensure that the Commission has the best possible economic analysis when it makes its decisions. Paul Pautler and Mark Frankena, who are my deputy directors for consumer protection and antitrust, have been a godsend and have enabled me to get out of the blocks running.

I also have managerial responsibilities, and a big priority of mine in this regard has been to foster an environment within BE that encourages and promotes policy-relevant economic research. This is essential to ensure that the Bureau of Economics is in the best position possible to provide relevant economic analysis to the Commission both now and in the future. Pauline Ippolito, who serves as my deputy director for R&D and operations, and Elizabeth Callison, who serves as a senior advisor, have both provided immeasurable support and advice on these and other matters.

I am also a spokesman of sorts for the Bureau of Economics, and in that capacity travel domestically and abroad to represent the Bureau at conferences and to present papers and speeches. I also help organize conferences and workshops at the FTC. For instance, I worked with Andrew Heimert from the Bureau of Competition to organize a panel at the FTC's unilateral effects workshop on February 12 on the virtues and limitations of econometric versus other approaches for developing economic evidence. I will also be moderating that panel.

Finally, we are in the early stages of planning an industrial organization conference on competition issues for fall 2008 that I hope will become an annual event. The plan is to bring in academic economists to present and discuss research papers on topics of interest to the Commission and thus to help advance our economic understanding of important issues that are arising in our work.

ANTITRUST SOURCE: In the time you have been at the FTC, has anything surprised you or has it been as you expected?

BAYE: I've been pleasantly surprised by the level of interaction that I have with staff. I was a little concerned originally about the geography of the Bureau of Economics. At headquarters, we have just a handful of economists—basically just me and my deputies. All of our other managers and Bureau staff are housed at our New Jersey Avenue office. But this concern hasn't proven to be a problem, and I've enjoyed the interaction.

It's also been interesting to see the sorts of checks and balances that exist within the agency. For example, when the Bureau of Economics sends up a recommendation on a matter, it includes a recommendation from the BE staff who worked on the case, as well as my own recommendation. The Bureau of Competition (BC) sends up their own recommendations, which includes a recommendation from BC staff and a recommendation from BC management.

These recommendations ultimately go up to the Commissioners, who also receive input from their own attorney-advisors before they ultimately vote. So, it's been very interesting to see how the organization actually works. A lot of inputs go into decisions at the FTC.

ANTITRUST SOURCE: Are there any similarities or differences you see in your style compared to that of previous Directors?

BAYE: I'm probably not the best person to answer this question, but I'm willing to give it a shot. I am primarily an academic, which probably makes my style closer to that of past academic Directors dating back to Jeremy Bulow than, for instance, David Scheffman, who came from a strong consulting background. But frankly, the organization is set up to function even without someone like me because of the quality and expertise of the deputies who are in place.

ANTITRUST SOURCE: How does the Bureau of Economics interact with the Bureau of Consumer Protection?

BAYE: The Bureau works very closely with Lydia Parnes, the Director of the Bureau of Consumer Protection (BCP), and her staff. Lydia's Bureau deals with an inordinate number of cases and we have a relatively small group of economists who work on consumer protection issues. Our staff assists attorneys in BCP by evaluating the economic issues in consumer protection matters.

ANTITRUST SOURCE: Are there economists who work within the Bureau of Consumer Protection or are all the economists within the Bureau of Economics?

BAYE: No, all consumer protection economists are within the Bureau of Economics. That's a very important feature of the institutional structure here at the FTC, and is one of the many checks and balances that ensures that the Chairman and other Commissioners have the best possible economic analysis available when they make there decisions.

ANTITRUST SOURCE: Since you've been at the FTC, has your work focused more on antitrust or more on consumer protection?

BAYE: I think it's been fairly balanced. A large amount of my time has been spent on Presidential

and Congressional inquiries into gasoline pricing anomalies. I spent the first month or so when I arrived focusing on the FTC's Report on the Spring/Summer 2006 Nationwide Gasoline Price Increases,[2] and since then on a number of ongoing investigations. Our extensive Google-DoubleClick investigation was time consuming. These sorts of antitrust issues have been interesting, but I anticipated these demands on my time.

I've been pleasantly surprised with the number of interesting issues that have arisen on the consumer protection side. It has been an area that I have really enjoyed and have learned a lot about during my short tenure here.

ANTITRUST SOURCE: Can you give us some highlights of the interesting issues on the consumer protection side?

BAYE: Sure. One of the more interesting projects from an economic point of view was our FACTA credit scoring study,[3] which was released shortly after my arrival. This study was done at the request of Congress and examined the effects of credit scoring on auto insurance risk ratings and on the prices of insurance for various ethic and racial groups. We have also been doing important and interesting work on mortgage disclosures, privacy issues, and consumer fraud.

ANTITRUST SOURCE: What has been your focus on the antitrust side?

BAYE: As I mentioned earlier, our work on oil and gas has been a big focus. So has our work related to the health care sector, including hospitals and pharmaceuticals. I have tried to focus on those areas or aspects of cases where my own expertise has the greatest potential for adding value. We've got a portfolio of things that we're in the midst of right now. Obviously, the Google-DoubleClick investigation was very time consuming. We did a very thorough investigation.

ANTITRUST SOURCE: There are a number of publications that come out of the Bureau of Economics. For example, in the last issue of The Antitrust Source there was a review of a paper by Malcolm Coate on barriers to entry that relied on some data internal to the FTC. How does the data used in these types of publications become available to someone outside the FTC who would be interested in learning more? Is the data available on the FTC Web site?

BAYE: Now that's a very good question. For published academic studies, the data we rely on is often based on data that was not obtained during the course of an investigation. For example, some of our retrospectives in oil and gas mergers involve data that we purchased from third parties like OPIS, and interested individuals can contact the parties directly with their data requests.

Some of the data in our official FTC reports—our FACTA study for example—and other papers rely on data that we are not in a position to share with others.

My advice to academics or anyone else who might be interested in obtaining data used in one of our studies is to contact David Schmidt in our Office of Applied Research and Outreach. Dave can put the person in contact with the people who know whether or not the particular data is available for their use.

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[2] The report is available at http://www.ftc.gov/reports/gasprices06/P040101Gas06increase.pdf.

[3] The report is available at http://www.ftc.gov/os/2007/07/P044804FACTA_Report_Credit-Based_Insurance_Scores.pdf.

ANTITRUST SOURCE: Thinking about some of the working papers put out by FTC economists, are these articles a good reflection of the Bureau of Economics' thinking on mergers and other antitrust issues?

BAYE: There are five Commissioners and they're the ones who have the authority to determine official positions of the agency. So, for example, the BE working papers and working papers that staff economists might publish in academic journals or disseminate through other academic venues like the Social Science Research Network and so forth are the views of those individual economists and do not necessarily reflect the views of the FTC or the individual commissioners.

ANTITRUST SOURCE: I want to switch gears a little bit now and talk about horizontal mergers. In one of your first speeches, you talked about the importance of fact-based merger analysis. For the mergers that you've reviewed thus far, have those transactions confirmed or revised your views about the importance of a fact-based analysis?

But not all cases are amenable to econometric analysis. I think it's extremely important to make sure that the underlying theory that one is using for a case lines up with the facts.

BAYE: I haven't changed my opinion at all. There are a plethora of economic theories which, in the abstract, might predict that a merger does or does not have anticompetitive effects, but the assumptions underlying many of these theories will be inconsistent with the facts. Facts are an essential input in merger analysis because they permit an economist to identify and refine the relevant theory of the case. The theory and facts, in turn, have implications which sometimes may be examined econometrically, provided appropriate data are available. But not all cases are amenable to econometric analysis. I think it's extremely important to make sure that the underlying theory that one is using for a case lines up with the facts.

And I think this is particularly important in this modern era of industrial organization, where one of the important tools that we use to analyze potential competitive effects is game theory. Anyone who's familiar with game theory will tell you that a lot of different things are possible in a game theoretic model. The important thing is to determine whether any of these things are likely or probable.

The classic example that I use with my Ph.D. students is the different predictions between the Cournot and Bertrand models of oligopoly. The only difference in these models is that, in the Cournot model firms are making quantity decisions and in the Bertrand model firms are making pricing decisions. This minor difference in the behavior of firms can have profound implications for such things as a merger. You need to know facts—in this case whether firms are making price or output decisions—to properly analyze the competitive effects.

That's a very simple example, but it illustrates why I think it's extremely important to test theories that one might use in a case against the relevant facts in that case.

ANTITRUST SOURCE: In addition to whether firms are setting prices or setting quantities, are there other key facts that you tend to look for when you go in and evaluate a merger?

BAYE: Certainly, there is a whole litany of things—in horizontal mergers, the ability of a firm to increase prices postmerger can depend on customer switching costs, transportation costs, commitment, potential entry, and so on. There are also facts that are relevant for coordinated effects—such as repeated interaction, the underlying transparency of prices, the transparency of decisions, and the ability of firms to monitor and react to the behavior of rival firms.

So, most often the factors that economic theory indicates could be important in a particular case are things that one can test with the underlying facts. These facts are obtained through dis-

covery and investigation to help hone in to determine whether there is a reasonable basis for antic-
ipating potential competitive effects.

ANTITRUST SOURCE: Have you come across any situations in which the FTC sees one set of facts
and the merging parties see a different set of facts? And if so, how do you, as the Director,
resolve that apparent conflict?

BAYE: Conflicts over some facts are probably inevitable in any discussion. Some of these conflicts
arise because of informational asymmetries. For example, we may be privy to information from
third parties that we are not at liberty to disclose during the course of an investigation. This may
color how we interpret facts relative to the parties.

Obviously, we try to make sure that any differences are not based on misperceptions about the
economic landscape.

ANTITRUST SOURCE: For those who are practitioners in this area, both lawyers and economists, what
advice do you have on how the merging parties can bolster their credibility or the relevance of the
facts that they're bringing to bear when they come in to a meeting with FTC economists present?

BAYE: It is important to have as open a discussion of the facts as possible, and to confront the
underlying problems directly. For example, if the issue is whether a merger is likely to have sig-
nificant anticompetitive effects, it's important to be up front with the types of data the parties have
to answer that question. I think a lot of people's gut reaction is that there is some inherent value
to being secretive, and in my opinion that's just a losing strategy all the way around.

Ultimately, it's better to disclose relevant information before one reaches the litigation stage
because we are more likely to be able to amicably resolve a potential concern than by trying to
save information as some sort of secret bullet you're going to shoot in litigation.

ANTITRUST SOURCE: Let's talk about econometric evidence. What do you do in situations when a
transaction or the available data in a transaction does not lend itself to an econometric analy-
sis? How do you identify that situation? And what role does the Bureau of Economics play in that
situation?

BAYE: BE's role is the same regardless of whether data is available for econometric analysis. My
view is that econometric analysis is just one potential piece of evidence that you might use in a
merger case. In fact, I would argue that in an ideal setting, econometric analysis or econometric
evidence is just icing on the cake.

Pound cakes don't have icing, and you don't have to have icing on every cake. But some peo-
ple mistakenly try to force an econometric analysis out of inappropriate data because they do not
recognize that not all cases or questions can be appropriately addressed with econometric
techniques.

In any event, econometrics is not a substitute for the facts of the case. Facts are necessary to
provide texture and context, thereby turning an otherwise abstract economic theory into a relevant
story. How well the facts fit the theory can be used as a qualitative test of the theory's relevance
to the merger. If the facts of a case are not consistent with the underlying story, econometrics is
likely to be of little value in understanding the potential competitive effects of a merger.

So, while econometrics is not a substitute for theory and facts, theory and facts can often be
used together as a sort of "test" of potential competitive effects. A number of additional tools and

types of information, including merger simulations, advertisements, strategic plans, customer reports, testimony and depositions of customers, and a host of other types of quantitative and/or qualitative data can be useful.

These additional tools can be useful regardless of whether it is possible to put that icing on the cake. For instance, in the Staples-Office Depot case some very sophisticated econometrics work was done to identify the competitive effects of a merger between Staples and Office Depot. But ultimately even absent that sophisticated evidence, there was evidence from advertisements that suggested that there were price differentials depending on whether the parties were competing head to head or not. The icing on the cake helped demonstrate that the price differentials in the ads weren't the result of spurious correlations. But at the end of the day, those advertisements might have been useful on their own.

One thing I'm always looking for in econometric analysis is the robustness of the results. It's not difficult for any first year graduate student to sit in front of a computer and run a gazillion regressions until he or she ultimately finds some relationship in the data.

ANTITRUST SOURCE: Are you able to identify those situations that aren't likely to lend themselves to econometric evidence pretty early on such that you can then scale back the data-intensive questions that typically accompany a second request?

BAYE: If one wants to identify competitive effects econometrically, one has to have some price variation to be able to do that. If we learn early on that it is not possible to obtain price data that's going to allow us to identify differences across markets or time, we wouldn't normally require that the data be delivered.

We work closely with our attorneys in BC to minimize the burdens that are associated with second requests. Open and honest communication is essential for this to work.

ANTITRUST SOURCE: In situations that do lend themselves to econometric work, what is your view on the Bureau of Economics staff sharing their econometric work with the merging parties?

BAYE: Sometimes it is not feasible to share data because of the reliance on data from third parties and other data that might be available. To the extent that we're able to discuss results and specifications without compromising the underlying confidentiality of data, we do.

To the extent possible, we strive to have a useful dialogue and to share as much information as is possible with parties.

ANTITRUST SOURCE: In those cases, are you able to share the structure of what the econometric model looks like or the type of data being used even if you can't turn over the exact data that's involved?

BAYE: Yes, and it is a two-way street. It is important for both sides to understand the types of controls that are being used in econometric work. It's also important to understand how the data is being manipulated and constructed.

I think we've had good working relationships with parties since the time I've been here on those cases that have involved econometric issues.

ANTITRUST SOURCE: Are there certain types of econometric analysis that you find to be particularly credible or particularly helpful in your analysis?

BAYE: One thing I'm always looking for in econometric analysis is the robustness of the results. It's

not difficult for any first year graduate student to sit in front of a computer and run a gazillion regressions until he or she ultimately finds some relationship in the data. What's important to me is whether or not those econometric specifications are based on a sound theoretical model that is consistent with the specifications that are being run. That's very important. And equally important is that the econometric results are robust to alternative specifications or controls.

ANTITRUST SOURCE: In the Whole Foods-Wild Oats transaction, the FTC recently filed an appellant brief appealing the district court's denial of the FTC's motion for a preliminary injunction. Can you describe generally the role that the Bureau of Economics plays in deciding whether it makes sense to file a motion like that?

BAYE: I'll speak generally, since this case is still in appeal.

It is important to realize that, in any merger case, the Bureau of Economics provides input at every stage of the process—from the time when an HSR filing comes in, the second request, decision to ultimately either close the investigation, or when the Commission votes to file a preliminary injunction. At every stage, the Bureau of Economic is involved, as is the Bureau of Competition.

And at each stage of that process we work closely with the Bureau of Competition. We might recommend changes in the Second Request, changes in complaints or appeals or whatever. But ultimately, anything we do—as with the Bureau of Competition—is a recommendation to the Chairman and the Commissioners. I'm the Director of the Bureau of Economics, but I don't have a vote on the Commission. Jeff Schmidt is the Director of Bureau of Competition, but he doesn't have a vote on the Commission. So, our roles are advisory and our goals are to provide the Commissioners with the information they need to make the best possible decisions.

ANTITRUST SOURCE: What was the Bureau of Economics' role in the Equitable Resources-Dominion transaction?

BAYE: We helped sort out two interesting and important issues, namely the impact of competition in a regulatory environment and potential efficiencies from the merger.

Both Equitable and Dominion are involved in various energy businesses, but a key part of the transaction involved competitive overlaps in the distribution of natural gas to industrial and commercial customers in certain areas of Pennsylvania. Competition in the interstate transmission of natural gas from producing regions to local distribution companies is common, but competition between local distribution companies, such as Equitable and Dominion, which own the pipelines that distribute gas directly to consumers, is extremely rare.

As a footnote, this unique form of competition in the area started about one hundred years ago when a number of natural gas pipeline companies started competing to deliver natural gas from producing regions in the Allegheny Mountains to the steel mills around Pittsburgh. This generated an overlapping distribution network.

In any event, competition between Dominion and Equitable results in substantial discounts from regulated rates for commercial and industrial customers that are served by more than one local distribution company, while "captive" consumers who do not enjoy such competition are charged regulated rates. So, one of our contributions was showing that there were competitive effects even though prices were regulated. And we obviously evaluated efficiency claims made by the parties in the distribution of natural gas.

Based on this work, the FTC filed a complaint and motions for a Preliminary Injunction to block the merger because customers receiving discounts from regulated rates would likely pay higher rates, postmerger.

The district court granted the parties' motion to dismiss the complaint on state action grounds rather than the economic merits. As you know, the FTC appealed this decision, and recently the parties abandoned the transaction while waiting for the court of appeals decision on the state action issue.

ANTITRUST SOURCE: To the extent that you know, was the Equitable Resources-Dominion transaction one in which econometric evidence was important to the Bureau of Economics or was this one that fell into the category of primarily relying on non-econometric evidence?

BAYE: We primarily relied on non-econometric evidence. As I mentioned earlier, there are a variety of other forms of economic evidence, including quantitative evidence, and not all cases lend themselves to, or even require, econometric analysis.

ANTITRUST SOURCE: Let's shift gears again. What are some of the things that you learned, or are hoping to learn, from the single-firm conduct hearings?

BAYE: I was not here when the hearings took place, but I have been involved in the report that we're working on jointly with the Department of Justice and have reviewed the transcripts. So I am fairly familiar with a number of the issues.

To me, the hearings highlighted the many challenges we face in attempting to prevent unilateral anticompetitive abuses of market power without discouraging procompetitive conduct. Section 2 can stifle firms' incentives to engage in procompetitive conduct because they are afraid of being sued for an abuse of market power. For instance, a firm might be afraid to offer consumers discounts on bundles due to concerns that it might be sued for predatory behavior. While "safe harbors" can mitigate uncertainty and alleviate some of these fears, it is a very difficult challenge to come up with economically sound "tests" that thwart anticompetitive behavior without stifling competition.

The big takeaway for me is that there is tremendous scope for scientific research on these issues.

ANTITRUST SOURCE: Do you have an estimate of when that report will be made publicly available?

BAYE: My record at forecasting how long it takes to get reports out of the Commission is not particularly good. I will say that we're currently working on this with the Department of Justice and I'm hopeful that it will be out in the not too distant future. But I certainly don't want to go on record giving you a date because it will almost certainly be wrong.

ANTITRUST SOURCE: I'd like to ask you about the gas price investigations. Since a report came out in August, from the public point of view, it looks like it has been pretty quiet compared to a year or two ago. You mentioned earlier on that there is quite a bit of activity going on. Can you describe the work that is ongoing?

BAYE: Sure. This is a very important area for us here at the FTC, and BE staff contribute in a number of ways.

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In the case of proposed petroleum mergers, staff conduct thorough analyses of potential competitive effects and efficiencies, evaluate proposed divestitures, and if the case is litigated, provide an array of support services for our attorneys. This support includes assisting our attorneys in deposition preparation, evaluation of expert reports, and the like.

But much of our work in this area does not involve mergers and is ongoing daily. BE staff monitor gasoline prices in about 360 areas across the country using an econometric model that identifies "anomalies" in gasoline prices. When pricing anomalies are detected, BE staff work closely with attorneys in BC to investigate the potential causes for the anomalies.

ANTITRUST SOURCE: Do you have a full-time staff of economists working on these investigations?

BAYE: We have a group of economists whose main focus is in the petroleum area. They do the monitoring project but also work on other matters, including Congressional requests for investigations of pricing issues in specific markets.

ANTITRUST SOURCE: Are there additional gas price reports that we can look forward to in the future?

BAYE: Most of the gas price reports that we produced in the past few years have been either requested by the President or by Congress and I can't predict whether or not they're going to ask us to do another report along those lines. With respect to internally generated reports, our Office of Applied Research and Outreach is in the very early stages of an R&D project that I'm hopeful will provide some value to us in our oil and gas areas.

Dave Schmidt, who is the Assistant Director of the Office of Applied Research and Outreach here in the Bureau of Economics, is heading up a new project to determine whether recent advances in the academic literature on dynamic oligopoly might be useful in our analysis of pharmaceutical, retail, and petroleum markets. I want to stress that this research is in the very early R&D stage, but I am hopeful that it might ultimately permit us to further enhance our gasoline price monitoring efforts.

ANTITRUST SOURCE: Let's talk about consumer protection for a moment. What are some of the recent issues that the Bureau of Economics has been actively involved?

BAYE: Economists in our consumer protection shop have considerable expertise in understanding the effects of disclosures in general, and mortgage disclosures in particular. We've got a great team in Jim Lacko and Jan Pappalardo. They recently released a study showing that a lot of consumers don't really understand what they're signing when they sign the mortgage papers.

ANTITRUST SOURCE: Is this related to subprime lending issues?

BAYE: Subprime lending is an important issue that has ramifications for the safety and soundness of our banking system—an issue that obviously falls under the Fed's oversight. But there is one particular facet of subprime lending where I believe the FTC can play a potentially important role. Jim and Jan found that both prime and subprime borrowers failed to understand key loan terms in current disclosures, and that improved disclosures benefited both types of borrowers. Further, they found that improved disclosures provided the greatest benefit for more complex loans, where both prime and subprime borrowers had the most difficulty understanding loan terms.

So, to the extent that loans in the subprime market tend to have more complex features than loans in the prime market, or if subprime borrowers are in a weaker position to "adjust" to changes in payments they did not anticipate due to their failure to understand the terms of their mortgages, one part of the solution to subprime issues could be improved mortgage disclosures.

Economists in the Bureau of Economics are currently working with others at the FTC to look for ways to improve current mortgage disclosures. We are also in conversations with the Federal Reserve and with HUD on these issues.

ANTITRUST SOURCE: Are there other issues you've been out in front with on consumer protection?

BAYE: In addition to our FACTA scoring studies and mortgage disclosures, we are also involved in work on carbon offsets. As you know, we had a workshop awhile back on that and I think there are some potentially interesting roles for economists there.

ANTITRUST SOURCE: What type of role do you see for economists in looking at carbon offsets?

BAYE: There's evidence that some consumers make choices based on their perceptions of a company's environmental record on carbon offsets. I believe a useful first step is for economists to help us gain a better understanding of what consumers take away from the various claims being made—that is, measuring consumer perceptions about carbon offset claims.

Economists in the Bureau of Economics have a lot of experience in evaluating consumer perceptions in areas that include mortgages, health claims, and advertising. Building on what we have learned in these areas, and our expertise in the scientific method and statistical analysis, another potential role of BE economists is to evaluate the scientific evidence that underlies the substantiation of carbon offset claims.

I think it's a really fascinating area and that there is a lot of important economic work to be done in this area.

ANTITRUST SOURCE: You mentioned earlier that you have done some traveling, including international travel. How much interaction do you have with your European counterparts?

BAYE: I'm really fortunate that the FTC has an Office for International Affairs that's headed up by Randy Tritell. Randy's office has done a great job helping me forge working relationships with our non-U.S. counterparts. For instance, in October I participated in the U.S.-European Commission Competition Consultations, and also met privately with Damien Neven—the EU's Chief Competition economist—to discuss a variety of matters. Good relations with all of our international counterparts are important in helping us fulfill our missions.

ANTITRUST SOURCE: Do you find that the economic frameworks used in the EU or the other areas where you interact similar to the frameworks that you and your staff in the Bureau of Economics use to evaluate antitrust issues?

BAYE: So far I have. One thing nice about dealing with economists is that we have a common language. We read the same textbooks, we publish in the same journals, and we read the same journal articles.

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I think it's a bit different for lawyers because legal frameworks differ across countries. I think a lot of the differences that we have with Europeans, for instance, don't so much stem from differences in the economics, but from differences in the legal frameworks and standards of proof.

ANTITRUST SOURCE: When you're interacting in this international context, how closely do you coordinate with the Department of Justice or with other federal agencies or state agencies?

BAYE: Very closely. For instance, Dennis Carlton also participated in our EU Consultations. Prior to his departure last week, Dennis served as my counterpart at the Department of Justice, where he was the Deputy Assistant Attorney General for Economic Analysis in the Antitrust Division.

ANTITRUST SOURCE: We really appreciate your taking the time today to talk with us. Thank you very much.

BAYE: Thanks so much for giving me this opportunity. It's been a pleasure chatting with you. ●

Improving Critical Loss Analysis

Joseph Farrell and Carl Shapiro

Market definition analysis usually claims to follow the 1992 Horizontal Merger Guidelines issued by the U.S. Department of Justice and the Federal Trade Commission.[1] The Merger Guidelines describe a market as a group of products for which a hypothetical monopolist would profitably impose a small but significant and non-transitory increase in price (SSNIP). Seeking relatively simple approaches to market definition that are consistent with the Merger Guidelines, courts and agencies often rely on Critical Loss Analysis.[2]

For example, the FTC recently challenged the proposed merger between Whole Foods and Wild Oats, two chains of grocery stores,[3] alleging that the relevant market was "premium natural/organic supermarkets" (PNOS). In that market, the merger was very highly concentrating in a number of geographic areas where Whole Foods and Wild Oats operated nearby stores. But the merging parties successfully argued that PNOS was too narrow a grouping of products and that the market included all supermarkets. In that broader market, there were many other competitors and the merger was not highly concentrating.

Arguing that PNOS was not a market, the merging firms echoed the Merger Guidelines by asking whether a hypothetical PNOS monopolist would find a SSNIP profitable or whether a SSNIP would deter enough sales to make it unprofitable. Critical Loss Analysis calculates the hypothetical monopolist's Critical Loss, meaning the magnitude of lost sales that would (just) make it unprofitable for the hypothetical monopolist to impose a SSNIP, and compares it against the so-called Actual Loss of sales that would result from the SSNIP. If the Actual Loss would be less than the Critical Loss, the SSNIP would be profitable, so PNOS would form a market. Whole Foods and Wild Oats argued that the Actual Loss would instead exceed the Critical Loss: A hypothetical PNOS monopolist that imposed a SSNIP would lose enough business to make the SSNIP unprofitable. Merging parties have used Critical Loss Analysis regularly, and with considerable success, to argue in court for a broader market than the government asserts.[4]

Joseph Farrell is Professor of Economics, University of California at Berkeley. **Carl Shapiro** is Transamerica Professor of Business Strategy, Haas School of Business, University of California at Berkeley. We thank Jonathan Baker, Dennis Carlton, Ken Heyer, Serge Moresi, Dan O'Brien, Russ Pittman, Greg Werden, Abraham Wickelgren, John Woodbury, and seminar participants at the U.C. Berkeley/Stanford IO Fest, the Antitrust Division of the U.S. Department of Justice, and CRA International for helpful comments on earlier drafts. We especially thank Steve Salop for particularly helpful comments and for encouraging us to develop these ideas.

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[1] U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines (1992, revised 1997), http://www.ftc.gov/bc/docs/horizmer.htm. Distinguished antitrust economist and lawyer Jonathan Baker begins a recent article by noting: "Throughout the history of U.S. antitrust litigation, the outcome of more cases has surely turned on market definition than on any other substantive issue." Jonathan Baker, *Market Definition: An Analytical Overview*, 74 ANTITRUST L.J. 129, 129 (2007).

[2] The term "Critical Loss" was introduced by Barry Harris and Joseph Simons in *Focusing Market Definition: How Much Substitution Is Necessary?* 12 RES. L. & ECON. 207 (1989).

[3] FTC v. Whole Foods Mkt., Inc., 502 F. Supp. 2d 1 (D.D.C. 2007). For a discussion of Whole Foods expressing skepticism about the FTC's case, see Carlton Varner & Heather Cooper, *Product Markets in Merger Cases: The* Whole Foods *Decision*, ANTITRUST SOURCE, Oct. 2007, http://www.abanet.org/antitrust/at-source/07/10/Oct07-Varner.pdf.

[4] Michael Katz, *Recent Antitrust Enforcement Actions by the U.S. Department of Justice: A Selective Survey of Economic Issues*, 21 REV. INDUS. ORG. 373 (2002) (explaining how Critical Loss Analysis was used by the merging parties in *United States v. SunGard Data Systems*, Inc., 172 F. Supp. 2d 172 (2001)). Additional cases are described in Daniel O'Brien & Abraham Wickelgren, *A Critical Analysis of Critical Loss Analysis*, 71 ANTITRUST L.J. 161 (2003). *See also* Barry Harris & Cento Veljanovski, *Critical Loss Analysis: Its Growing Use in Competition Law*, 5 EUROPEAN COMPETITION L.J. 213 (2003).

Estimating a hypothetical monopolist's Actual Loss is difficult, so that a substantial range of estimates could seem plausible. Incentives in litigation may push parties toward exploiting that range. Thus, it is highly desirable, if possible, to anchor estimates of Actual Loss and to facilitate reality checks based on actual premerger conduct. When it comes to demand responsiveness, economics suggests that it is particularly helpful to examine firms' own premerger pricing conduct. As discussed below, some economists have explored how to exploit such evidence, but others have suggested that premerger pricing is sufficiently remote from the hypothetical monopolist question that these reality checks are unhelpful. In this article we explore more deeply how some of the complexities of premerger pricing might be thought to undermine the link with the demand elasticity faced by the hypothetical monopolist. We find that premerger pricing, together with estimates of diversion ratios, can be highly informative about a hypothetical monopolist's incentives.

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We can thus offer two powerful new tests to determine, using Critical Loss Analysis, whether a candidate group of products contains enough substitutes to form a market.[5] These tests extract information from the gold standard for evidence about competitive conditions in antitrust cases: firms' decisions actually made in the normal course of business.

1. A Short Refresher Course in Critical Loss Analysis

Suppose that a group of products, such as PNOS, is proposed as a candidate market. How would one know, following the Merger Guidelines, whether a hypothetical monopolist would find it profitable to impose a SSNIP? Simple economics tells us that the answer is, "It would be profitable if demand is not too elastic." But that answer alone is not very helpful.

Critical Loss Analysis contributes by asking quantitatively just *how* elastic demand must not be, for the candidate market to be an antitrust market. This part of the analysis yields a number for the Critical Loss. It is often described as "just arithmetic," although, as we shall see, that is a simplification. The meat of the analysis then involves estimating the Actual Loss—by no means a simple task. We may have no recent experience with a monopolist over just that group of products, and typically no business plans will exist for such a hypothetical monopoly. On the consumer side, while marketing studies in the ordinary course of business may well ask customers, "If product X were unavailable, or more expensive, what would you buy instead?" they seldom ask, "If products X, Y, and Z were unavailable, or more expensive, what would you buy?"[6]

In practice, Critical Loss Analysis typically assumes that the products are symmetric in price and cost, and studies only a uniform SSNIP imposed on all products.[7] The assumption of product symmetry will, of course, seldom be correct, and a hypothetical monopolist might well want to raise some prices much more than others. In our companion paper we develop an alternative technique that is better suited to analyzing product asymmetries or non-uniform price increases.[8]

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[5] In this article we follow the Merger Guidelines methodology largely without question. In an ongoing work, *Mergers with Unilateral Effects: A Simpler and More Accurate Alternative to Market Definition*, we criticize the market definition approach and offer an alternative in cases involving unilateral effects. This paper will be available at http://faculty.haas.berkeley.edu/shapiro.

[6] Indeed, Harris and Veljanovski suggest that estimation of Actual Loss is apt to be too difficult, so that one should instead only gauge the plausibility of its being below the calculated Critical Loss. *See* Harris & Veljanovski, *supra* note 4, at 215.

[7] The asymmetric case can be analyzed, with additional complexity. *See, e.g.*, Serge X. Moresi, Steven C. Salop & John R. Woodbury, *Implementing the Hypothetical Monopolist SSNIP Test with Multi-Product Firms*, Antitrust Source, Feb. 2008, http://www.abanet.org/antitrust/at-source/08/02/Feb08-Moresi.pdf.

[8] Joseph Farrell & Carl Shapiro, Cannibalization, Pass-Through, and Market Definition, uses a different technique and provides additional tests for market definition, also following the Guidelines, that allow for asymmetry among the products in the candidate market. This paper will be available at author Carl Shapiro's Web site, http://faculty.haas.berkeley.edu/shapiro/.

Here we adopt the conventional simplification of symmetric products and a uniform SSNIP. We also make the standard assumption in Critical Loss Analysis that the hypothetical monopolist produces at constant marginal cost.

Let the premerger price be p, and the constant marginal cost be c, so the premerger gross margin is $m = (p - c)/p$. Let the size of the SSNIP (as a percentage of premerger price) be s; following the Guidelines, we often illustrate with a 5 percent SSNIP, so $s = .05$ (that is, 5%). Let the premerger unit sales in the candidate market be X.

A. Critical Loss Arithmetic and Demand Sensitivity to Price Increase. Critical Loss analysis begins by calculating the Critical Loss, i.e., the (proportional) loss of sales that would just make a SSNIP unprofitable. In this calculation, the hypothetical monopolist's profit function is normally simplified to include only the direct, immediate, and quantifiable costs and revenues, marginal cost is simplified to be constant, and the SSNIP is simplified to be uniform. Using this simple proxy, the Critical Loss measured as a fraction of the hypothetical monopolist's premerger sales is given by $s/(m + s)$.[9] For example, with a margin of 45 percent and a SSNIP of 5 percent, the Critical Loss is $5/(45 + 5) = 1/10$, or 10 percent. The SSNIP will be profitable if and only if the actual loss of sales, as a fraction of premerger sales, is less than the Critical Loss.

This calculation asks: "Would a hypothetical monopolist find a SSNIP more or less profitable than the status quo?" This "break-even" version of the hypothetical monopolist's pricing incentives fits naturally with the separation of Critical Loss and Actual Loss calculations, and the approach has been accepted by a number of courts, including the *Whole Foods* court, so we pursue it here through Section 5 below. The Merger Guidelines actually ask the related but distinct question: "Is the hypothetical monopolist's profit-maximizing price at least a SSNIP above the status-quo level?"[10] Section 6 discusses the relationship between the breakeven and profit-maximizing approaches, and shows in the case of linear demand how to modify our analysis to handle the profit-maximizing approach.

B. Estimating Actual Loss: The Role of Premerger Margins. The second step in Critical Loss analysis is to estimate the number of lost sales, Z, or equivalently the fraction of premerger sales, Z/X, that will be lost due to a SSNIP. We define the Actual Loss as this fraction: $L = Z/X$.[11] Estimating the Actual Loss requires evidence about buyer substitution patterns. The controversy over Critical Loss Analysis concerns where to look for such evidence—specifically, how much can be inferred from premerger margins.

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[9] All technical derivations are in the Appendix.

[10] Section 1.0 of the Merger Guidelines defines a market as "a product or group of products and a geographic area in which it is produced or sold such that a hypothetical *profit-maximizing* firm, not subject to price regulation, that was the only present and future producer or seller of those products in that area likely would impose at least a 'small but significant and nontransitory' increase in price, assuming the terms of sale of all other products are held constant. A relevant market is a group of products and a geographic area that is no bigger than necessary to satisfy this test." (Emphasis added.) Section 1.11 states that "In performing successive iterations of the price increase test, the hypothetical monopolist will be assumed to pursue *maximum* profits in deciding whether to raise the prices of any or all of the additional products under its control." (emphasis added) One economist actively involved in the development of the Merger Guidelines reports that profit maximization was intended even in the 1982 Guidelines and that the 1984 revision included a revision "in an attempt to make [this] clear." Gregory J. Werden, *The 1982 Merger Guidelines and the Ascent of the Hypothetical Monopolist Paradigm*, 71 ANTITRUST L.J. 253, 258 (2003).

[11] Confusingly, the term "Actual Loss" means the *predicted* loss that would result from a *hypothetical* monopolist's SSNIP. Unfortunately, the term has become standard.

Katz and Shapiro[12] and O'Brien and Wickelgren[13] have shown how to estimate Actual Loss using information about demand responsiveness based on firms' premerger pricing decisions. This is what economists call "revealed preference" information: inferences about preferences based directly on observed choices. Here, one can make inferences about demand sensitivity, as gauged by a real firm based on its premerger choice of price. In particular, if (before the merger) a firm chooses a high margin on its product, the firm evidently thinks that demand for its product is not very sensitive to price.

This idea is captured in the Lerner Equation, the textbook centerpiece of pricing economics. The Lerner equation states that, if a product is priced so as to maximize the profits from that product, then the proportional gross margin, m, will be the inverse of the elasticity of demand facing the product ϵ: that is, $\epsilon = 1/m$.[14] For example, a margin of 50 percent (one-half) will be chosen when the firm faces an elasticity of two.

The Lerner Equation directly implies a prediction of the sales that would be lost by a single product if its price were to rise by a SSNIP. By the definition of elasticity, the fraction of sales lost is approximately ϵs,[15] and by the Lerner Equation, that in turn equals s/m. With a profit-maximizing margin of 45 percent, a single product whose price rises by a 5 percent SSNIP can be expected to lose a fraction 5/45, or 11.1 percent, of its sales.

Can one use the Lerner Equation to arrive at a reliable estimate of the hypothetical monopolist's Actual Loss in Critical Loss Analysis?[16] In stark form, the contending positions are:

- *Stress Premerger Pricing Evidence.* If we want to know how the sales of a product, or a group of products, would respond to a price change, the best evidence normally is what the firms owning those products think, and what they do when their money is on the line. These firms know the market for their products better than any outside expert or court is likely to, and decisions taken in the normal course of business are less likely to be biased than is analysis developed in an adversarial setting. Economists generally treat revealed-preference information, i.e., direct inferences from actual choices, with special respect. Economics can fairly reliably infer a firm's beliefs about its demand elasticity from the firm's premerger behavior, specifically, the price that it chose for its product. Other information on demand responsiveness that was known to the firm should already be factored into its choice of price, and thus should be given little or no separate weight. Information on demand responsiveness that was available to the firm, but that the firm chose not to use, is probably not all that valuable, as judged by

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[12] Michael L. Katz & Carl Shapiro, *Critical Loss: Let's Tell the Whole Story*, ANTITRUST, Spring 2003, at 49.

[13] O'Brien & Wickelgren, *supra* note 4.

[14] A modified version of the Lerner Equation applies if the price affects the firm's profits in ways not captured by the margins the firm earns on this product alone. *See infra* Section 4.

[15] The Appendix shows that this approximation is exact (in the way we use it) when demand is linear. Of course, demand will never be exactly linear, but for small changes in price, departures from linearity should not normally cause large errors in calculating the change in profits. We thus view the linear calculations as a reasonable first approximation, which is all that market definition seeks in any case; if it suggests a close call, then one can look for curvature or kinks, as we discuss in Section 3 below.

[16] This approach to Critical Loss Analysis was explored by Michael Katz and Carl Shapiro, *supra* note 12, and by Daniel O'Brien and Abraham Wickelgren, *supra* note 4. Arguments against relying on the Lerner Equation were presented by David Scheffman and Joseph Simons in *The State of Critical Loss Analysis: Let's Make Sure We Understand the Whole Story*, ANTITRUST SOURCE, Nov. 2003, http://www.abanet.org/antitrust/at-source/03/11/scheffman.pdf. For responses to Scheffman and Simons, see Michael Katz & Carl Shapiro, *Further Thoughts on Critical Loss*, ANTITRUST SOURCE, Mar. 2004, http://www.abanet.org/antitrust/at-source/04/03/katzshapiro.pdf, and Daniel O'Brien & Abraham Wickelgren, *The State of Critical Loss Analysis: Reply to Scheffman and Simons*, ANTITRUST SOURCE, Mar. 2004, http://www.abanet.org/antitrust/at-source/04/03/obrienwickel.pdf.

the firm when it had money on the line. Thus, a good, simple way to estimate Actual Loss is to extrapolate, using economic logic, from the firms' premerger pricing choices.

- *Ignore Premerger Pricing Evidence.* The use of revealed-preference information in this context is badly flawed for several reasons. Firms do not always maximize profits. Even if they do, maximizing profits in the real world is very complex, often requiring the firm to take into account spillovers to its other (substitute or complement) products, but also involving customer loyalty, reputation, learning-curve effects, network effects, and so on. These factors are not included in any practicably implementable form of the Lerner Equation. Moreover, in an oligopoly, other firms may respond to any one firm's price changes, so a rational firm will not set its price to maximize profits taking as given its rivals' prices. Indeed, some economists have suggested that this often yields a "kink" in the demand curve facing a firm once rival responses are taken into account. Thus, in estimating the Actual Loss, it is better to give little or no weight to the firm's premerger choice of price and, instead, to seek direct evidence about demand responsiveness. Such evidence can include econometric or marketing studies and/or an intuitive evaluation of qualitative facts about what it would take for a customer to substitute away from a group of products. If the answer appears at odds with firms' premerger prices and margins, one should not be unduly puzzled or concerned.

In Sections 2 to 4 we address the concerns raised in the second bullet about the use of premerger margins to estimate the Actual Loss. To make the concept concrete, however, we begin by reviewing how premerger margins can be used in the simplest case.

   How Premerger Choices Reveal Demand Sensitivity: The Simple Case. Katz and Shapiro, and O'Brien and Wickelgren, develop a simple test for market definition using two ingredients. The first ingredient is the premerger margin, m. The second is the Aggregate Diversion Ratio, A, which is the fraction of the sales lost by one product, when its price alone rises by a SSNIP, that go to other products in the candidate market. Equivalently, one can think of $(1 - A)$ as the fraction of a product's demand elasticity that consists of substitution to goods *outside* the candidate market.

   Thus the elasticity of demand facing the hypothetical monopolist is only a fraction $(1 - A)$ of that facing any one product. This directly implies an estimate of Actual Loss of $L = (1 - A)\epsilon s$; this estimate is precise if demand is linear for small price changes. So, if we can use the Lerner Equation, the Actual Loss equals $L = (1 - A)(s/m)$. For example, with a SSNIP of 5 percent, a margin of 45 percent, and an Aggregate Diversion Ratio of 25 percent, the Actual Loss is estimated to be 8.3 percent, while the Critical Loss is 10 percent, so the group of products would form a market. Following this logic, in the symmetric case, gives:[17]

   Proposition 1 (Katz-Shapiro-O'Brien-Wickelgren): If each firm owns a single product and prices to maximize its profits taking as given all other prices, and if demand for each product is linear in price for small price changes from the premerger price, then a symmetric group of products forms a market under break-even analysis if and only if

$$A \geq \frac{s}{m + s} .$$

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[17] This is the test for whether a uniform SSNIP, imposed on all the (symmetric) products in the candidate market, is more profitable than the status quo price. A different condition diagnoses whether the hypothetical monopolist would find a SSNIP imposed on just one product more profitable than the status quo. As Øystein Daljord, Lars Sørgard & Øyvind Thomassen note in *The SSNIP Test and Market Definition with the Aggregate Diversion Ratio: A Reply to Katz and Shapiro*, J. Competition L. & Econ. (forthcoming 2008), this latter condition is that $A \geq s/m$. Because this latter condition is less easily satisfied than the one in Proposition 1, Proposition 1 accurately follows the Merger Guidelines test in the symmetric case. As Daljord et al. stress, the asymmetric test follows the Merger Guidelines in asymmetric situations where an asymmetric SSNIP is more apt to be profitable than is a symmetric one.

We do not suggest that this revealed preference approach is the only way to estimate Actual Loss. Nor should it be ignored, however. If one had a reasonably reliable estimate of m and of the Aggregate Diversion Ratio A, one should be skeptical of a separate estimate of Actual Loss that departed much from the predicted value of $L = (1 - A)(s/m)$. In our numerical example, a separate estimate of Actual Loss much greater than 8.3 percent would require reconciliation with the estimate of 25 percent for the Aggregate Diversion Ratio. We discuss how to handle such conflicting evidence in Section 5 below.

Evidence on the premerger margin can come directly from measurements of the premerger price and marginal cost. While there may be some debate about the level of marginal cost, there is often good information in company documents about marginal cost (or some appropriate version of average incremental cost) and one can always perform sensitivity analysis on the level of marginal cost.

Evidence on the Aggregate Diversion Ratio may be gleaned from surveys of customer switching patterns or past customer responses to changes in prices or product availability. Econometric evidence based on demand responses to price changes also can help in measuring A. As usual, one must seek to avoid inadvertently measuring price responses to demand shifts. Recall that A is calculated on the assumption that the price of one product changes and the other prices do not.

Proposition 1 implies that a seemingly narrow group of products will often form a market according to the Guidelines. With the standard SSNIP of $s = .05$ and with a moderate margin of $m = .45$, a group of products forms a market if $A \geq 0.1$. In many intuitively defined "industries," the Aggregate Diversion Ratio would be far higher, so narrower markets may well exist within the industry. For instance, if the price of one model, or brand, of cars were to rise by a SSNIP, quite a few customers would no doubt substitute away—but we would expect that most of them would substitute away to some other car. Thus, if gross margins are about 45 percent, there would be a product market considerably narrower than "cars." For example, if 20 percent of BMW customers would substitute to Mercedes or Audi following a SSNIP by BMW, and conversely, then the hypothetical monopolist test suggests that "German luxury cars" would be a market.[18] Certainly this arithmetic suggests that "cars" would easily be a market, and the hypothetical monopolist methodology would not imply that pickup trucks or minivans would need to be included. Whether the relatively narrow groups of products that often emerge from the Merger Guidelines methodology are the most informative way to define a market is a deep issue beyond the scope of this paper.

The *Whole Foods* court appeared to believe that a group of products could not form a market if the Aggregate Diversion Ratio is significantly below one-half, but our analysis shows that this view is inconsistent with the Merger Guidelines if, as is normally the case, m substantially exceeds s.[19]

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[18] In this article, we focus on whether a SSNIP would be profitable (either more profitable than the status quo, or profit maximizing), not on whether the candidate market contains the closest substitutes, in order, starting from one product of one of the merging firms.

[19] The court stated: "In other words, when a Whole Foods enters an area that has a Wild Oats store, its sales do not overwhelmingly come from Wild Oats, but primarily from other supermarkets; the main competitive interaction is between Whole Foods and 'other' grocery retailers." FTC v. Whole Foods Mkt., Inc., 502 F. Supp. 2d 1, 20 (D.D.C. 2007). While the public information on *Whole Foods* does not appear to include an estimate of m, there is evidence that the margin was far larger than the size of a SSNIP. The public version of the rebuttal report of the FTC's expert Dr. Kevin Murphy indicates that even with an aggregate diversion ratio of only 0.1 to 0.2, premium/natural organic supermarkets would constitute a relevant market according to a test equivalent to Proposition 1. *See* Expert Report of Kevin M. Murphy ¶ 28, FTC v. Whole Foods Mkt., Inc., 502 F. Supp. 2d 1 (D.D.C. 2007) (Civ. No. 07-cv-01021-PLF), *available at* http://www.ftc.gov/os/caselist/ 0710114/070823murphy.pdf. SSNIP sizes of 5% and 1% were discussed earlier in his report. Using a SSNIP of 5% and an aggregate diversion ratio of 20% would, according to Proposition 1, suggest a gross margin of 20%, four times the SSNIP. Using a SSNIP of 1% and an aggregate diversion ratio of 10% would suggest a gross margin of 9%, nine times the SSNIP.

But what if the assumptions behind Proposition 1 are not accurate? In Section 2 we generalize Proposition 1 to cover industries in which the premerger firms respond to one another's price changes. In Section 3 we generalize Proposition 1 to allow for the possibility that demand is not linear in price—in particular that demand becomes more sensitive to price increases as the price rises above the premerger level. In Section 4 we discuss how Critical Loss Analysis can be useful even when firms' real-world profit functions include various subtle and complex factors.[20]

2. Accounting for Pricing Responses by Rivals

Much quantitative merger analysis assumes in practice that each firm sets its price taking as given the other firms' prices. So far, we have followed that approach. However, this may not accurately reflect firms' actual behavior in many oligopolies in which mergers would be challenged these days. Indeed, whether a firm tracks, and responds to, other firms' price changes is often taken as an indicator of whether they compete or are in the same market.[21]

If premerger oligopolists are in the habit of responding to one another's price changes, then a firm that contemplates a price change will not care how its sales *would* respond if other prices were held fixed, but will seek to predict how its sales *will* respond once others react to that change as they are expected to do in the real-world oligopoly.[22] In general, then, revealed-preference information illuminates price sensitivity on this *residual demand curve*, not (directly) on the conventional demand curve that holds other prices fixed.[23]

Again, some fraction of the sales lost by any one product through its SSNIP go to other products in the candidate market, but now this fraction must be measured using the residual demand curve, i.e., accounting for the price responses of the other products. We call this the Residual Aggregate Diversion Ratio, or *A**. The Appendix proves:[24]

> *Proposition 2:* If each firm owns a single product and prices to maximize its profits accounting for price responses by other firms in the candidate market, and if demand for each product is linear in price for small price changes starting from the premerger price, then a symmetric group of products forms a market under break-even analysis if
>
> $$A^* \geq \frac{s}{m + s},$$
>
> but may do so even if that condition fails to hold.

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[20] In a few places we combine these analyses, but that is largely left for future work: we primarily relax the simplifying assumptions one at a time.

[21] For example, the *Whole Foods* court noted that Whole Foods tracks prices in mainstream supermarkets. 502 F. Supp. 2d at 19.

[22] Economists will recognize this approach as involving "conjectural variations," as developed by A.L. Bowley in THE MATHEMATICAL GROUNDWORK OF ECONOMICS (Oxford Univ. Press 1924) and extended by Timothy Bresnahan, *Duopoly Models with Consistent Conjectures*, 71 AM. ECON. REV. 934 (1982), and Martin K. Perry, *Oligopoly and Consistent Conjectural Variations*, 13 BELL J. ECON. 197 (1982). The theory of conjectural variations has been criticized in economic theory because it does not lay out from first principles a game-theoretic model of oligopoly. This is something of a bum rap. Economic theory does not suggest that oligopolies will tend to be characterized by static Nash competition; it is just that game theorists understand that case best. But the fact is that oligopolists often do respond to rivals' price changes, so a theory that recognizes that fact has some considerable advantage over a more elegant theory that denies it. Moreover, though not easy, it is perfectly possible to analyze price responses in game-theoretically primitive form. *See, e.g.*, Eric Maskin & Jean Tirole, *A Theory of Dynamic Oligopoly II: Price Competition, Kinked Demand Curves, and Edgeworth Cycles*, 56 ECONOMETRICA 571 (1988).

[23] The importance of the residual demand curve for assessing market power is not new in antitrust. *See, e.g.*, Jonathan B. Baker & Timothy F. Bresnahan, *Estimating the Residual Demand Curve Facing a Single Firm*, 6 INT'L J. INDUS. ORG. 283 (1988).

[24] The Appendix explains the technical assumptions underlying Proposition 2. We assume that the products are "strategic complements," so when one firm raises its price it expects the others to raise their prices (or leave them unchanged). We also assume that the prices set by firms in the candidate market are not materially influenced by any responses they anticipate from firms outside the candidate market. Our results would need to be modified if this condition is not met.

In the usual case where firms expect accommodating responses, meaning that rivals at least partly match price changes, less of each firm's lost sales will remain within the candidate market than would do so if those rivals did not respond. Thus, $A^* < A$, so using A and Proposition 1 could incorrectly suggest that a group of products is a market. Intuitively, if premerger firms face substantial accommodating responses, then they are not competing very strongly, so there is less of a change from that situation to that of control by the hypothetical monopolist, who therefore might find a SSNIP unprofitable.[25] Proposition 2 offers a conservative check on that possibility, by giving a sufficient (but not necessary) condition using the smaller value A^*.

The Residual Aggregate Diversion Ratio, A^*, may be estimated from industry experience of responses to price changes. Econometrically, it would be important to ensure that those price changes are indeed initiated by the one firm, perhaps following changes in its firm-specific costs, or changes in managerial assessment of market conditions, as opposed to general price shifts prompted by industry-wide cost shocks or by shifts in demand. Evidence on A^* could also come from documents of the merging parties, especially those analyzing the profitability of a price change by estimating the extent to which sales will *in fact* (in the premerger oligopoly) be lost to (or taken from) various rival products. For example, a merging party might have documents predicting rival pricing responses. One can estimate A^* by combining these expected pricing responses with survey data indicating customer switching patterns in response to price changes. Furthermore, evidence regarding A will bear on A^*, either through the inequality $A^* \leq A$ or to the extent that one might be able to trace through the differences between the two.[26]

Estimation of A^* will often be more reliable than estimation of L, because A^* is directly relevant to real-world premerger pricing decisions faced by the firms: "If we raise our price, and our rivals respond as we expect, how many customers will we lose and what alternatives will they pick?" In contrast, L inherently involves a hypothetical that is typically a significant, artificial departure from the real, premerger world: "If we and a collection of our rivals raise our prices in unison, how many customers will we lose?" This question is unlikely to be contemplated by suppliers in the normal course of business (unless they are engaged in price fixing or the industry dynamics involve very strong price-matching responses).

3. Demand More Sensitive to Price Increases than Price Decreases

Scheffman and Simons criticize the Katz-Shapiro/O'Brien-Wickelgren test in Proposition 1 because it assumes that customers are equally sensitive to price increases and price decreases: "But the price elasticity might be significantly different for price increases than for price decreases."[27] We now show how Propositions 1 and 2 can be modified to address this possibility.

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[25] The Merger Guidelines recognize that premerger coordination may not persist, so the "but-for merger" price from which the SSNIP should be measured may be lower than the premerger price. Section 1.1 in the Merger Guidelines states that "the Agency will use prevailing prices of the products of the merging firms and possible substitutes for such products, unless premerger circumstances are strongly suggestive of coordinated interaction, in which case the Agency will use a price more reflective of the competitive price." With strongly accommodating premerger behavior, it may not be appropriate under the Merger Guidelines to measure the SSNIP starting from premerger prices, and the test in Proposition 2 would need to be modified. Our approach offers a possible way to do so—using the no-reactions Aggregate Diversion Ratio—while as far as we are aware other quantitative techniques do not. If one believes that premerger pricing reflects (perhaps tacit) coordination that ought not to be taken as the but-for world, market definition might begin from a lower price, just as it ought in circumstances threatened by the *Cellophane* Fallacy.

[26] The relationship between A and A^* depends upon the degree to which rivals match a single firm's pricing changes and the impact of those reactions on the firm's sales (as measured by diversion ratios). The proof of Proposition 2 in the Appendix derives a formula for the relationship between A and A^*.

[27] Scheffman & Simons, *supra* note 16, at 6.

Suppose that a single product loses sales in response to a price increase, accounting for responses by other firms in the candidate market, at a rate $1 + k$ times the rate at which it gains sales in response to a tiny price decrease.[28] With this definition, which is simply an arithmetical way to keep track of such possible asymmetry on the residual demand curve, Proposition 2 becomes:

> *Proposition 3:* If each firm owns a single product and prices to maximize its profits accounting for price responses by other firms in the candidate market, a symmetric group of products forms a market under break-even analysis if and only if

$$A^* \geq \frac{\dfrac{s}{m + s} + k}{1 + k}$$

which is equivalent to

$$k \leq k_{max} = \frac{A^* - \dfrac{s}{m + s}}{1 - A^*} .$$

Following Katz and Shapiro,[29] it seems reasonable to require a party arguing for $k > 0$ based on asymmetric customer responses to present evidence in support of this claim.

Another possibility is that customers are equally sensitive to price increases and decreases but *rivals* have asymmetric responses. Suppose, in particular, that rivals more fully match price cuts than they do price increases: this is the "kinked demand curve" theory of oligopoly.[30] The Appendix shows how such behavior can imply $k > 0$ and provides a method of calculating k.[31]

One procedure for incorporating these issues would run as follows. Begin with a default assumption that demand is equally sensitive to price increases and price decreases: $k = 0$.[32] Under this default assumption, Proposition 2 tells us that the symmetric group of products forms a market if and only if $A^* \geq s/(m + s)$. If reliable evidence on A^* implies that this condition holds, there would be a presumption that these products form a market, but this presumption could be rebutted.

One way to rebut the presumption would be to produce other evidence on Actual Loss. If that other evidence suggests that $L > s/(m + s)$, it would conflict with the evidence suggesting that $A^* > s/(m + s)$. In Section 5 we offer some comments on how a court might weigh such conflicting evidence, but our principal point is that it should do so, and should not ignore the evidence on Actual Loss that is based on estimating A^*.

Begin with a default

assumption that

demand is equally

sensitive to price

increases and price

decreases . . .

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[28] The Appendix gives a technical definition of k. If the demand curve is not literally "kinked," but only curved, then it is not necessary to specify that the tiny price change is a decrease.

[29] *See* Katz & Shapiro, *supra* note 12.

[30] *See* Paul M. Sweezy, *Demand Under Conditions of Oligopoly*, 47 J. POL. ECON. 568 (1939). Sweezy refers to the "imagined demand curve," which we now know as the "residual demand curve." *See also* R.L. Hall & C.J. Hitch, *Price Theory and Business Behaviour*, *in* 2 OXFORD ECON. PAPERS 12 (1939).

[31] If a candidate market includes all of the rival products whose asymmetric responses kink the residual demand curve for any one product, then as Katz and Shapiro observe, there is no kink in the demand curve facing the hypothetical monopolist. *See* Katz & Shapiro, *Further Thoughts on Critical Loss*, *supra* note 16.

[32] Alternatively, one might begin with a different default assumption or presumption about k, based on empirical evidence not specific to the case at hand. Although we would not want to over-weight evidence consisting of economic theorists' and econometricians' conventional choices of functional forms for study, we note that while linear demand has $k = 0$, constant-elasticity and several other widely used "standard" demand systems have $k < 0$.

Another way to rebut the presumption would be through evidence that demand is sufficiently more sensitive to price increases than to price decreases. The necessary level of asymmetry k_{max} is given by Proposition 3. One might use a sliding scale of rebuttable presumption, with more convincing evidence required for larger k_{max}. As discussed in our companion paper, evidence on the rate at which changes in costs are passed through to changes in price is relevant to k.[33]

This approach treats evidence concerning demand response (such as company documents, customer interviews, marketing surveys, or econometric estimates of demand) quite differently than does Critical Loss analysis as it is often currently performed. In many cases, such as *Whole Foods*, an expert for the merging parties estimates Actual Loss using evidence that says little or nothing about *asymmetric* demand response, neither explicitly estimating k nor calculating k_{max}, but that tends to suggest that the demand facing the hypothetical monopolist is sensitive to price.[34] Combining such evidence with a calculation that, with fairly high margins, Critical Loss is not very large, some experts and courts have inferred that a group of products is too narrow to be a market. But this inference ignores premerger pricing information: a high demand elasticity would also suggest that firms were pricing irrationally high prior to the merger. Thus, it puts little or no weight on firms' own premerger pricing decisions, or is very willing to believe a high value of k, or both. The approach discussed here, in contrast, discounts evidence that would suggest high demand elasticity if it conflicts with the evidence from firms' premerger pricing decisions, unless that conflict is resolved by evidence on demand response or industry dynamics.

4. Complexities in Real-World Profits

Real-world firms often do not maximize the direct, readily quantifiable profits from any one product considered in isolation. When a firm sells competing or complementary products, it will naturally account for spillover effects on profits when setting the price of any one product. Plus, dynamic and intangible considerations, such as customer loyalty, reputation, network effects, and learning curves, commonly arise.

When such factors are significant, it matters whether or not one views the hypothetical monopolist as inheriting premerger firms' concern for those factors. If so—an assumption that might place more strain on our assumption of symmetry[35]—then we can extend the analysis above relatively simply. If not, then there are reasons to be pessimistic about the likely contribution of market definition to a reasonable presumption or screen concerning a merger's competitive effects.

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[33] Farrell & Shapiro, *supra* note 8.

[34] Criticizing the economic expert for the merging parties, the economic expert for the FTC stated: "Economic theory makes no prediction that consumers will respond more to price increases than to price decreases, and Dr. Scheffman provides zero evidence that such asymmetric responses would be expected in this case, or any other one. All of the qualitative evidence he relies on is equally supportive of large responses to price increases and decreases, both for existing firms and for a hypothetical PNOS monopolist." *See* Rebuttal Expert Report of Kevin M. Murphy ¶ 14, FTC v. Whole Foods Mkt., Inc., 502 F. Supp. 2d 1 (D.D.C. 2007) (Civ. No. 07-cv-01021-PLF), *available at* http://www.ftc.gov/os/caselist/0710114/070823rebutmurphy.pdf. A different way in which direct estimates of (or claims about the magnitude of) Actual Loss sometimes fail to confront contrary evidence from revealed preference is if the direct estimate merely recites a number of ways by which demand elasticity *could* arise—ways in which customers *could* substitute—but does not reconcile this estimate with the evidence from premerger margins that those channels of substitution do not *in fact* cause high premerger elasticity.

[35] Of course, these complexities may differ for the different firms in the market. As noted above, in practice, Critical Loss Analysis is performed by considering a uniform SSNIP applied to symmetric products. We retain the assumption of symmetry in this section and refer readers to Moresi et al. and to our companion paper, *Cannibalization, Pass-Through, and Market Definition*, for analysis of asymmetric situations. *See* Moresi, Salop & Woodbury, *supra* note 7; Farrell & Shapiro, *supra* note 8.

Suppose that the various factors that enter into the premerger firms' profit functions are also included in the hypothetical monopolist's profit function. In the symmetric case, this seems the most useful and appropriate way to interpret the hypothetical monopolist test.[36] After all, the point of the test is to identify the collection of firms that would find it profitable to impose a SSNIP, so that changes in concentration among that group of firms tell one something about the likely competitive effects of the merger. Concern for customer reputation or for follow-on sales of a tangible complement applies before the proposed merger and will apply afterwards. Therefore, it seems natural to include it in any analysis intended to be informative about competitive effects.[37]

The calculations above did not take such factors into account, either in the simplified profit function used for the hypothetical monopolist or for the profit functions of the premerger firms. We now show how to use premerger pricing information in markets where these complexities are important.

To illustrate, suppose that the premerger firms all sell a complementary product as well as the primary product being studied. Suppose that each firm expects some profitable sales of the complement to follow each sale of the primary product. For example, in a candidate market for enterprise computers, each manufacturer may anticipate profitable follow-on sales of information technology management services to the buyers of its computers. Then a premerger firm sets the price of its primary product to maximize not simply the direct profit from sales of the primary product, $(p - c)x$, but rather $(p - c)x + Bx$, where B represents the anticipated follow-on benefits (profits) from selling one more unit of the primary product.[38] This formulation is general enough to handle a wide range of complexities, including network effects, learning-by-doing, and reputation effects, as well as multi-product firms. An outside observer may or may not be able to estimate accurately the benefit B in a particular case, but even when it is difficult to do so, it may at least be feasible to determine whether B is positive or negative. We believe that most of the intangibles that businesses typically focus on involve a positive value of B, so we assume here that $B \geq 0$. That is, if anything, businesses typically like to make sales even past the point where a simple quantitative profit analysis would recommend.

Introducing additional per-unit benefits of B is economically equivalent to reducing the net cost of selling a unit from c to $c - B$. The true economic margin is thus $m^* = (p - c + B)/p$ rather than $m = (p - c)/p$, the accounting margin. We write $m^* = m + b$ where $b = B/p$. Replacing the accounting margin m with the economic margin m^*, all of the analysis leading up to Propositions 1, 2, and 3 can be repeated, but now the presence of these follow-on (perhaps intangible) benefits does not undermine the Lerner equation, which takes them into account. Thus Propositions

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[36] The Merger Guidelines do not explicitly state what factors should be included in the profit function of the hypothetical monopolist, and we are not aware of this issue being addressed in other published work or agency guidance.

[37] Scheffman and Simons emphasize that the Critical Loss is "just arithmetic." Scheffman & Simons, *supra* note 16, at 2, 3, 4. That is only true if one uses the highly simplified profit function for the hypothetical monopolist. While using that profit function is reasonable if the excluded factors are small, when they are large it introduces a significant change in incentives having nothing to do with the hypothesized end to competition among the products in the candidate market. It thus muddies the waters of market definition. We show below how using the simplified profit function can lead to absurd results. *See also* David S. Evans & Michael D. Noel, *Analyzing Market Definition and Power in Multi-Sided Platform Markets* (Working Paper Oct. 21, 2005), *available at* http://ssrn.com/abstract=835504 (arguing that standard techniques applied to one side of a platform market in isolation are often badly misleading; one can view this as a form of omitting consideration of an important complement).

[38] We continue to assume that the firm maximizes its overall profits. Scheffman and Simons observe that firms do not always exactly maximize profits. *See* Scheffman & Simons, *supra* note 16. This is surely true, but the critical-loss methodology, and indeed almost all modern antitrust economics, is based on evaluating firms' profit incentives (and the Merger Guidelines follow this approach regarding the hypothetical monopolist). Because merger analysis focuses on the *change* in market power, a disciplined approach should presumably take the same view of the profit maximization hypothesis (or approximation) before and after a merger.

1, 2, and 3 remain valid, replacing m with $m^* = m + b$. For example, the condition in Proposition 2 becomes

$$A^* \geq \frac{s}{m^* + s} = \frac{s}{m + b + s}.$$

If one can reliably quantify b then one can use these formulae directly to diagnose antitrust markets in this more complex environment. In other cases, it will not be possible to quantify b and thus calculate m^*. However, if $B > 0$ then $m^* > m$, so if the conditions provided in Propositions 1, 2, and 3 hold using the accounting margin m, then they hold using m^*, so one can all the more strongly conclude that the candidate group of products form a market.

> *Proposition 4:* If each firm receives some additional benefit from selling its primary product, and if these benefits are not included in the accounting margin m, then if the conditions in Propositions 1, 2, and 3 hold using that accounting margin, the candidate group of products must form a market under break-even analysis, so long as these benefits also are included in the profits of the hypothetical monopolist.

We now address the possibility that $B < 0$, i.e., that each firm incurs some cost, not measured in the accounting margin, when it sells one more unit of the primary product. This possibility arises if the primary product cannibalizes sales from substitute products owned by each firm that are not in the candidate market.[39] In this situation, the tests in Propositions 1, 2, and 3 can incorrectly report that a candidate group of products is a market: the true economic margin is lower than the accounting margin, so the elasticity of demand for each product is higher than would be inferred from the Lerner Equation using the accounting margin, leading to a larger Actual Loss. One way to analyze that situation is to perform Critical Loss Analysis on a broader group of products including those substitute products.[40] Alternatively, if the cannibalization effect can be measured, one can use the (lower) true economic margin instead of the accounting margin in Propositions 1, 2, and 3.

While we think it makes sense to include B in principle in the hypothetical monopolist's profit function in the symmetric case, one might read the Merger Guidelines not to do so. Surprisingly, the issue does not seem to have attracted explicit discussion. We do not take a strong general position here, but simply observe that omitting a substantial B can be expected to lead to market definitions that may be uninformative or misleading.[41]

The fundamental idea of market definition for merger analysis in unilateral effects cases is to provide a simple preliminary gauge of the extent to which a merger's removal of competition between the merging firms' products will threaten competition. To do so, it asks how important that competition is in restraining prices, premerger. It seems strikingly uninformative to observe, for instance, that if, instead of removing that competition, one severed each product's link to an important complement that is present premerger and will be present postmerger, then prices would rise substantially. But this is all the hypothetical monopolist test would be telling us if we stripped the hypothetical monopolist of premerger firms' concerns for their complements: in fact, if $b > s$, one would find single-product markets.[42]

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[39] Moresi et al. focus attention on this particular case. *See* Moresi, Salop & Woodbury, *supra* note 7.

[40] Strictly speaking, doing this might not adhere to the algorithm in the Merger Guidelines for adding products in the order of "next-closest substitutes," and "generally" stopping with the smallest group of products that forms a market. In practice, this algorithm is rarely followed slavishly, in part because the information necessary to do so is typically unavailable (and the "narrowest-market principle" can be misleading).

[41] *See also* Evans & Noel, *supra* note 37.

[42] In general, with $B > 0$, the Appendix shows that the hypothetical monopolist test systematically leads to narrower markets if the hypothetical monopolist's profits do not include B than if they do.

5. Conflicting Evidence

Because market definition is often central in antitrust litigation, courts and agencies are often confronted with conflicting Critical Loss analyses. We offer some suggestions for using revealed preference analysis to help confront such conflicting economic evidence.

Suppose that a SSNIP of 5 percent will be used and that there is no dispute that the accounting margin is 45 percent.[43] If there are no significant intangible benefits, these values for m and s imply that the Critical Loss is 10 percent. Suppose, however, that the opposing experts disagree over the Actual Loss to be expected if a hypothetical monopolist over the government's proposed market were to impose a SSNIP.

Professor A, the government's economic expert, performs a study finding that the Actual Loss would be only 8.3 percent. Because this is less than the Critical Loss of 10 percent, she finds that the government's proposed market is indeed a market.

Professor B, the expert for the merging parties, performs a different study concluding that the Actual Loss would be L = 15%. Because this exceeds the Critical Loss of 10 percent, he testifies that the government's proposed market is not a market.

Can we help the judge assess the reliability of the conflicting estimates?

If neither study used revealed-preference methods, one can ask what each would imply for the Residual Aggregate Diversion Ratio, A^*. To do so, we ask what loss of sales an individual product would experience if it unilaterally raised its price by the 5 percent SSNIP. Given the margin of 45 percent, the Lerner equation suggests an elasticity of residual demand of 1/.45, or 2.2. With linear demand, the loss of sales from a 5 percent price increase would be 2.2 times 5 percent, or 11 percent. This is less than the 15% Actual Loss estimated by Professor B, the defense expert. While the Actual Loss for the single producer is greater than the Critical Loss, how can the Actual Loss for the hypothetical monopolist be *more* than the loss for a single product?

As Section 3 discussed, Professor B could defend his L = 15% estimate of Actual Loss by arguing that demand is more sensitive to price increases than price decreases. With such demand asymmetry, the Lerner equation for premerger firms gives an estimate of Actual Loss for the hypothetical monopolist of $L = (1 + k)(1 - A^*)(s/m)$. Since $s/m = 0.11$, Professor B's estimate that $L = 0.15$ implies that

$$(1 + k)(1 - A^*) = \frac{0.15}{0.11} = 1.36, \text{ or } k = \frac{1.36}{1 - A^*} - 1,$$

so $k > .36$ (so long as A^* is positive). While k might be this large, as discussed in Section 3, we would recommend further probing of Professor B's Actual Loss estimate, since it implies such a sharply curved (or kinked) residual demand curve.

Defense expert Professor B might alternatively point out that many factors other than accounting profits enter into firms' premerger pricing decisions. Our analysis in Section 4 implies that this

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[43] Since m is important in Critical Loss Analysis, one might expect it to be controversial, as it typically is in predatory pricing cases. If Actual Loss is estimated separately, then estimates of m are used only in calculating Critical Loss, where a higher estimate of m lowers estimated Critical Loss and thus tends to lead to broader markets. Typically one would then expect to see the government arguing for lower m and the merging firms for higher m, although it is not always the case that broader markets assuage competitive concerns. If, on the other hand, Actual Loss is estimated from revealed preference, then a higher estimated m reduces the estimates of both Critical Loss and Actual Loss; as it turns out (see Propositions 1 to 3) a higher estimate of m tends on balance to lead to narrower markets. Strictly, the relevant cost concept is average incremental cost over the demand increment concerned. Average incremental cost is, by definition, equal to the average value of marginal cost. In practice it is often approximated by accounting-based measures of average variable cost (see, e.g., Harris & Veljanovski, *supra* note 4, at 214), although this approximation is not always reliable. One can view some of the analysis in this section as also offering insights into the effects of simply over- or under-estimating gross margins.

is not a good answer if $b > 0$, as we expect will normally be the case. For then the true econom-ic margin exceeds the accounting margin of 45 percent, so the Lerner equation indicates that the elasticity of demand facing any given product is *lower* than the previous estimate of 2.2. For example, if selling one more unit generates intangible benefits valued at 5 percent of the price, so $b = 5\%$, then the economic margin is $m^* = m + b = 45\% + 5\%$, so the Lerner equation implies that the elasticity of demand facing any one product is 2.0. Therefore, the loss of sales for a sin-gle product following a unilateral SSNIP will be 10 percent, which casts even more doubt on Professor B's Actual Loss estimate of $L = 15\%$. Thus a challenge to the use of the Lerner Equation here must involve either a claim that premerger firms were pricing *above* their profit-maximizing level (and our use of residual demand implies that this would not be simply a result of oligopoly interdependence), or face important intangibles discouraging additional sales, or else a radical challenge to the use of the profit maximization methodology.

With the numbers given above, government expert Professor A's estimate that $L = 8.3\%$ is eas-ily calculated to be consistent with an Aggregate Diversion Ratio of 25 percent if k is zero. Specifi-cally, recall that the Lerner equation applied to a 45 percent gross margin implies a product-level residual demand elasticity of 2.2. If $A^* = 0.25$ then the predicted demand elasticity for the hypo-thetical monopolist is $(1 - 0.25) \times 2.2 = 1.65$, so that a 5 percent SSNIP would lead to an Actual Loss of $1.65 \times 5\% = 8.3\%$. The court could ask whether this 25 percent estimate for A^* is con-sistent with the evidence.[44]

Another possibility is that one of the experts relied on the revealed-preference method. Suppose for instance that the government's expert, Professor A, put less weight on marketing and econometric studies of demand but conducted a study of demand substitution patterns in response to price changes initiated by one product. Her study yielded an estimate $A^* = 0.25$, and she testified that this was her primary basis for her $L = 8.3\%$ estimate. In this case, obviously, con-sistency with A^* is not an issue. Now the two experts have arrived at their conflicting estimates of L via more fundamentally differing paths. Professor A estimated A^*, inferred L, and found that the inferred estimate of L was less than the Critical Loss. Professor B estimated L to be greater than the Critical Loss. They embody the two bullet points in Section 1.B.

In this situation, we hope the court would recognize and confront the tension between the two approaches. Naturally, the court will want to assess the quality of the evidence underlying the esti-mate of $A^* = 25\%$ by the government's expert and the estimate of the Actual Loss of $L = 15\%$ by the expert for the merging parties.

The court may be tempted to give greater weight to the separate "direct" estimate of L than to the indirect estimate of Actual Loss based on an estimate of A^* combined with use of the Lerner Equation. However, we believe such an approach would not be justified, for three reasons. First, the version of the Lerner Equation developed in this paper is very general and flexible, allowing for oligopolistic interactions, for curvature of demand, and for many other factors to enter into firms' pricing decisions. Rejecting this version of the Lerner Equation is tantamount to rejecting the whole profit-maximization methodology that underlies the Merger Guidelines and indeed much if not all of antitrust economics as currently practiced. Second, as noted above, it may well be pos-sible to obtain a more reliable estimate of A^* than of L based on documentary evidence, because A^* relates more closely to questions that the suppliers actually face in the real, premerger world. Third, since Critical Loss Analysis involves comparing two estimated quantities (the Critical and

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44 The court also can ask what value of k would bring the estimate of A^* in line with the other evidence.

Actual Losses), its accuracy depends in potentially complex ways on the accuracy of the two estimates. In particular, if a method errs in the same direction in its estimation of each quantity, it may be more robust and accurate than another method whose errors are less correlated. Further work on this issue could prove helpful.

6. Break-Even and Profit-Maximizing Tests

As we noted in the previous paragraph, the assumption of profit maximization permeates much, if not all, of antitrust economics as currently practiced. The break-even version of Critical Loss Analysis we have explored so far does not analyze what a hypothetical monopolist would find *most* profitable, but only asks which of two pricing patterns it would find *more* profitable. In doing so, it departs not only from usual economic and antitrust methodology, but also from the Merger Guidelines themselves. Such a departure is somewhat built into an approach of separate estimation of Critical and Actual Losses, but is avoidable if one is willing to take as a working approximation that demand is roughly linear or to use another functional form for demand. Thus, we can modify our Propositions 1 through 4 to work with the profit-maximizing version of the SSNIP test called for in the Merger Guidelines.

   A. Relationship Between the Two Tests. The Appendix provides mild conditions such that if the profit-maximizing response to hypothetical monopolization is to impose at least a SSNIP, then a SSNIP is more profitable than the status quo.[45] Intuitively, if a SSNIP is a partial move toward profit maximization (from the status quo) then it will likely yield some increase in profit. However, even when these conditions are met, the converse need not hold, and no reasonable conditions suggest themselves under which one could make that inference. Thus, for a given size of SSNIP, the break-even test is easier to satisfy, and will tend to suggest narrower markets.

   Further work is needed to learn more about which of the two tests is more robust, i.e., less sensitive to errors in the measurement of the Actual Loss, the Residual Aggregate Diversion Ratio, the curvature of the residual demand curve, and the premerger margins.

   B. Linear Demand: Modifying Propositions 1 and 2. Recall that Propositions 1 and 2 assumed linear (residual) demand. The Appendix shows that for a firm—including a hypothetical monopolist—with constant marginal cost and linear (residual) demand, the profit-maximizing price change from any status quo is just half the break-even change. Thus, as Katz and Shapiro noted,[46] it is profit-maximizing to impose (at least) a SSNIP *s* if and only if a price increase of 2*s* is more profitable than the status quo. As a result, we can readily modify Propositions 1 and 2 as follows:

   Proposition 1A (Katz-Shapiro-O'Brien-Wickelgren): If each firm owns a single product and prices to maximize its profits taking as given all other prices, and if demand for each product is linear in price for small price changes from the premerger price, then a symmetric group of products forms a market under profit-maximizing analysis if and only if

$$A > \frac{2s}{m + 2s}.$$

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[45] These conditions will often be met, but not always. Discussing the *Sungard* case, Katz notes that they would not be met if a substantial number of customers would switch in response to a 5 percent SSNIP, making it unprofitable, but few additional customers would switch in response to a considerably larger price increase, making the latter profit-maximizing. *See* Katz, *supra* note 4. He also suggests that even if *in fact* a 5 percent SSNIP would be profitable, it might be easier to *prove* that a larger price increase would be profitable.

[46] *See* Katz & Shapiro, *supra* note 12.

Proposition 2A: If each firm owns a single product and prices to maximize its profits accounting for price responses by other firms in the candidate market, and if demand for each product is linear in price for small price changes starting from the premerger price, then a symmetric group of products forms a market under profit-maximizing analysis if

$$A^* \geq \frac{2s}{m + 2s},$$

but may do so even if that condition fails to hold.

The logic underlying Proposition 4 carries over to the profit-maximizing version of the SSNIP test, so we have

Proposition 4A: If each firm receives some additional benefit from selling its primary product, and if these benefits are not included in the accounting margin *m*, then if the conditions in Propositions 1A and 2A hold using that accounting margin, the candidate group of products must form a market under profit-maximizing analysis, so long as these benefits also are included in the profits of the hypothetical monopolist.

C. Demand More Sensitive to Price Increases: Modifying Proposition 3. If demand is more sensitive to price increases than price decreases, the profit-maximizing analysis is significantly more complex than the break-even analysis. The profit-maximizing price increase depends upon the precise shape of the demand curve at prices above the premerger price. Our companion paper explores how the rate at which cost changes are passed through into price changes features in this analysis and develops tests for market definition with non-linear demand using the profit-maximizing SSNIP test in the Merger Guidelines.[47]

Our overall message is that the complexities sometimes thought to undermine inferences based on premerger margins need not do so.

Conclusion

We have developed new and improved tools for using premerger pricing information in Critical Loss Analysis to help define markets under the Merger Guidelines. Our overall message is that the complexities sometimes thought to undermine inferences based on premerger margins need not do so. We have explored three such complexities: various modes of oligopolistic interaction; greater sensitivity of demand to price increases vs. price decreases; and various complementarities and business intangibles that enter into firms' profits. We have provided two versions of our results: the analysis that applies to the breakeven version of Critical Loss Analysis that is used regularly in merger litigation, and one that applies to the profit-maximizing version of the SSNIP test actually called for in the Merger Guidelines.

In Section 2, we extended the analysis to cases in which it is important to account for the possibility that oligopolists respond to one another's price initiatives. Katz and Shapiro[48] discussed this but we take the analysis further here. Proposition 2 shows that the natural generalization of Propositions 1 to dynamic oligopolistic conduct continues to provide sufficient conditions for a group of products to form a market.

In Section 3, we extended Proposition 2 to allow for the possibility that residual demand is more sensitive to price increases than to price decreases. We calculated how much asymmetry in the price sensitivity of residual demand must be present for a group of products *not* to form a market. This result, Proposition 3, relies only on Critical Loss arithmetic and the standard assumption

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[47] *See* Farrell & Shapiro, *supra* note 8.

[48] Katz & Shapiro, *supra* note 12.

that the premerger price of each product in the candidate market was set to maximize the profits from that product. So far as we are aware, no such general condition has previously been available. We suggest that the agencies and the courts should require convincing evidence before accepting claims that residual demand is much more sensitive to price increases than to price decreases. If an expert estimates an Actual Loss for a hypothetical monopolist implying that premerger firms were failing to maximize profits premerger, that result should be explicitly acknowledged and some skepticism applied. Unfortunately, this does not appear to have happened in *Whole Foods*.

In Section 4, we asked how different approaches fare when business considerations omitted from the simplified profit function substantially affect premerger (and likely postmerger) pricing. We showed that when intangibles like customer goodwill favor low prices, as we would typically expect, the conditions in Propositions 1, 2, and 3, calculated using accounting margins, remain sufficient for a candidate group of products to form a market so long as the profits of the hypothetical monopolist also include these same intangible factors. This is a major generalization of previous results. Section 6 extends the results to a profit-maximizing SSNIP.

Larger premerger margins imply a lower Critical Loss but also, by revealed preference, strongly suggest a lower value of Actual Loss. Using the revealed-preference approach, larger premerger margins on balance suggest narrower markets, in contrast to what is suggested if one estimates Actual Loss separately. This lesson can be seen in Propositions 1, 2, and 3, which show that a smaller degree of competition among the products in a candidate market (as measured by the Aggregate Diversion Ratio) is sufficient for these products to form a market if the premerger margin is larger. Intuitively, larger premerger margins magnify the cannibalization effect, making it more profitable for the hypothetical monopolist to impose a SSNIP. Another lesson is that markets are narrower, the smaller is the SSNIP used. Section 5 illustrates how the analysis here can be used to test the market definition claims of opposing experts.

Some of our analysis is fairly simple, some not. But where it gets complicated, it does so because it is dealing with complicated reality. One can undertake Critical Loss Analysis in a seemingly simpler manner, but only by ignoring key revealed-preference information and stripping the hypothetical monopolist of key business concerns shared by pre- and post-merger actual firms, thus depleting the market definition exercise of both reliability and relevance.

Even with the new and improved tests developed here and in our companion paper,[49] the whole market definition exercise has some serious drawbacks. We argue in ongoing work[50] that an alternative approach can be used instead of the market definition and market concentration methodology in cases where the primary concern is unilateral anticompetitive effects. We argue that this alternative approach offers a simple and intuitive formulation of unilateral effects that is far more transparent and robust than traditional merger simulation and encourages the integration of marginal-cost efficiencies at an early stage in the analysis. ●

If an expert estimates

an Actual Loss for

a hypothetical

monopolist implying

that premerger firms

were failing to

maximize profits

premerger, that result

should be explicitly

acknowledged and

some skepticism

applied. Unfortunately,

this does not appear

to have happened in

Whole Foods.

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[49] *See id.*

[50] *See supra* note 5.

Appendix

Critical Loss Calculation

If the hypothetical monopolist would lose sales of Z units, then the SSNIP increases the (simplified) profits of the hypothetical monopolist if and only if $(p+sp-c)(X-Z) > (p-c)X$, i.e., if the profits earned on the remaining sales at the higher price exceed those earned on the initial sales at the lower price. This expression can be rewritten as $Z/X < s/(m+s)$.

Proof of Proposition 1

Let the (point) elasticity of demand facing a single product be given by ε. By the Lerner Equation, $\varepsilon = 1/m$. If a single firm raises the price of its product by a SSNIP, and if the demand for its product is linear over this range in prices, the percentage decrease in its sales will be equal to the percentage increase in price, s, times the elasticity, ε. Therefore, its percentage loss of sales will be εs, which equals s/m.

Now consider the hypothetical monopolist that imposes a uniform SSNIP on all of the products in the candidate market. The hypothetical monopolist will recapture a fraction A of the sales lost by any one product when its price is raised, since those lost sales will be diverted to products owned by the hypothetical monopolist. Therefore, Actual Loss for the hypothetical monopolist, measured as a percentage of initial sales, will be $(1-A)\varepsilon s$ which equals $(1-A)s/m$. The products form a market if and only if this expression is less than the Critical Loss of $s/(m+s)$. This simplifies to $A \geq s/(m+s)$, proving Proposition 1.

This proof relies on the assumption of linear demand. We used linear demand to conclude that the single firm's loss in sales will be εs, an expression that is linear in the price increase. If demand is convex, the loss of sales will be smaller and the condition in Proposition 1 will be sufficient but not necessary for the products to form a market. Concave demand is studied in Proposition 2.

The proof also relied on the assumption that the Aggregate Diversion Ratio is constant over the relevant range of prices (between premerger prices and the prices after the SSNIP). We used this assumption when we stated that the Actual Loss for the hypothetical monopolist imposing a uniform SSNIP will be $(1-A)\varepsilon s$. One can think of the hypothetical monopolist as imposing the SSNIP on one product after another *seriatim*. The resulting recapture rate will be A if the Aggregate Diversion Ratio is the same for each individual price increase.

Proof of Proposition 2

We show here that the Actual Loss as a fraction of initial sales is at least $(1-A^*)/m$.

We define δ as the diversion ratio between any pair of products, i.e., the fraction of sales lost by one product when its price alone rises that are captured by the other product. We assume that all the diversion ratios are constant in the relevant range and that each firm's demand is linear in price over the relevant range. So we can write the unit sales of Product 1 as $x_1 = \overline{x}_1 - (p_1 - \overline{p}_1) + \delta \sum_{j \neq 1}(p_j - \overline{p}_j)$. The Aggregate Diversion Ratio is $A = \delta(K-1)$ where there are K products. If the prices of all products other than Product 1 are the same, we can write $x_1 = \overline{x}_1 - (p_1 - \overline{p}_1) + A(p_2 - \overline{p}_2)$. We also can write the change in output at the other firms when Product 1's price alone changes as $x_2 = \overline{x}_2 - (p_2 - \overline{p}_2) + \delta(p_1 - \overline{p}_1) + \delta \sum_{j \neq 1,2}(p_j - \overline{p}_j)$. With symmetry among all of the other firms, this becomes

$$x_2 = \overline{x}_2 + (p_2 - \overline{p}_2)[-1 + A - \delta] + \delta(p_1 - \overline{p}_1).$$

Now we are ready to consider an arbitrary exogenous increase in p_1 and see how the outputs of all firms respond. Call $p_1 = \overline{p}_1 + h$ and $p_2 = \overline{p}_2 + \lambda h$ where this defines the matching rate $\lambda \leq 1$. So, we get $x_1 = \overline{x}_1 - h + A\lambda h$. The loss of sales at Product 1 are $\overline{x}_1 - x_1 = h(1 - \lambda A)$, so the loss rate is $g^* = 1 - \lambda A$. The gain in sales at Product 2 is $x_2 - \overline{x}_2 = (p_2 - \overline{p}_2)[-1 + A - \delta] + \delta(p_1 - \overline{p}_1)$ which can be written as $x_2 - \overline{x}_2 = \lambda h[-1 + A - \delta] + \delta h$. The total gain in sales by all of the other firms thus equals $X_{-1} - \overline{X}_{-1} = (K-1)h\{\lambda[-1 + A - \delta] + \delta\}$.

The Residual Aggregate Diversion Ratio is defined as $A* \equiv \dfrac{X_{-1} - \bar{X}_{-1}}{\bar{x}_1 - x_1} = (K-1)\dfrac{\lambda[-1+A-\delta]+\delta}{(1-\lambda A)}$. Writing this in terms

of primitives gives $A* = (K-1)\dfrac{(\delta-\lambda)+\lambda\delta(K-2)}{1-\lambda\delta(K-1)}$. Note as a check that if $\lambda = 0$ this does give back $A* = \delta(K-1) = A$. Note

also that with two firms, $K = 2$, we get $A* = \dfrac{\delta-\lambda}{1-\lambda\delta}$. We focus on the case where $A* > 0$ which is equivalent to

$\lambda(1-\delta(K-2)) < \delta$.

Next, we measure the Actual Loss for the hypothetical monopolist who raises prices of all products uniformly by an amount h. Product 1's lost sales are $\bar{x}_1 - x_1 = h(1-\delta(K-1))$, which equals $h(1-A)$. Total lost sales are thus $Kh(1-\delta(K-1))$. Note that the hypothetical monopolist's proportional losses are the single firm loss rate (unity with our normalizations) times one minus the aggregate diversion ratio.

Our method of using revealed-preference information requires that we compare the Actual Loss by the hypothetical monopolist with the loss that a single firm would incur given equilibrium matching by its rivals. We explore using the following *estimate* of the sales lost on each product by the hypothetical monopolist: $(\bar{x}_1 - x_1)(1-A*)$. This is the loss of sales at Product 1 if it raises its price and others follow, which is $h(1-\lambda A)$ times $1-A*$.

Using this estimate, estimated total lost sales are $K(\bar{x}_1 - x_1)(1-A*)$. Using $\bar{x}_1 - x_1 = h(1-\lambda A)$ from above, this estimate equals $Kh(1-\lambda A)(1-A*)$. Since $A = \delta(K-1)$, this estimate is $Kh(1-\lambda\delta(K-1))(1-A*)$.

This will *over-estimate* lost sales if and only if $Kh(1-\lambda\delta(K-1))(1-A*) > Kh(1-\delta(K-1))$, which becomes $[(1-\lambda\delta(K-1)](1-A*) > 1-\delta(K-1)$. Expanding the left-hand side, this becomes $1-\lambda\delta(K-1)-[1-\lambda\delta(K-1)]A* > 1-\delta(K-1)$ or $(K-1)\delta(1-\lambda) > A*[1-\lambda\delta(K-1)]$. This is the same as $\delta(1-\lambda) > \dfrac{A*[1-\lambda\delta(K-1)]}{K-1}$. Substituting for the right-hand side using the definition of $A*$, this becomes $\delta(1-\lambda) > (\delta-\lambda)+\lambda\delta(K-2)$. Simplifying, this becomes $1-\delta(K-1) > 0$, i.e., $\delta(K-1) < 1$: the Aggregate Diversion Ratio is less than unity.

Since we will over-estimate the lost sales by the hypothetical monopolist, if we find that the hypothetical monopolist earns greater profits by imposing the price increase than at the status quo, this comparison will certainly hold using the Actual Losses, which are lower than the estimated losses. Summarizing gives Proposition 3, a sufficient (but not necessary) condition for a group of products to form a market using the breakeven Critical Loss test.

Proof of Proposition 3

The asymmetry parameter k is defined so that the proportionate losses facing a single product that raises its price by a SSNIP are $(1+k)(s/m)$, where s is the chosen SSNIP (thus in general k will depend on the choice of SSNIP) and the (point) elasticity of demand facing the product is (by the Lerner equation) $1/m$. With this definition, the proportional loss of demand for the hypothetical monopolist following a SSNIP is $(1-A*)(1+k)(s/m)$. Thus the Actual Loss is less than the Critical Loss if and only if $(1-A*)(1+k)(s/m) \leq s/(m+s)$. Solving for A gives

$$A* \geq \frac{\dfrac{s}{m+s}+k}{1+k}.$$

With $k = 0$ this simplifies to $A* \geq s/(m+s)$ as in Proposition 2. The larger is k, the higher must be the Aggregate Diversion Ratio for the products to form a market.

To illustrate, with $s = .05$ and $m = 0.45$, $s/(m+s) = .05/(.45+.05) = 0.1$, so a group of products forms a market if and only if $A* \geq (0.1+k)/(1+k)$. As noted above, for $k = 0$, the test is $A* \geq 0.1$. For $k = 0.1$, i.e., losses from price increases are 110% of corresponding gains from price decreases, the test becomes roughly $A* \geq 0.18$. For $k = 0.2$, i.e., losses from price increases are 120% of corresponding gains from price decreases, the test becomes $A* \geq 0.25$.

We can solve the above expression for k to calculate the critical asymmetry ratio, k_{max}, i.e., the minimum amount of asymmetry that would be necessary to lead to a different conclusion:

$$k_{max} = \frac{A* - \dfrac{s}{m+s}}{1-A*},$$

which gives Proposition 3. Again using $s = .05$ and $m = 0.45$, we have $s/(m+s) = 0.1$, so $k_{max} = (A* - 0.1)/(1 - A*)$. If $A* = 0.2$, then $k_{max} = .125$. If $A* = 0.4$, then $k_{max} = .5$.

Kinked Demand Curve Theory of Oligopoly

Suppose that rivals match price decreases at a rate λ_D and price increases at a rate $\lambda_I < \lambda_D$. A firm that decreases price by h gains sales of $h(1 - \lambda_D A)$. A firm that increases price by h loses sales of $h(1 - \lambda_I A)$. Therefore, $1 + k = \dfrac{1 - \lambda_I A}{1 - \lambda_D A}$, so $k = \dfrac{(\lambda_D - \lambda_I) A}{1 - \lambda_D A}$. With $\lambda_D = 1$ and $\lambda_I = 1/2$ this becomes $k = \dfrac{A}{2(1-A)}$. With $A = 0.2$ this gives $k = 1/8$.

Exclusion of Additional Benefit in the Profits of the Hypothetical Monopolist

If we do not include these benefits in the hypothetical monopolist's profits function, then the hypothetical monopolist has a marginal cost of c rather than $c - B$. Higher costs lead to higher prices, so this must lead to narrower markets than would inclusion.

Following the logic of Proposition 1, the point elasticity of demand facing a single product is now given by $\varepsilon = 1/(m+b)$. With linear demand, if a single firm raises the price of its product by a SSNIP, the percentage loss will be εs, which equals $s/(m+b)$. The Actual Loss for the hypothetical monopolist will be $(1-A)\varepsilon s$ which equals $(1-A)s/(m+b)$. Excluding the benefits from the hypothetical monopolist's profit function, the products form a market if and only if this expression is less than the Critical Loss of $s/(m+s)$. This simplifies to $A \geq (s-b)/(m+s)$. With $b > s$ we get single-product markets.

Profit-Maximizing Price Increase vs. Break-Even Price Increase

So long as the profit function is single-peaked in price, the profit-maximizing price increase will be no more than the break-even price increase. With linear demand and constant marginal costs, profits are a quadratic function of price. It is a property of a quadratic profit function that the profit-maximizing price increase is half as large as the break-even price increase.

Implementing the Hypothetical Monopolist SSNIP Test With Multi-Product Firms

Serge X. Moresi, Steven C. Salop and John R. Woodbury

In this note, we describe the implementation of the "hypothetical monopolist SSNIP test" for market definition in the context of merger cases where firms produce multiple differentiated products. Recent articles by Michael Katz and Carl Shapiro and by Daniel O'Brien and Abraham Wickelgren have set out a framework for carrying out the hypothetical monopolist SSNIP test for market definition under the assumption that the firms maximize profits before the merger.[1] They use the information derived from profit-maximization as an input into the analysis of the incentives of the hypothetical monopolist. We take their framework as a given in our analysis.[2]

Those articles assume that each firm sells only a single product. In this note, we extend their analysis for the case of multi-product firms. We discuss the appropriate test and illustrate it with an example. As we demonstrate below, when multi-product firms sell substitute products, the relevant market under the hypothetical monopolist SSNIP test tends to be broader. In the Appendix, we provide a more general and technical description of the test.

Basic Framework

It is common for firms to produce multiple differentiated products that are substitutes for at least some consumers. For example, GM produces Cadillacs and Buicks; Phillip Morris produces Marlboro and Parliament cigarette brands; Verizon offers a variety of cell phone models and calling plans. Industrial products, such as microprocessors and certain chemicals, also fit this paradigm. Where firms produce multiple differentiated products, the proper analysis of market definition should take this structure into account.

Consider the following simple market structure, for example. Three firms each sell brands of three products that are substitutable to some degree for some consumers. Suppose that the three sellers are The Coca-Cola Company, PepsiCo, and Cadbury Schweppes, and the three products are Cola (e.g., Coke, Pepsi, and RC Cola), Lemon-Lime (e.g., Sprite, Sierra Mist, and 7Up), and

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*Steven C. Salop is a
Professor of Economics
and Law, Georgetown
University Law Center.
Serge X. Moresi and
John R. Woodbury are
Vice Presidents, CRA
International. John
Woodbury is an editor
of The Antitrust Source.
The authors thank
Øystein Daljord, Carl
Shapiro, and Greg
Werden for useful
comments.*

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[1] Michael Katz & Carl Shapiro, *Critical Loss: Let's Tell the Whole Story*, Antitrust, Spring 2003, at 49; Daniel O'Brien & Abraham Wickelgren, *A Critical Analysis of Critical Loss Analysis*, 71 Antitrust L.J. 161 (2003). *See also* Øystein Daljord, Lars Sørgard & Øyvind Thomassen, *The SSNIP Test and Market Definition with the Aggregate Diversion Ratio: A Reply to Katz and Shapiro*, J. Competition L. & Econ. (forthcoming 2008); Joseph Farrell & Carl Shapiro, *Improving Critical Loss Analysis*, Antitrust Source, Feb. 2008, http://www.abanet.org/antitrust/at-source/08/02/Feb08-Farrell-Shapiro.pdf.

[2] In particular, we are assuming that it is useful to define a relevant market. As many economics commentators have pointed out, it is not clear that relevant market definition is even necessary for unilateral effects analysis, other than perhaps for evaluating safe harbors. *See, e.g.*, Jonathan B. Baker & Steven C. Salop, *Should Concentration Be Dropped from the Merger Guidelines*, in Perspectives on Fundamental Antitrust Theory (ABA Section of Antitrust Law 2001) (*reprinted in* 33 U. West Los Angeles L. Rev. 3 (2001)). More generally, for a discussion of simulation techniques for evaluating competitive effects, see Gregory Werden, *Simulating the Effects of Differentiated Products Mergers: A Practical Alternative to Structural Merger Policy*, 5 Geo. Mason L. Rev. 363 (1997).

Orange Flavor (e.g., Fanta, Tropicana Twister, and Sunkist). Assume that all the brands are substitutes to some degree. For example, the three brands sold by Coca-Cola (e.g., Coke, Sprite, and Fanta) are imperfect substitutes for one another, as are the three brands of the other two firms.

Consider next a proposed merger between two of these firms. The antitrust authorities might want to determine whether the three flavors (cola, lemon-lime, and orange) constitute separate, distinct markets or whether they jointly constitute a single, broader carbonated soft drink market.[3]

The Hypothetical Monopolist SSNIP Test

To answer this market definition question, the Merger Guidelines dictate the use of the "hypothetical monopolist SSNIP test."[4] According to that test, product X is a relevant market if a profit-maximizing hypothetical monopolist of product X could impose a small but significant, nontransitory increase in price (SSNIP) above the current prices of the brands of product X. In the example, Cola would be a relevant market if a hypothetical monopolist of Cola would raise the prices of Coke, Pepsi, and RC Cola by at least a SSNIP.

Following the Guidelines, the hypothetical monopolist is assumed to be the only present and future producer of the relevant product (e.g., cola). Most importantly, the hypothetical monopolist is also assumed to produce and sell only the relevant product and not any other products (e.g., lemon-lime or orange).[5]

However, unlike the hypothetical monopolist, the three firms in the real world do produce and sell brands of the other products. This fact has important implications for evaluating market definition under the Merger Guidelines' test. As explained in the Katz-Shapiro and O'Brien-Wickelgren articles, the pricing incentives of the hypothetical monopolist are related to the factors that have determined the current price level in the premerger world. In the context of multi-product firms, the current equilibrium price level of product X depends in part on the fact that at least some of the firms selling their brand of product X also sell brands of products Y and Z, which are somewhat substitutable for product X. Therefore, to determine the profitability of a price increase by the hypothetical monopolist, we begin by analyzing how premerger prices are affected by the presence of multi-product firms.

Premerger Competition and Prices

We assume that the firms engage in Bertrand (unilateral) price competition. In setting its prices, each firm rationally takes into account that the brands that it sells are substitutes to some degree. In the premerger world, when Firm A unilaterally sets the price of its brand of product X, it takes into account the fact that raising price would reduce the sales of its brand of product X by a certain amount, but that a fraction of the lost sales would be diverted to its own brands of products Y and Z, as well as to the brands of all three products sold by its competitors. (For example, when Coca-Cola evaluates the profitability of raising the price of Coke, it rationally would take into

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[3] As discussed above, this may not be necessary for a unilateral effects analysis.

[4] U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines § 1.11 (1992, revised 1997), http://www.ftc.gov/bc/docs/horizmer.htm [hereinafter Merger Guidelines]. *See also* Fed. Trade Comm'n & U.S. Dep't of Justice, Commentary on the Horizontal Merger Guidelines 5 (2006), http://www.ftc.gov/opa/2006/03/mergercom.shtm [hereinafter Merger Commentary].

[5] As stated in the Merger Guidelines, "Specifically, the Agency will begin with each product (narrowly defined) produced or sold by each merging firm and ask what would happen if a hypothetical monopolist of that product imposed at least a 'small but significant and non-transitory' increase in price, but the terms of sale of all other products remained constant." Merger Guidelines, *supra* note 4, § 1.11. Thus, the hypothetical monopolist would own the three brands of (say) cola and no brands of either (say) lime or orange.

account the fact that some fraction of the lost sales of Coke would be recaptured by higher sales of Sprite and Fanta.) These recaptured sales would contribute to the profitability of the increase in the price of Firm A's brand of product X.

The profit-maximizing price of Firm A's brand of product X balances the gains and losses in profits, taking into account both the volume reduction of its brand of product X and the diversion to its own brands of products Y and Z.[6] In the premerger world, Firm A engages in a similar profitability calculus in setting the prices of its brands of products Y and Z, as do Firm B and Firm C in setting their prices, all of which leads to the premerger equilibrium. The hypothetical monopolist's own pricing incentives would be compared to this initial price equilibrium.

Implications for the Hypothetical Monopolist SSNIP Test

[W]hen there are multi-

product firms selling

imperfect substitutes,

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Intuitively, a multi-

product firm has a

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set higher prices than

would a single-product

firm.

Our key analytic point is that when there are multi-product firms selling imperfect substitutes, pre-merger prices are higher than if firms sell only a single product. Intuitively, a multi-product firm has a unilateral incentive to set higher prices than would a single-product firm.[7] This is because the customers who switch to the other products sold by that same firm are not lost customers. In contrast, a hypothetical monopolist solely of product X would not have this "multi-product incentive" to keep prices at this relatively high current level; this hypothetical single-product monopolist does not sell any brands of the other two products. This factor alone would tend to lead the hypothetical monopolist of product X to reduce its profit-maximizing price below the initial, premerger level. Of course, a hypothetical monopolist of product X would also own and sell all the brands of product X. This fact alone would tend to lead the hypothetical monopolist of product X to increase its profit-maximizing price above the initial, premerger level.

Therefore, in evaluating the overall profitability of raising the price of one brand of product X, both factors must be taken into account. The hypothetical monopolist would account for any sales recapture via the diversion from the one brand to all the other brands of product X. But the hypothetical single-product monopolist would not account for any recapture of the one brand's sales via the diversion to the other brands of products Y and Z. This latter recapture is ignored even though that recapture previously was taken into account by the standalone firms when setting prices in the premerger world.

For example, a hypothetical monopolist of cola would recognize that raising the price of Coke would divert some sales to Pepsi Cola and RC Cola—diversion that would be recaptured. This is the basis of the hypothetical monopolist's standard incentive to raise price. (In contrast, in the premerger world, Coca-Cola clearly does not have this incentive to raise price because the diversion to Pepsi and RC Cola is a complete loss to Coca-Cola.) However, the hypothetical cola monopolist would not take into account any recapture of diversion to Sprite and Fanta. (In contrast, in the premerger world, Coca-Cola clearly does have this incentive to raise the price of its cola brand because of the recapture of this diversion.)

Thus, multi-product firms have an incentive to set higher prices than would single-product firms that only sold one of the products. They take into account a price-raising factor that a hypo-

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[6] The profit-maximizing price also depends on the brand's own-price elasticity and the margins of the other brands sold by Firm A. See the Appendix for further discussion.

[7] In this unilateral effects framework, we assume that these higher prices are the result of multi-product profit-maximization, not coordinated interaction among the firms. Therefore, there is no *Cellophane* Fallacy issue raised. *See* United States v. E.I. du Pont de Nemours & Co., 351 U.S. 377 (1956). This is consistent with the approach of the Merger Guidelines when there is no coordinated interaction. Merger Guidelines, *supra* note 4, § 1.11 (use prevailing prices unless premerger circumstances are strongly suggestive of coordinated interaction).

thetical monopolist of a single product would not take into account. Therefore, when there are multi-product firms involved in market definition analysis, the hypothetical monopolist SSNIP test tends to define broader markets, relative to the situation with only single-product firms, all things being equal.

Accounting for Multi-Product Firms in the SSNIP Test

This analysis affects the basic methodology for implementing the hypothetical monopolist SSNIP test. To illustrate, suppose that an analyst is evaluating whether product X is a relevant market and first evaluates whether it would be profit-maximizing for the hypothetical monopolist of product X to impose a single-brand SSNIP; that is, a price increase for only one of the brands of product X.[8]

[A] single product

is more likely to

constitute a separate

relevant market if

consumers' loyalty to

the product exceeds

their loyalty to the

seller of the brand

of the product.

In evaluating the profitability of this single-brand SSNIP, the hypothetical monopolist would take into account the profit recapture from the customer diversion to the brands of product X previously produced by Firm B and Firm C. As discussed above, however, the hypothetical monopolist would not take into account any recapture of diversion to Firm A's brands of products Y and Z because of the assumption that the hypothetical monopolist controls only a single product.

The profitability of the single-brand SSNIP by the hypothetical monopolist thus depends crucially on the relative magnitudes of (a) the diversion from the brand of product X produced by Firm A to the brands of product X produced by Firm B and Firm C versus (b) the diversion from the brand of product X produced by Firm A to the brands of products Y and Z sold by Firm A. If the latter diversion is larger, then the hypothetical monopolist would have an incentive to reduce the price of the brand of product X produced by Firm A. This factor would make it less likely that product X would comprise a separate market. (If the above relationship between diversion within the candidate market and diversion within the firm applies to each of the brands of product X, then clearly product X is not a relevant market.)

This same single-brand SSNIP test also can be carried out for the prices of each of the brands of product X sold by Firm B and Firm C. The test also can be implemented for other candidate product markets (e.g., product Y, products X and Y jointly, etc.). Thus, this test compares the diversion inside the firm across its various products versus the diversion outside the firm across brands of the same product. This comparison can be expressed intuitively as follows: a single product is more likely to constitute a separate relevant market if consumers' loyalty to the product exceeds their loyalty to the seller of the brand of the product.

This test can be implemented for a SSNIP of a single brand of a product and, under some assumptions, for a uniform SSNIP for all the brands in the candidate market.[9] Like the Katz-Shapiro and O'Brien-Wickelgren tests, our generalized test also requires data on diversion ratios and margins, and can be implemented for a SSNIP of any size.

The formal analysis in the Appendix leads to a very simple test when the firms are symmetric: assume initially that all three firms earn fully identical margins (that is, identical on each brand and identical to each other). For simplicity, assume also that there are no economies of scope in pro-

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[8] The Merger Guidelines contemplate this type of single brand SSNIP. Merger Guidelines, *supra* note 4, § 1.11. *See also* Katz & Shapiro, *supra* note 1. However, it may have limited practical importance if the agency is concerned about a broader competitive effect, that is, a price increase for all the brands. In short, market definition should not be divorced from the ultimate competitive effects analysis. *See, e.g.*, Steven C. Salop, *The First Principles Approach to Antitrust,* Kodak*, and Antitrust at the Millennium*, 68 ANTITRUST L.J. 187 (2000).

[9] Generally, the hypothetical monopolist would maximize profits by imposing different SSNIPs on different brands. The analysis of such non-uniform SSNIPs would require use of a simulation model.

ducing the three products. Under these symmetry conditions, a candidate market comprises a relevant market with respect to a uniform SSNIP of X percent, if and only if

$$\delta_M > \frac{\delta_F m + 2X}{m + 2X}$$

where m is the percentage profit-margin, δ_M is the aggregate diversion ratio from each brand in the candidate market whose price has been increased to all the other brands in the candidate market, and δ_F is the diversion ratio from each brand whose price has been increased to all the other brands sold by the same firm (inside as well as outside the candidate market).

For example, suppose that the percentage profit-margin is 30 percent and the uniform SSNIP is 5 percent. Assume further that there were only single-brand firms, in which case $\delta_F = 0$. In that situation, the product would comprise a relevant market if the diversion ratio from the brand whose price has been increased to other brands of the same product exceeds 25% (i.e., 10% ÷ {30% + 10%}).[10] However, if instead there were multi-brand firms and the diversion inside the firm from its brand of the product to its other brands was significant, say, $\delta_F = 25\%$, then the critical aggregate diversion ratio would rise substantially. The product would comprise a relevant market only if the diversion ratio δ_M from one brand of the product to other brands of the same product exceeds 44% (i.e., {25% x 30% + 10%} ÷ {30% + 10%}). This is a large difference that would be determinative in many cases.

Thus, taking into account the fact that firms sell multiple products is essential to implementing the hypothetical monopolist SSNIP test for multi-product firms based on an assumption that firms are maximizing premerger profits. ●

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[10] If $\delta_F = 0$, the test is identical to that described in Katz & Shapiro, *supra* note 1, at 53 & 56 n.25.

APPENDIX

In this Appendix, we carry out a formal analysis of the hypothetical monopolist test when there are multi-product firms.

A. Profit Maximization by Multi-Product Firms

Consider a candidate market with M products.[11] For each product $j \in M$, let N_j be the set of all the products sold by the owner of product j, including all the products (if any) that the owner of product j sells *outside* the candidate market. The first-order condition can be written as:

$$m_j - \sum_{k \neq j}^{N_j} \delta_{jk} m_k \frac{p_k}{p_j} = \frac{1}{\eta_{jj}} \qquad (\forall j \in M) \qquad (1)$$

where $m_j = (p_j - c_j)/p_j$ is the percentage profit margin of product j, $\delta_{jk} = -(\partial D_k/\partial p_j)/(\partial D_j/\partial p_j)$ is the diversion ratio from product j to product k, and $\eta_{jj} = -(\partial D_j/\partial p_j)(p_j/D_j)$ is the own-price elasticity of demand for product j.

B. Profit Maximization by the Hypothetical Monopolist

Consider a hypothetical monopolist who owns all the M products in the candidate market and no other product outside the candidate market. Let X be the uniform percentage price increase imposed on each of the M products (and assume that the prices of all the other products outside the candidate market remain constant). Assuming that demand and cost functions are linear, one can evaluate the effect on the hypothetical monopolist's profit of each individual price increase, and then add up those effects.

For each product $j \in M$, the increase in price (from p_j to $(1 + X)p_j$) has three effects on the hypothetical monopolist's profit:

- The price increase reduces the sales volume of product j (from q_j to $(1 - X\eta_{jj})q_j$) and thus tends to reduce the profits of product j by the amount:

$$X\eta_{jj} q_j m_j p_j \qquad (2)$$

- The price increase increases the margin (from $m_j p_j$ to $(m_j + X)p_j$) earned on the remaining volume of product j that is still being sold, and thus tends to increase the profits of product j by the following magnitude:

$$(1 - X\eta_{jj})q_j X p_j \qquad (3)$$

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[11] We use M to denote both the number and the set of products included in the candidate market.

● The price increase raises the sales volume of the other products in the candidate market, and thus tends to increase the profits of those other products by the following magnitude:

$$X \eta_{jj} q_j \sum_{k \neq j}^{M} \delta_{jk} (m_k + X) p_k \tag{4}$$

Based on Equations (2), (3) and (4), the net effect of increasing the price of product j on the total profits of the M products included in the candidate market can be written as follows:

$$X \eta_{jj} p_j q_j \left[\sum_{k \neq j}^{M} \delta_{jk} (m_k + X) \frac{p_k}{p_j} - m_j - X + \frac{1}{\eta_{jj}} \right] \tag{5}$$

Using the convention $\delta_{jj} = -1$, the total effect on the hypothetical monopolist's profit of increasing the prices of all the products in the candidate market is equal to:

$$X \sum_{j=1}^{M} p_j q_j \left[\eta_{jj} \sum_{k=1}^{M} \delta_{jk} (m_k + X) \frac{p_k}{p_j} + 1 \right] \tag{6}$$

Under the assumption that demands and costs are linear, if a price increase of Z is neither profitable nor unprofitable, then the profit-maximizing price increase is $Z/2$. It thus follows from Equation (6) that the profit-maximizing price increase is expressed as follows:

$$X^* = - \frac{\sum_{j=1}^{M} q_j \eta_{jj} \sum_{k=1}^{M} \delta_{jk} m_k p_k + \sum_{j=1}^{M} p_j q_j}{2 \sum_{j=1}^{M} q_j \eta_{jj} \sum_{k=1}^{M} \delta_{jk} p_k} \tag{7}$$

In this regard, note that if one assumes that the hypothetical monopolist would raise the price of product j only (and would leave the other prices unchanged), then the profit-maximizing price increase would be equal to (using Equation (5) and then Equation (1)):

$$X_j^* = \frac{1}{2} \left[\sum_{k \neq j}^{M} \delta_{jk} m_k \frac{p_k}{p_j} - m_j + \frac{1}{\eta_{jj}} \right]$$

$$= \frac{1}{2} \left[\sum_{k \neq j}^{M} \delta_{jk} m_k \frac{p_k}{p_j} - \sum_{k \neq j}^{N_j} \delta_{jk} m_k \frac{p_k}{p_j} \right] \tag{8}$$

This expression shows that the profitability of a SSNIP (from the perspective of the hypothetical monopolist) tends to be lower when firms sell multiple products either inside or outside the candidate market.

C. Analysis of the Symmetric Case

In the situation where there is symmetry across brands and across firms, Equations (1) and (6) reduce to:

$$(1 - \delta_F) m = 1/\eta \tag{9}$$

$$X M pq (\eta (\delta_M - 1)(m + X) + 1) \tag{10}$$

Here, δ_F is the total diversion ratio from any product in the candidate market to all the products sold by the same firm (inside as well as outside the candidate market), while δ_M is the aggregate diversion ratio from any product in the candidate market to all the other products in the candidate market.

Using Equation (9) to substitute for η, Equation (10) is positive (and thus the price increase is profitable for the hypothetical monopolist) if and only if:

$$(\delta_M - 1)(m + X) + (1 - \delta_F)m > 0 \tag{11}$$

In the special case with single-product firms (i.e., $\delta_F = 0$), Equation (11) can be written as $\delta_M > X/(m + X)$. This is the standard formula of Katz-Shapiro (2003) and O'Brien-Wickelgren (2003). The more general formula proposed in this note is:

$$\delta_M > \frac{\delta_F m + X}{m + X} \tag{12}$$

Thus, when there are multi-product firms (i.e., $\delta_F > 0$), a SSNIP of X percent is less likely to be profitable (*ceteris paribus*) and thus the candidate market is less likely to be a relevant market.

This also can be seen from the hypothetical monopolist's profit-maximizing price increase, i.e., Equation (7), which in the symmetric case reduces to:

$$X^* = \frac{(\delta_M - \delta_F)m}{2(1 - \delta_M)} \tag{13}$$

It follows from Equation (13) that, in industries with multi-product firms (i.e., $\delta_F > 0$), the profit-maximizing price increase X^* is lower and thus the candidate market is less likely to be a relevant market.

Two other properties of this analysis are worth noting. First, this analysis may not lead to very narrow markets even for very small SSNIP*s*. For example, for an infinitesimal price increase (i.e., $X = 0$), Equation (12) reduces to $\delta_M > \delta_F$. In other words, the hypothetical monopolist has an incentive to raise price at all only if the diversion within the candidate market is higher than the diversion within the firm. As previously expressed in the text, a single product is more likely to constitute a separate relevant market if consumers' loyalty to the product exceeds their loyalty to the seller of the brand of the product.

Second, if one were to assume that the hypothetical monopolist raises the price only of single product j (and leaves the other prices unchanged), then it follows from Equation (8) that the profit-maximizing price increase would be equal to the following:

$$X_j^* = (\delta_M - \delta_F)m/2 \tag{14}$$

This result can be useful in analyzing the profitability of price discrimination and the existence of relevant markets based on that price discrimination.

To Cooperate or Not:
The Corporate Leniency Program After *Stolt-Nielsen*

Ed Magarian, William Michael Jr., Michael Lindsay, and James Nichols

Since 1993, the U.S. Department of Justice Antitrust Division's Corporate Leniency Program has been instrumental in the Antitrust Division's crusade against antitrust violators. In fact, antitrust violators have entered the Leniency Program at rates as high as two per month, resulting in the prosecution of some of the Antitrust Division's biggest cases.[1]

The Leniency Program's success is due largely to its ability to offer an incentive that is simply too good to pass up. If accepted into the Leniency Program, a company can avoid all criminal penalties (both for itself and its officers and employees) for its antitrust violations, as long as the company complies with its obligations under its agreement with the Antitrust Division. This is a tremendous inducement for corporations that would otherwise face multi-million dollar fines and prison terms for their executives.[2]

In 2004, the Leniency Program's benefits were statutorily enhanced through the de-trebling of civil damages for successful leniency applicants,[3] increasing the incentive for a company to come forward. But the recent completion of the *Stolt-Nielsen* saga—revocation of leniency, followed by indictment, and then dismissal of charges—raises questions about the value and requirements of the Leniency Program in the future, as well as the risks associated with participating in the program. Should companies still seek such leniency? If so, how should they make sure that their leniency is permanent?

Stolt-Nielsen: From Leniency to Indictment to Vindication

Background. Stolt-Nielsen S.A., a Luxembourg shipping company, participated in a customer-allocation, price-fixing, and bid-rigging conspiracy with two other shipping companies, Odfjell Seachem AS and Jo Tankers[4]—a classic per se antitrust violation with serious exposure for criminal fines and jail time. When responsible officials at Stolt-Nielsen discovered the violation, the company sought and received protection under the Leniency Program.[5]

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Ed Magarian and
William Michael Jr.
are co-chairs of the
White Collar and Civil
Fraud Practice Group at
Dorsey & Whitney LLP;
Michael Lindsay is the
co-chair of its Antitrust
Practice Group and a
member of the White
Collar and Civil Fraud
Practice Group; James
Nichols is an associate
at the firm in both
practice groups.

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1 Joseph Harrington, Corporate Leniency Programs and the Role of the Antitrust Authority in Detecting Collusion, Fair Trade Commission of Japan International Symposium: Towards an Effective Implementation of New Competition Policy 23–24 (Jan. 31, 2006), *available at* http://www.econ.jhu.edu/People/Harrington/Tokyo.pdf. On February 26, the ABA Section of Antitrust Law sponsored a Brown Bag program on *Stolt-Nielsen*. A description of the program can be found at http://www.abanet.org/antitrust/at-bb/08/AT82608.pdf. A podcast of the program will be available to Antitrust Section members in early March at http://www.abanet.org/antitrust/mo/premium/at-bb/08/AT82608.mp3.

2 *See* U.S. Dep't of Justice, Antitrust Division Corporate Leniency Policy (1993), *available at* http://www.usdoj.gov/atr/public/guidelines/0091.pdf [hereinafter Leniency Policy].

3 Antitrust Criminal Penalty Enhancement and Reform Act of 2004, Pub. L. No. 89-670, tit. II § 213(a), 118 Stat. 666 (2004).

4 United States v. Stolt-Nielsen S.A. (*Stolt-Nielsen III*), 524 F. Supp. 2d. 609, 611 (E.D. Pa. 2007).

5 *Id.* at 612–13.

Participation in the Leniency Program depends on the applicant's ability to satisfy several conditions. Where an investigation has not yet begun (that is, the applicant's self-reporting is truly the cause of a subsequent investigation), leniency is subject to these conditions: (1) the Division has not received information about the illegal activity from any other source; (2) on discovering the illegal activity, the company "took prompt and effective action to terminate its part in the activity"; (3) the company reports the wrongdoing "with candor and completeness" and continues to provide full and complete cooperation throughout the investigation; (4) the confession of wrongdoing is "truly a corporate act," (as opposed to isolated confessions of individual executives or officials); (5) the company makes restitution to injured parties (where possible); and (6) the company was not the leader or originator of and did not coerce another party to participate in the illegal activity.[6] If the Division has already begun an investigation (or has received information about the activity at issue), a company can still obtain leniency if a three-pronged test is satisfied: (1) the company is "the first one to come forward and qualify for leniency," (2) the Division does not yet have evidence that is "likely to result in a sustainable conviction" of the company, and (3) granting leniency would not be "unfair to others."[7]

Stolt-Nielsen came forward after the Antitrust Division had already begun an investigation,[8] but it met all of the conditions of the three-pronged test to the satisfaction of the Antitrust Division, at least initially.[9] Stolt-Nielsen provided the Division with "volumes of highly incriminating evidence" concerning its role in the customer-allocation conspiracy.[10] This information allowed the Antitrust Division to prosecute Stolt-Nielsen's co-conspirators: Odfjell was fined $42.5 million and two of its executives served prison terms and were fined personally; Jo Tankers was fined $19.5 million and one of its executives served a prison term and was fined personally.[11] Indeed, according to the district court, these convictions would not have been possible without Stolt-Nielsen's cooperation.[12]

Stolt-Nielsen took extensive internal measures to comply with the obligation to take prompt and effective action to end the illegal activity, including:

- instituting a new antitrust policy and publishing an Antitrust Compliance Handbook;
- distributing the Compliance Handbook to all employees and competitors;
- holding mandatory seminars for all employees on antitrust compliance;
- requiring all employees to sign certifications that they would comply strictly with all terms the new Antitrust Compliance Policy; and,
- informing competitors of the new policy and of Stolt-Nielsen's intent to comply with it.[13]

In addition to informing its competitors of its new compliance policy, Stolt-Nielsen also began competing with its co-conspirators on at least some accounts—as the district court would later find.

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[6] Leniency Policy, *supra* note 2.

[7] *Id.*

[8] *Stolt-Nielsen III*, 524 F. Supp. 2d. at 612.

[9] *Id.*

[10] *Id.* at 614.

[11] *Id.*

[12] *Id.*

[13] *Id.* at 611–12.

Notwithstanding these steps, Stolt-Nielsen's perceived lack of compliance in ending its antitrust violations gradually became a point of contention with the Antitrust Division.[14] Specifically, the Antitrust Division did not believe that Stolt-Nielsen ended its illegal activities "promptly" but rather continued its anticompetitive conduct in subsequent meetings with its co-conspirators. The Antitrust Division's suspicion arose largely from allegations from one of Stolt-Nielsen's former co-conspirators who claimed that Stolt-Nielsen did not end its anticompetitive activity.[15] The Antitrust Division eventually found six other witnesses, all former conspirators, willing to corroborate that account.

From Leniency to Litigation. The Antitrust Division asserted that Stolt-Nielsen had violated its leniency agreement by failing to promptly withdraw from the antitrust conspiracy. As a result, on April 8, 2003, the Antitrust Division began the process of revoking Stolt-Nielsen's leniency.[16] The obligation to cooperate was suspended, an executive was arrested, and leniency was formally revoked.[17]

By filing a suit to enjoin the Antitrust Division from indicting the company and its executives, Stolt-Nielsen preempted the Antitrust Division's plan to obtain a grand jury indictment of the company. The District Court for the Eastern District of Pennsylvania found that Stolt-Nielsen had not breached the agreement and enjoined the Antitrust Division from revoking leniency.[18] The Antitrust Division appealed, and the Third Circuit reversed on the grounds that the constitutional principle of separation of powers prohibited the district court from enjoining the prosecution.[19] The Third Circuit found that the non-prosecution agreement could not serve as a basis for enjoining an indictment, but the court made clear that the agreement could be asserted as a defense after indictment. Thus, on remand, when the company raised the non-prosecution agreement as a defense to an indictment, the district court would then be free to consider the agreement "anew," and, among other things, consider whether the defendants fulfilled their obligations under the agreement.[20]

Dismissal of the Indictment. Following the Third Circuit's decision, Stolt-Nielsen and two of its executives were indicted. Before trial, the defendants moved for dismissal of the indictment based upon a violation of the non-prosecution agreement. The motion was heard by a new judge, who found that the Antitrust Division violated the non-prosecution agreement, and dismissed the indictment.[21]

The new judge used a defense-friendly principle of interpretation for non-prosecution agreements. The court held that non-prosecution agreements are unique contracts that must be construed in light of the important constitutional rights at stake.[22] A central question in adjudicating the dispute is whether the Antitrust Division's "conduct comported with 'what was reasonably understood by the defendant when entering' the Agreement."[23] The court explained that the

Specifically, the

Antitrust Division

did not believe that

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its illegal activities

"promptly" . . .

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[14] *Id.* at 614.

[15] *Id.* at 614 n.7.

[16] *Id.* at 614.

[17] *Id.*

[18] Stolt-Nielsen S.A. v. United States (*Stolt-Nielsen I*), 352 F. Supp. 2d 553 (E.D. Pa. 2005), r*ev'd* 442 F. 3d 177 (3d Cir.), *cert. denied* 127 S. Ct. 494 (2006).

[19] Stolt-Nielsen S.A. v. United States (*Stolt-Nielsen II*), 442 F.3d 177 (3d Cir. 2006), *cert. denied*,127 S. Ct. 494 (2006).

[20] *Id.* at 187 n.7.

[21] *Stolt-Nielsen III*, 524 F. Supp. 2d. at 615.

[22] *Id.* at 615 (citing Santobello v. New York, 404 U.S. 257, 262 (1971); United States v. Baird, 218 F.3d 221, 229 (3d Cir. 2000)).

[23] *Id.*

Antitrust Division may not rely on a "rigidly literal" construction of the agreement; rather, it "bears the burden of demonstrating that [the defendant] materially breached the Agreement."[24] In determining whether a breach is material, the most important factor is the incriminating nature of the evidence provided by the defendant—whether or not the government has received the benefit of its bargain.[25] The court did not reach the issue of the quantum of proof required to show such a material breach—whether "clear and convincing" evidence was necessary or whether a "preponderance of the evidence" was sufficient—because here the Antitrust Division had not offered sufficient proof to meet the preponderance standard, much less the "clear and convincing" standard.[26]

Why did the court find that a material breach was not established? The non-prosecution agreement required Stolt-Nielsen to take "prompt and effective action to terminate its part in the anticompetitive activity being reported upon discovery of the activity."[27] The Antitrust Division alleged that Stolt-Nielsen failed to live up to this obligation.[28] Based on the testimony of seven executives at Odfjell and Jo Tankers, the Antitrust Division alleged that Stolt-Nielsen continued to collude on the allocation of three shipping contracts.[29] The key to the court's rejection of this assertion was that Stolt-Nielsen's actions to end the antitrust violations were deemed "prompt and effective."[30] The court found that, "by its plain meaning, [prompt and effective action] requires a prompt and diligent process, and does not require immediate termination of all anti-competitive activity."[31] The court said that this approach is what the defendants would have reasonably understood.[32]

The court readily found that Stolt-Nielsen had satisfied the requirement of "prompt and effective action" through its "large-scale effort" to "eliminate anticompetitive activity at all levels of the company, including senior management."[33] The court's finding was supplemented by evidence that Stolt-Nielsen followed its Antitrust Compliance Policy by engaging in "genuine competition" on contracts previously allocated under the conspiracy.[34] For example, a Stolt-Nielsen executive refused to withdraw a bid for a contract that was formerly allocated by conspiracy—defying the demands of a former co-conspirator.[35] (The former co-conspirator did win that contract, but not because of anticompetitive activity by Stolt-Nielsen—the customer gave Stolt-Nielsen's competitor a "last look" that allowed it to win the contract.[36]) In another case, Stolt-Nielsen significantly reduced its rates to retain a contract.[37]

Stolt-Nielsen followed its Antitrust Compliance Policy by engaging in "genuine competition" on contracts previously allocated under the conspiracy.

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[24] *Id.* at 616 (citing United States v. Fitch, 964 F.2d 571, 574–75 (6th Cir. 1992)).

[25] *Id.* (citing United States v. Castaneda, 162 F.3d 832, 837 (5th Cir. 1998); *Fitch*, 964 F.2d at 574; United States v. Johnson, 861 F.2d 510, 513 (8th Cir. 1988)).

[26] *Id.*

[27] *Stolt-Nielsen II*, 442 F.3d at 181.

[28] *Stolt-Nielsen III*, 524 F. Supp. 2d. at 610, 616.

[29] *Id.* at 623–27.

[30] *Id.* at 617–18.

[31] *Id.* at 617.

[32] *Id.* at 617 n.11 (citing *Baird*, 218 F.3d at 229).

[33] *Id.* at 617.

[34] *Id.* at 618.

[35] *Id.* at 619.

[36] *Id.*

[37] *Id.* at 620.

The court found Stolt-Nielsen's evidence to be more credible than that offered by the Antitrust Division.[38] Stolt-Nielsen was able to provide corroborating testimonial and documentary evidence to support its position.[39] In contrast, the Antitrust Division's witnesses were discredited by their own contradictions, as well as their incentives to be untruthful.[40] The government's witnesses were former co-conspirators agreeing to testify in exchange for reduced sentences, and they all withered under Stolt-Nielsen's impeachment.[41] Some of the government's witnesses offered testimony that did not even support the argument that Stolt-Nielsen continued to engage in anticompetitive activity after obtaining its leniency agreement.[42] The Antitrust Division alleged that Stolt-Nielsen had entered into a quid pro quo agreement to allocate some shipping contracts with Jo Tankers, only to have their star witness deny the existence of such an agreement.[43] This put the Antitrust Division in the unenviable position of impeaching its own witness.[44] The Antitrust Division fared only slightly better with its other witnesses. One witness claimed that he could not remember the details of a meeting in which Stolt-Nielsen had informed him of its intent to comply with its Antitrust Compliance Policy, but two other witnesses did remember the conversation.[45] Another witness misstated basic facts about the contracts that were allegedly still allocated by conspiracy and then went on to state that he had "no clue" who drafted his grand jury declaration.[46] Accordingly, the court rejected the Antitrust Division's arguments and dismissed the indictment.

On December 21, 2007, three weeks after *Stolt-Nielsen III* was decided, the Antitrust Division announced that it would not appeal the dismissal of the indictment.[47]

The Legacy of *Stolt-Nielsen*

So what is the practical effect of the *Stolt-Nielsen* saga? Two preliminary observations are certain and worth mention. First, corporations will continue to seek leniency under this program. Second, the Antitrust Division will continue to grant leniency. Corporations continue to have a tremendous incentive to cooperate. As before *Stolt-Nielsen*, the risk of leniency revocation will remain small; the Stolt-Nielsen revocation was the first since the current program's debut in 1993, and the Antitrust Division stated that the action was "not take[n] lightly" and was "regrettabl[e]" but "necessary."[48] The benefits to both the companies seeking leniency and the Antitrust Division continue to be real and significant. It is improbable that companies will cease coming forward simply as the result of one attempted revocation. Instead, there likely will be much more oversight by the Antitrust Division into the actions of a company seeking leniency and its employees. In addition,

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[38] Id. at 623–27.

[39] *E.g.*, *id.* at 619 n.13.

[40] *Id.* at 623.

[41] *Id.* at 623–27.

[42] *Id.* at 623–24.

[43] *Id.*

[44] *Id.*

[45] *Id.* at 625.

[46] *Id.*

[47] Press Release, U.S. Dep't of Justice, Justice Department Will Not Appeal *Stolt-Nielsen* Decision (Dec. 21, 2007), *available at* http://www.usdoj.gov/atr/public/press_releases/2007/228788.pdf.

[48] Press Release, U.S. Dep't of Justice, Stolt-Nielsen S.A. Indicted on Customer Allocation, Price Fixing, and Bid Rigging Charges for Its Role in an International Parcel Tanker Shipping Cartel (Sept. 6, 2006), *available at* http://www.usdoj.gov/atr/public/press_releases/2006/218199.pdf.

it is likely that less ambiguous language will be used in future agreements so that the standards defining the company's expected conduct are clearer. Clear standards carry with them two primary implications. First, clearer guidelines assist companies in their attempts at compliance and therefore may make it less likely that the Antitrust Division will be tempted to revoke their leniency. Second, because any revocation of leniency by the Antitrust Division will be made on a clearer record, it is more likely that, if the Antitrust Division chooses to revoke leniency in a future case, it will prevail.

Indeed, the Third Circuit's decision in favor of the Government's authority to indict did not seem to affect the steady stream of applicants for the Corporate Leniency Program. Even after the Antitrust Division's revocation of leniency for Stolt-Nielsen and before the district court's dismissal of the indictment, numerous companies continued to contact the Antitrust Division in an attempt to be the first in the door to qualify for the Leniency Program—including companies such as Virgin Atlantic and Lufthansa in the summer of 2007.[49] Simply put, the leniency-revocation litigation and the attendant uncertainty did not deter companies from seeking the benefits of the program.

Likewise, from the government's viewpoint, the Leniency Program is far too valuable to permit it to fall into disuse. Significantly, the Antitrust Division has recognized that the Corporate Leniency Program needs to have a fairly high degree of certainty, predictability, and freedom from prose-cutorial discretion,[50] but it does not have be "risk free" to be an attractive option for antitrust vio-lators.[51] The Antitrust Division has described the program as its "most effective investigative tool" and "a model for similar corporate leniency programs . . . adopted by antitrust authorities around the world."[52] The program "has resulted in scores of convictions and nearly $4 billion in criminal fines" and has been a material source of information in "the majority of the Division's major inter-national investigations."[53] The Department of Justice cannot afford to turn off the spigot from which flows so much of its success in breaking up cartels.

Immediate reactions to *Stolt-Nielsen III* characterized the court's decision as saving the Antitrust Division from its own error in judgment; the Antitrust Division never should have sought to revoke leniency in this particular case, much less indicted the company.[54] This characterization may

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[49] *See* posting of Tyler M. Cunningham to Antitrust LawBlog, *British Airways, Korean Air Lines to Plead Guilty to Passenger and Cargo Price Fixing Conspiracies*, http://www.antitrustlawblog.com/article-british-airways-korean-air-lines-to-plead-guilty-to-passenger-and-cargo-price-fixing-conspiracies.html (Aug. 6, 2007).

[50] Scott D. Hammond, Dir. of Criminal Enforcement, Antitrust Div., U.S. Dep't of Justice, Cornerstones of an Effective Leniency Program, Presentation Before the ICN Workshop on Leniency Programs: Cornerstones of an Effective Leniency Program 3 n.1 (Nov. 23–24, 2004), *available at* http://www.usdoj.gov/atr/public/speeches/206611.pdf ("The Amnesty Program was revised . . . to ensure that amnesty is auto-matic if there is no pre-existing investigation. That is, if a corporation comes forward prior to an investigation and meets the program's requirements, the grant of amnesty is certain and is not subject to the exercise of prosecutorial discretion."); *id.* at 5 ("[T]here must be trans-parency and predictability to the greatest extent possible throughout a jurisdiction's cartel enforcement program, so that companies can pre-dict with a high degree of certainty how they will be treated if they seek leniency and what the consequences will be if they do not.").

[51] *See* posting of Risto Keravuori, Joseph Saunders & Cheryl Kong to Overt Collusion, *Breaking the Silence: The Corporate Leniency Program*, http://econ419.blogspot.com/2007/03/breaking-silence-corporate-leniency.html (Mar. 21, 2007, 15:13 EST).

[52] Scott D. Hammond, Deputy Assistant Att'y Gen. for Criminal Enforcement, Antitrust Div., U.S. Dep't of Justice, Recent Developments, Trends, and Milestones In The Antitrust Division's Criminal Enforcement Program, Presentation Before the ABA Section of Antitrust Law Cartel Enforcement Roundtable 2007 Fall Forum 11 (Nov. 16, 2007), *available at* http://www.usdoj.gov/atr/public/speeches/227740.pdf.

[53] *Id.*

[54] *See* Carl W. Hittinger & John D. Huh, *Federal Court Enforces Antitrust Amnesty Agreement, Dismisses Indictment*, DLA Antitrust Alert, Dec. 13, 2007, http://www.dlapiper.com/files%5Cupload%5CAntiTrust_Alert_Dec07.html; Michael H. Byowitz & David B. Anders, *U.S. District Court Reaffirms Integrity of Criminal Antitrust Amnesty Policy*, Real Corporate Lawyer, Dec. 2, 2007, http://www.realcorporatelawyer.com/pdfs/U.S.%20District%20Court%20Reaffirms%20Integrity%20of%20Criminal%20Antitrust%20Amnesty%20Policy.pdf.

be true to an extent, but *Stolt-Nielsen III* is not as significant a decision as some might suggest. The district court did adopt a defense-friendly standard for reviewing compliance with agreements under the Leniency Program, but the case ultimately turned on the underlying facts. The Department of Justice's decision not to appeal likely had more to do with not wanting to create bad law by appealing a case with bad facts or insufficient evidence. That is, the Department of Justice decided to limit *Stolt-Nielsen III*'s precedential impact and to confine the government's loss.

Stolt-Nielsen III's practical effect will be on the likelihood and imminence of a second leniency revocation. The Antitrust Division made clear that the revocation of Stolt-Nielsen's leniency, though regrettable, was necessary to "to maintain the integrity of the program."[55] Certainly, at some point in the future, it is likely the Antitrust Division will again revoke a grant of leniency given to another corporation. Nevertheless, it is also true that the Antitrust Division is not going to risk bringing such further action unless it concludes that the conduct of the company granted leniency jeopardizes the integrity of its premier investigative tool and that the facts are strongly in its favor. Thus, the clarity, certainty, and severity of noncompliance will likely have to be significant before the Division will take action.

Accordingly, companies also should expect more scrutiny from the Antitrust Division regarding the details of leniency agreements. *Stolt-Nielsen III* turned in large measure on the court's perception of the parties' understanding and intention in the leniency agreement. To limit the effects of *Stolt-Nielsen III*, the Antitrust Division presumably will require greater specificity in leniency agreements—provisions that will demonstrate more clearly what the leniency applicant was bargaining away and what specifically will be required. Future participants in the Leniency Program may well be subject to more clearly defined agreements and may also be required to make a stronger showing that they meet the conditions of leniency. Consequently, *Stolt-Nielsen III* may actually mean that companies can have a marginally greater level of comfort about retaining the leniency after they are accepted into the Leniency Program,

But *Stolt-Nielsen III* does not mean that companies should test the limits of how far they can go before being deemed noncompliant. The risk of becoming the next revocation case may be small, but the cost is potentially staggering: Even though Stolt-Nielsen prevailed, it did so only after years of litigation—years in which the company and its cooperating officers and employees faced both expense and significant high-stakes risk. Additionally, had the district court denied the motion to dismiss, Stolt-Nielsen would have been in a far worse position than it would had it not cooperated in the first place.

Conclusion

Stolt-Nielsen III is unlikely to affect the fundamentals of the Leniency Program because there is too much at stake both for the applicants and for the Department of Justice. Nevertheless, leniency applicants can expect greater clarity and specificity of requirements in their leniency agreements, and successful applicants must plan to live up fully to those commitments. ●

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[55] Press Release, U.S. Dep't of Justice, Stolt-Nielsen S.A. Indicted, *supra* note 48.

The Intersection of Antitrust with Product Safety—
The Need for Greater Collaboration by Antitrust and Regulatory Lawyers When Counseling Corporate Clients

Susie L. Hoeller

For some companies, a single in-house counsel handles both product regulatory, including product safety issues, and antitrust compliance. In many law firms and corporate legal departments, however, lawyers who advise on food and consumer product regulatory issues and lawyers who handle antitrust issues often practice in separate worlds. They may never meet except on a social basis, since their normal clients and legal concerns would have no common nexus. Increasingly, however, regulatory attorneys are finding themselves in situations where antitrust guidance can be critical. As companies strive to manage the complex relationships and logistics implicated by product safety recalls and other public safety or environmental issues, their counsel must also be aware of and actively guard against some of the potential hazardous areas for inadvertent antitrust exposure.

Different Constituencies and Concerns of Product Regulatory and Antitrust Specialists

To better understand the need for a collaborative approach to counseling corporate clients in these emergency regulatory areas, it is important to note that attorneys who specialize in regulatory fields and those who focus on antitrust issues generally have different skills and deal with different departments of the average corporate client. Corporate antitrust lawyers deal with an enormous body of case law interpreting a relatively small number of federal and state statutes. When representing global corporations, they need to be aware of the competition laws in many jurisdictions outside of the United States and be able to successfully collaborate with foreign local counsel. Antitrust specialists must also master the intricacies of complex economic theories and statistics. The antitrust litigators need to be highly skilled at marshaling facts and evidence and analyzing minute differences in factual situations that may determine the ultimate judicial outcome. The antitrust counselor often deals with marketing and sales managers, upper-level management, and boards of directors on structuring major transactions and business relationships.

Corporate food and consumer product regulatory lawyers, in contrast, spend much of their practice interpreting an alphabet soup of federal laws and regulations (FDA, USDA, CDC, CPSC, EPA, and FTC). They also deal with myriad state laws and regulations, such as Louisiana's country of origin labeling law for meats, and Illinois' Lead Poisoning Prevention Act for children's articles.[1] Even familiarity with local ordinances may be a necessary part of the legal expertise for product regulatory lawyers, especially lawyers representing retailers, restaurants, and other facilities serving the general public.[2]

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Susie L. Hoeller, formerly in-house counsel with several large corporations, now develops antitrust and other legal compliance programs in her Bentonville, Arkansas, law practice. She is also the author of Recall: Food and Toy Safety: An American Crisis *(BookSurge Publishing 2007).*

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[1] La. Rev. Stat. § 51:613 (West 2007); 410 Ill. Comp. Stat. 43/1 et seq. (2008).

[2] Local ordinances contain a wide variety of restrictions or prohibitions for diverse articles and ingredients, such as firearms, replica firearms, fireworks, mercury thermometers, balloons, tobacco, alcohol, foie gras, and trans fats.

Product regulatory lawyers may have the first review of sourcing, design, manufacturing, production, operational and safety agreements, as well as policies and procedures, and be the first to counsel their clients on when and how to conduct product withdrawals and recalls. While they may later team up with litigators to defend their companies against product liability lawsuits, these attorneys often spend considerable time training their business clients on regulatory and safety compliance before any incident occurs. Their day-to-day client contacts are often food scientists, microbiologists, design, manufacturing and quality engineers, buyers, and other more technical employees. Their interaction with sales and marketing teams—in contrast to those of antitrust attorneys—is often much more narrowly focused on assuring that product marketing and advertising claims are consistent with product attributes.

While product regulatory lawyers clearly do counsel upper management and perhaps even the board of directors when company products are involved in a personal injury claim, safety issue, or a major recall, they tend to have greater, ongoing interactions with the client at the departmental or group level than antitrust specialists. The product safety lawyer's skills for interpreting precise and sometimes arcane regulations and working with scientists and engineers are obviously different from the skills needed for developing antitrust defenses and reining in enthusiastic marketing types negotiating new deals and customer relationships. Nevertheless, regulatory attorneys can greatly benefit from an awareness of potential antitrust problem areas, particularly in the early stages of counseling a client in a regulatory crisis.

2007—The Year of the Recall

We can now look back on 2007, which many people have called "The Year of the Recall," and see that the past year was unprecedented in terms of both the number of food and consumer product recalls and in the attendant national and international publicity. In the fall of 2006 and throughout 2007, there were highly publicized food-borne illness outbreaks, food recalls, seafood import alerts, and consumer product recalls numbering in the hundreds. Spinach, lettuce, peanut butter, pet food, green onions, ground beef, chili, seafood, raw dairy products, and many other foods caused food-borne illness outbreaks and were recalled. On the consumer product side, recalls of millions of lead-painted and lead-filled toys and children's jewelry, magnetic toys, tainted toothpaste, and unsafe automobile tires, baby cribs, and even children's apparel have been among the products in the headlines. Both imported and domestic foodstuffs and products have been implicated in a global food and product safety crisis. Many of these product safety issues have created the impetus for greater coordination by industry participants.

With global supply chains, product quality and safety failures originating at overseas factories or farms can directly impact U.S. companies and consumers. For clients that produce, manufacture, distribute and sell food and consumer products, handling recalls and dealing with supply changes or shortages as new materials are substituted for problematic or prohibited materials may require collaborative actions with others, including in some cases, competitors. Even for clients who are not directly implicated in a recall, there may be increased interest in prophylactic coordinated activities to improve product safety or reduce consumer concern, such as new industry initiatives or consultation among suppliers in global supply chains to safeguard against a perceived concern.

With increased consultation and coordination of activities in dealing with the product safety and regulatory challenges, product regulatory counsel has a greater need to be sensitive to and aware of antitrust issues. In educating their common clients as to the bounds of permissible conduct in crisis situations, antitrust lawyers can develop new opportunities, in collaboration with their regulatory colleagues, to increase their value to their clients' businesses.

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Information Sharing Practices During Recalls

At the time a consumer level recall is publicly announced, it is not just the manufacturer of the recalled product that is involved. All of the manufacturer's distribution channels are directly impacted. When a manufacturer announces a recall of a popular product, its distribution and retail channels are also fielding questions and handling actual logistics of product returns and product destruction. There can be legitimate needs for concerted action in sharing information, for example, in tracing and identifying a supplier in the global supply chain that may be the ultimate source of the contamination or product defect. The legitimate business purpose in this tracing and identification activity is to remove end products from distribution channels and recall them from consumers' homes as expeditiously as possible.

 While customers may be demanding refunds and trying to return products, there are usually additional pressures from other constituencies that lawyers must be prepared to handle. Often news media reporters and camera operators are cruising down aisles in retail stores trying to locate and photograph recalled products remaining on the shelves. Federal, state, and local government officials may be investigating and lawsuits may be being filed. A recall can be a very stressful period for business clients, whether they are a manufacturer, importer, distributor, or retailer. Manufacturers must notify their distributors and retail customers promptly when they discover product contamination or a safety hazard. They must treat big customers and smaller customers in an even-handed fashion, providing all customers with the same information.

Another less obvious issue for attorneys is the need to alert the product manufacturer or importer and its distribution chain on how to handle calls and e-mails from competitors on the logistics or impact of the recall. The manufacturer's or importer's business people may not see any harm in discussing all of this with competitors as, after all, they are just cooperating to assure consumer safety. They may feel that the entire industry needs to "pull together" in a time of crisis.

The antitrust laws do allow competitors to collaborate in a limited fashion for socially beneficial purposes like assuring food and product safety. The tension comes from the method of collaboration. The immediacy of the situation, however, may create an impetus for more informal collaboration. Conference calls between a small group of competitors should be discouraged, even in a crisis mode. The risk of telephone conversations or small gatherings of competitors in the wake of a recall is that the competitors may unwittingly cross over the antitrust line and start allocating the business among new suppliers or jointly negotiating prices with the suppliers of alternative products to the recalled product line. Of course, some collaboration within the confines of a duly constituted trade association with counsel present is usually permissible. The trade association, guided by counsel and in cooperation with a government agency, may work on new and improved industry responses to the safety concern. The California produce growers association, for example, followed this approach working with the FDA, the Centers for Disease Control, and the California Department of Health in formulating an industry initiative on growing, harvesting, sanitation, inspection, and testing in the wake of the 2006 spinach recall due to E.coli O157:H7 contamination.

Outside this context, however, the best way for counsel to communicate this message across the organization and any affiliated companies is to cover these issues in regularly scheduled, preventative legal training programs. That way when a recall crisis hits, it is hoped that the client's employees will already know how to behave and when to ask for more legal guidance as the crisis is unfolding.

One of the difficult challenges in this proactive training is teaching the various corporate business and scientific teams the nuances of when competitor information sharing is permissible under the antitrust laws and when it is not. There are two fundamental aspects of the collabora-

tion. One is the nature of the subject matter and the other is the forum for the collaboration. Lawyers can illustrate this idea using a color coded chart which graphically shows how the antitrust risk increases or decreases depending on the particular subject matter and the forum where it is discussed. For example, competitor companies meeting in a counsel-monitored trade association forum discussing methods to improve lead testing techniques for children's products could fall in a green ("go ahead") section of the chart. Two competitor product safety managers having a telephone conversation trying to identify the source of a product contamination in ingredients their companies both purchased from the same growing area might fall in a yellow ("consult the legal department before proceeding") section. Two procurement managers at large competitors getting together to discuss how to structure a reimbursement plan for the supplier who had announced a recall would fall in a red ("no go") area of the chart. Production managers at competing manufacturers meeting together to discuss the performance and pricing of industry suppliers, would also fall into the red area of the chart.

The regulatory counsel when consulted on a pending product safety issue, however, must continue to stress antitrust compliance to the business teams as various responses are being contemplated.

Of course, all potential scenarios cannot be anticipated in training. Antitrust compliance programs can help employees spot issues and alert counsel. The regulatory counsel when consulted on a pending product safety issue, however, must continue to stress antitrust compliance to the business teams as various responses are being contemplated.

Development of Coordinated Responses to Address Product Safety Concerns

Recalls and product safety concerns also directly fuel a push for coordinated action as companies strive to address these issues in a coordinated fashion, either as an industry initiative or in response to multi-faceted legislative or regulatory mandates. At the time of publication of this article, Congress is already working on new legislation to increase the powers and budget of the Consumer Product Safety Commission (CPSC).[3] On November 6, 2007, the Interagency Working Group on Import Safety presented to President Bush its Action Plan, which contains recommendations for improving the safety of imports crossing our borders. On January 25, 2008, the FDA announced that it intends to station inspectors throughout the developing world to improve the quality and safety of imported food and drugs flowing to the United States.[4]

On September 26, 2007, the American National Standards Institute (ANSI) held an open forum for all stakeholders in Washington D.C., entitled "Building Consumer Confidence." The purpose of the forum was to develop recommendations to help protect consumers from imported goods that do not meet U.S. standards for health and safety. Lydia Parnes, Director of the FTC's Bureau of Consumer Protection, addressed the forum. Her remarks praised the past work of industry self-regulatory organizations in complaint resolution, quality assurance, best practices, and standards that raise the level of industry compliance with laws enforced by the FTC. She indicated that the FTC stands ready to assist in the development of new self-regulatory programs in the area of product safety as well.[5]

With all of these governmental actors interested in safety issues, the push for an industry response to the legislative and regulatory pressures is likely. Industry groups also seek to self-

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[3] S.2045, 110th Cong., 1st Sess. (2008) (CPSC Reform Act of 2007). This bill is currently on the Senate's legislative calendar. Another similar reform bill passed the House of Representatives last fall. *See* Consumer Product Safety Modernization Act, H.R. 4040, 110th Cong., 1st Sess. (2007). The House bill is a weaker bill from a consumer protection viewpoint.

[4] Gardiner Harris, *F.D.A. to Expand Scope of Foreign Inspections*, N.Y. TIMES, Jan. 25, 2008, at C3.

[5] Lydia Parnes, Director, Bureau of Consumer Protection, Federal Trade Comm'n, Remarks at the Building Consumer Confidence Forum (Sept. 26, 2007), *available at* http://www.ftc.gov/speeches/parnes/070926ansi.pdf.

regulate to be good corporate citizens. As member companies in various trade associations work to improve safety standards for products, such as toys and fresh produce, it is incumbent on their regulatory counsel to work closely with antitrust colleagues to help company participants understand the acceptable parameters of competitor cooperation in new industry standard development. This will assure that smaller companies are not left out or injured, intellectual property is appropriately protected, and that new standards promote overall product safety in the interests of consumer welfare.

Concerted Conduct in Context of Scarcity of Supply/Substitution of Materials

Another area where businesses may perceive a need for concerted conduct is in the context of scarcity of supply or substitution of ingredients, chemicals, or materials. Closely related and often inseparable from the product safety issues discussed above, are environmental, social, and animal welfare concerns expressed by consumer advocates. Today's highly sophisticated consumer groups are closely examining all aspects of food and consumer product supply chains, product composition and contents, production and transportation methods, and environmental impacts. Americans now understand the concept of "food miles" and the calculation of how much carbon dioxide is released into our atmosphere during the raising of livestock and the production and transportation of foods from farm to fork. This trend has gained momentum as a result of California's Proposition 65,[6] influential food chefs and writers, animal welfare activists, former Vice President and Nobel Laureate Al Gore's educational work and advocacy on global warming, and other factors. Consumers are increasingly concerned about harmful chemicals and dangerous materials found in consumer products. With an increased emphasis on these operations and policies, many future-oriented companies are engaging in more information sharing and coordinated action to improve and further their corporate social responsibility agenda.

A prominent example of recent legislative action taken to address scientific and consumer concerns about chemicals and other materials found in household products is California's passage of Assembly Bill 1108,[7] which bans the use of a group of chemicals called phthalates, a type of plasticizer,[8] from toys and child care articles intended for children under the age of three. The concern is that these chemicals may cause cancer and reproductive defects.

When widely used chemicals or materials are banned or restricted in large markets like California, the manufacturers of the end-consumer products may have difficulty obtaining sufficient substitute chemicals or materials to continue production of the end product. In a case of a legislative ban on a critical product component or material, it is very easy to imagine a scenario where the procurement managers for two competitors with a combined 60 percent of the market get together to come up with a plan. If they decide to throw all of their business for a replacement plastic to the same supplier, and end up with the exact same pricing, or divide the market up and allocate their existing inventories accordingly, then they may be in violation of the antitrust laws.

In these situations, which I believe may happen more frequently in light of consumer trends, regulatory counsel needs to involve antitrust counsel from the beginning to address antitrust aspects of these emerging supply chain issues before new supply arrangements are implement-

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[6] The Safe Drinking Water and Toxic Enforcement Act of 1986, Cal. Health & Safety Code §§ 25249.5–25192 (West 2008), *available at* http://www.oehha.ca.gov/prop65.html (with list of prohibited substances).

[7] Cal. Health & Safety Code §§ 108935–108939 (West 2008). Governor Schwarzenegger signed the legislation on October 14, 2007.

[8] Plasticizers are various substances added to plastics to keep them pliable or soft.

ed. Perhaps the legal advice will be to enlist the relevant trade association to deal with the shortages on an industrywide basis and perhaps with the involvement of the government entity that implemented the ban in the first place. It is one thing to ban chemicals or materials that are deemed harmful. It is often more difficult to come up with workable substitutes, especially if the legislative action does not provide a reasonable transitional period.

Alternatively, perhaps the advice is that the competitors can get together if they invite all the industry players, even outside of a trade association context. Where time is of the essence, and there is no exclusion, the failure of some industry participants to participate may not be an insurmountable issue if counsel is present for all group discussions. Counsel could guide the meeting participants about what can and cannot be discussed, so that the meeting focuses on how to develop new materials, not impermissible topics, such as individual company pricing, quantities, sales figures, a division of markets or a group boycott of one of the plastic suppliers.

Regulatory counsel should also take into account market realities when faced with a scenario where a state (or other governmental entity) bans the use of a certain chemical, material, ingredient, or method of production for a product category, based on health, safety, social, or environmental reasons, and the client wishes to work with some, but not all, of the companies affected by the ban. What if two competitors control the supply of an alternative material and raised the prices, so that the substitute articles became either unavailable or very expensive and unaffordable for low income consumers? This is why regulatory and antitrust lawyers need to keep informed about trends in this area and work closely to make sure their clients are included as stakeholders in governmental and industry policy making.

Conclusion

The key takeaway for our clients should be that promoting consumer safety and social and environmental responsibility are laudable goals for which all companies should strive, but that industry collaboration and concerted activities should be undertaken with caution and carefully vetted by counsel. Companies need to understand that competitor collaboration that violates the antitrust laws must be avoided even when pursuing these other important societal values. Where regulatory and antitrust advice is being given by different attorneys, regulatory counsel must gain greater awareness of the scope of the antitrust laws and understand the need for sensitivity to antitrust issues as they guide their corporate clients through industry standard making, product recalls, and supply chain disruptions and substitutions. ●

Paper Trail: Working Papers and Recent Scholarship

Editor's Note: In this edition, we review a paper by Dennis Carlton and Michael Waldman criticizing the Antitrust Modernization Commission's definition of safe harbors in the analysis of bundled discounts, which they believe are usually benign. We also include a response from Malcolm Coate to our review of his working paper on barriers to entry in merger analysis. Send comments and suggestions for papers to review to: page@law.ufl.edu or jwoodbury@crai.com.

—*WILLIAM H. PAGE AND JOHN R. WOODBURY*

Recent Papers

Dennis Carlton & Michael Waldman, Safe Harbors for Quantity Discounts and Bundling (Jan. 2008)
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1089202

In this short paper, Dennis Carlton and Michael Waldman criticize the Antitrust Modernization Commission's definition of safe harbors[1] in the analysis of bundled discounts. The authors note that safe harbors are often beneficial in antitrust law because certain "practices often are motivated by efficiency and that a broad antitrust attack on them could cause more harm than good." Quantity and bundled discounts, like price cutting, are in this category, because they are usually benign. The practices only become matters of antitrust concern if they harm both rivals and consumers by the same actions. In other words, they should only be unlawful when they are used as exclusionary practices, not when they are used for price discrimination. Indeed, the authors suggest that no pricing practices raise antitrust concerns unless they threaten a rival's existence or impair its competitiveness by denying it the ability to produce at an efficient scale.

The two-part test for predatory pricing reflects these standards. The requirement of pricing below incremental cost provides a kind of safe harbor. Even though above cost pricing might be anticompetitive in some instances, it is per se legal "in light of the fear of chilling beneficial price competition." The recoupment requirement recognizes that below-cost pricing is only harmful if it impairs rivals' ability to constrain the defendant's ability to raise price above marginal cost.

Quantity discounts raise similar, but not identical issues. When a firm offers a quantity discount, buyers' total expenditure for the goods increases with quantity, but "at slower rate than with linear pricing." This kind of discount can be evaluated under essentially the same two-part standard as predatory pricing. First, the discount will be profitable only if the expenditure remains above marginal cost, although there may be some (usually unimportant) discontinuities at the price points when the discount kicks in. Second, "if either the rival will not be driven out, or if re-entry can occur with no penalty, then recoupement is not possible and the claim of anticompetitive exclusionary pricing should fail." This latter condition is met, even if there are sunk costs, so long as the rival is not actually driven out of business and its marginal costs increase with output. In these circum-

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[1] The AMC's test is not stated as a "safe harbor," but as a test of legality. But it is arguable that the first prong of the test is a kind of safe harbor.

stances, the rival's ability to constrain pricing would remain, even if it loses sales and is thus deprived of scale. In a footnote, however, Carlton and Waldman concede that there may be anti-competitive effects if the losses to the rival force it to reduce investment in innovation.

Bundled discounts also raise similar issues, but the analysis is complicated by the involvement of multiple products, not all of which are competitively priced. This portion of the paper attempts to demonstrate that the Antitrust Modernization Commission's proposed definition of the safe har-bor for bundling is incorrect. The Commission proposed:

> Courts should adopt a three-part test to determine whether bundled discounts or rebates violate Section 2 of the Sherman Act. To prove a violation of Section 2, a plaintiff should be required to show each one of the following elements (as well as other elements of a Section 2 claim): (1) after allocat-ing all discounts and rebates attributable to the entire bundle of products to the competitive product, the defendant sold the competitive product below its incremental cost for the competitive product; (2) the defendant is likely to recoup these short-term losses; and (3) the bundled discount or rebate program has had or is likely to have an adverse effect on competition.[2]

Carlton and Waldman focus their criticism on the first element of this test, the full "discount attri-bution" standard, which the Ninth Circuit endorsed in *PeaceHealth*.[3] They claim that this part of test is a safe harbor, but is too narrowly drawn because it does not take account of nonexclu-sionary uses of bundling for price discrimination. To make the point, they hypothesize a firm that sells product A, over which the firm has a monopoly, and product B, which faces competition from other producers. If the separate monopoly price of A is 10 and the separate competitive price (marginal cost) of B is 5, and all consumers need both products, then it is arguably predatory to sell the bundle for 14. The firm has accomplished the same thing as selling B below marginal cost. The AMC would thus frame the first prong of its test by calculating the implicit net price of B by assigning to it the full discount on the bundle, then asking if the resulting price is below marginal cost.

Carlton and Waldman object that this definition of the safe harbor is too narrow, because it fails to recognize the legitimate, nonexclusionary use of bundling to discriminate in price. Suppose, for example, that one consumer values product A at 15 and product B at zero, while another con-sumer values A at 11 and B at 6. B is sold separately at its marginal cost of 5. Pricing each prod-uct separately, the firm could only sell two units of A at 11 each. Using mixed bundling as a strat-egy of price discrimination to exact each consumer's surplus, however, the firm could sell A separately to the first consumer for 15, and sell a bundle of A and B to the second consumer for 16. But doing so would fail the first prong of the AMC's safe harbor. If we apply the full discount of the bundle (compared to the prices of A and B separately) to B, the implicit price of B is 4, which is below B's marginal cost of 5. Yet, according to Carlton and Waldman, this bundling strategy is not exclusionary, even though rival producers of B are eliminated, because neither consumer is harmed by the exclusion of the rival producers. Indeed, they note that, if there are consumers who value B but not A, rival producers could remain in the market by selling to those consumers, yet the firm selling the bundle would have failed the AMC's safe harbor.

[2] Antitrust Modernization Comm'n, Report and Recommendations 99 (2007), *available at* http://www.amc.gov/report_recommendation/chapter1.pdf.

[3] Cascade Health Solutions v. PeaceHealth, No. 05-35627, 2008 WL 269506, at *15 (9th Cir. Feb. 1, 2008). Carlton and Waldman cite an opin-ion in the case that the cited opinion superseded, but the new opinion does not affect this point.

The AMC's test has two other prongs: first, will the bundle allow the firm to recoup by raising the price of B in a later time period; and, second, will the bundle cause competitive harm? They suggest that a better approach would be to ask whether producers of B can remain in the market by specializing in sales to consumers who value only B. This test has the virtue of (relative) simplicity, and recognizes that any harm to consumers of A is purely the result of price discrimination, and is thus not exclusionary.

—WHP

Author's Response

From Malcolm Coate, Economist, Federal Trade Commission*

In the December issue of the *Antitrust Source*'s Paper Trail, John Woodbury reviewed my working paper (since updated), "Theory Meets Practice: Barriers to Entry in Merger Analysis." Woodbury gave what's essentially a referee report on the initial version of the paper. He did make some helpful comments that have been incorporated into the latest version of the paper (revised 2008) (available at SSRN: http://ssrn.com/abstract=988423). However, I think the review fails to capture the essence of the line of work I collectively term the "Transparency Project."[4] The goal of the overall project is to explore the Federal Trade Commission's enforcement record in a search for both empirical generalities and innovations in merger analysis. The project has led to the release of useful information on aggregate data for Herfindahl levels and number of significant competitors, the proportion of cases that report some form of evidence (natural experiment data, customer concerns, or hot documents) and the styles of analysis that are used to define markets in practice. Moreover, papers in the project discuss innovative ideas associated with isolating a relevant market, measuring market structure and proving a competitive concern. Entry analysis would also benefit from this style of transparency.

The paper reviewed in the December 2007 Paper Trail focuses on the entry issue; it gives an overview of the Guidelines process and highlights innovations such as modeling likelihood of entry. Woodbury characterizes the insights on how the agency applies the Guidelines as "nothing new;" instead, he suggests the paper re-focus on obtaining a "deeper understanding" of what the staff "typically" looks at to evaluate entry. In effect, Woodbury would prefer a case study approach to merger analysis. Some case study information is available to the antitrust community, as the joint FTC/Department of Justice Commentary on the Horizontal Merger Guidelines contains a section on entry barriers.[5] More detailed analyses of actual cases are difficult in light of the constraints on releasing Hart-Scott-Rodino confidential information.

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* The analyses and conclusions contained in this response are those of the author and do not necessarily represent the views of the Federal Trade Commission, any individual Commissioner or any Commission Bureau.

[4] *See, e.g.*, Malcom B. Coate & Shawn W. Ulrick, *Transparency at the Federal Trade Commission: The Horizontal Merger Review Process*, 73 ANTITRUST L.J. 531 (2006); Malcolm B. Coate, *Economic Models and the Merger Analysis: A Case Study*, 2 REV. L. & ECON. 53 (2006); Malcolm B. Coate, *Empirical Analysis of Merger Enforcement Under the 1992 Merger Guidelines*, 27 REV. INDUS. ORG. 279 (2005); Malcolm B. Coate & Jeffrey H. Fischer, *A Practical Guide to the Hypothetical Monopoly Test for Market Definition*, J. COMPETITION L. & ECON. (forthcoming), *available at* http://ssrn.com/abstract=940667.

[5] *See* Federal Trade Comm'n & U.S. Dep't of Justice, Commentary on the Horizontal Merger Guidelines (2006), *available at* http://www.ftc.gov/os/2006/03/CommentaryontheHorizontalMergerGuidelinesMarch2006.pdf.

All the papers in the Transparency Project attempt to identify economic considerations relevant to the staff analyses using the Merger Guidelines as a context. Often this requires providing some definitions and background material. In this paper, I define barriers as "structural conditions or strategic behaviors that prevent market forces from quickly deterring or counteracting an anti-competitive effect of concern."

Woodbury questions the overweighting of strategic barriers to entry in the theoretical discussion, describing it as "too cryptic." Unfortunately, Post-Chicago economics is cryptic, but antitrust professionals are stuck with it. The theoretical discussion, along with references to the recent work of Dennis Carlton, are crucial to convince the stakeholder to accept the fundamental proposition that the concept of an entry barrier must be defined in light of a theory of competitive concern.[6] In effect, this means that merger enforcement and barrier analysis are empirical tasks. While economists can postulate any number of models to simulate the universe, the models are only applicable if (1) they can be validated with some type of evidence to show their predictions have been tested and (2) the facts underlying the model can be quantified in the real world.[7]

Woodbury notes that the discussion of the FTC cases does not start until section VI. I have clarified the draft and it is now clear that the entire second half of section III is based (in part) on insights gleaned from the case files. Table 1 lists historical barriers to entry, all of which make their appearance in some form or the other in the files. Each entry style (de-novo entry, fringe branding, fringe entry, etc.) needs to be evaluated for timeliness and then likelihood. Then styles of entry that are both timely and likely are passed through the sufficiency analysis to determine if the effect of timely, likely entry, when viewed together, is sufficient to offset or deter the competitive effect of concern.

Woodbury appeared concerned with the lack of evidence on the likelihood issue. The text has been tweaked to focus the reader on the minimum viable scale test. Staff claims entry is not profitable in 93 matters, but only provides a comprehensive explanation for 47 of the cases. Arguments such as "the product was branded" or "the market was declining" could have been developed into fact-based analyses, but were not. The solution to this problem is lifted right out of the files: in a few innovative reviews, staff presented actual models of the entry decision, based either on available entry studies or pro-forma profitability models. Net present value analysis, if carefully implemented, should be able to determine if a firm could profitably (would) enter in response to a specific anticompetitive effect. While further research on any topic may be useful, the ideas contained in this paper are likely to help stakeholders address entry issues at the FTC.

John Woodbury Replies:

I want to clarify two points Malcolm Coate takes issue with in his response to my review of his paper in the December 2007 Antitrust Source, *http://www.abanet.org/antitrust/at-source/ 07/12/Dec07-pTrail12-17.pdf: First, contrary to what Coate seems to be suggesting, I did find the data discussed in his paper informative and interesting. That's why most of my review focused on the FTC's release of the information that characterizes the agency's enforcement approach contained in the Coate paper.*

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[6] Dennnis W. Carlton, *Why Barriers to Entry Are Barriers to Understanding*, 94 AM. ECON. REV. 466 (2004).

[7] Malcolm B. Coate & Jeffrey H. Fischer, *Can Post-Chicago Economics Survive* Daubert, 34 AKRON L. REV. 795 (2001).

And if it were correct, as Coate writes in his response, that "Post-Chicago economics is cryptic, but antitrust professionals are stuck with it"—this would certainly be an unsettling state of affairs in the relationship between antitrust law and economics. But my experience has been that economists can generally provide the intuition behind even a technically complicated concept. So I wasn't suggesting that post-Chicago economics was beyond the comprehension of mere mortals and lawyers, only that the discussion of post-Chicago economics in the paper was not particularly accessible. ●

Editor's Note: The Antitrust Source *welcomes comments from the authors whose papers are reviewed in the Paper Trail. Send comments to* antitrust@att.net.