Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
2006 Quadrennial Regulatory Review—Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996	)	MB Docket No. 06-121
	)	
2002 Biennial Regulatory Review—Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996	)	MB Docket No. 02-277
	)	
Cross-Ownership of Broadcast Stations and Newspapers	)	MM Docket No. 01-235
	)	
Rules and Policies Concerning Multiple Ownership of Radio Broadcast Stations in Local Markets	)	MM Docket No. 01-317
	)	
Definition of Radio Markets	)	MM Docket No. 00-244

JOINT DECLARATION OF

LUKE FROEB, PADMANABHAN SRINAGESH
AND MICHAEL WILLIAMS

IN SUPPORT OF COMMENTS OF
HEARST-ARGYLE TELEVISION, INC.

EXECUTIVE SUMMARY

We have been asked by Hearst-Argyle Television, Inc. to comment on the Federal Communications Commission's (FCC's) current and previously proposed rules regarding local television station ownership.[1] We conclude that the public interest as defined by the FCC's goals of competition, diversity, and localism would be better served by rules that permit some mergers that would be prohibited by the current and previously proposed rules. Our conclusion is based on the following:

- At the Federal Trade Commission ("FTC") and U.S. Department of Justice ("DOJ") (collectively referred to hereafter as the "Agencies"), simple enforcement rules based on market shares and the number of competitors have given way to a case-by-case analysis of the likely competitive effects of mergers. The structural thresholds of the *Horizontal Merger Guidelines* are now seen as a safe harbor for mergers, rather than an indicator of their likely competitive effects. The change has been driven by research showing that structural indicators are poor proxies for the likely competitive effects of mergers, as well as by the experience of the Agencies.

- The FTC merger enforcement data indicates that the proposed FCC rules would block all mergers that were investigated, but not challenged, by the FTC from 1996-2003.[2] This rule would result in larger Type I errors (blocking mergers that benefit consumers), which may have significant effects on economic efficiency, especially in an industry such as the television industry with a rapidly changing competitive environment.

- There is a difference, of course, between the legislative mandates of the Agencies and the FCC. In addition to competition, the FCC is concerned with diversity and localism. However, the peculiar features of media markets, e.g., the ease of product repositioning, suggest that media mergers are more likely to increase diversity and increase consumer welfare. The merged firm has an incentive to move the merging products further away from one another to avoid cannibalizing each other's sales (or audience), so the anticompetitive motive to increase price is reduced and products are more differentiated, resulting in greater diversity.

We conclude that deregulatory modifications to the structural thresholds currently utilized, and those previously proposed by the FCC, to regulate mergers between broadcast television stations in the same local markets would likely benefit consumers.

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[1] In its *2002 Biennial Review Order,* the Commission cited two papers co-authored by Dr. Froeb and one paper co-authored by Dr. Williams.

[2] The data are for the "other" category excludes mergers involving pharmaceuticals, oil, chemicals, and grocery stores. Mergers in this category accounted for 44 percent of the markets in the horizontal merger enforcement data.

I. INTRODUCTION

1. Luke Froeb is the William C. and Margaret M. Oehmig Associate Professor of Entrepreneurship and Free Enterprise at Vanderbilt University's Owen Graduate School of Management. In July 2005, he completed a two-year term as Director of the Bureau of Economics at the U.S. Federal Trade Commission (FTC), where he managed 75 Ph.D. economists who provided economic analysis to support the antitrust and consumer protection missions of the agency. He has also served as an economist at the U.S. Department of Justice, and has published extensively on the economics of competition policy. He holds a Ph.D. in economics from the University of Wisconsin.

2. Michael Williams is a Director at ERS Group. He specializes in analyses involving antitrust, industrial organization, and regulation. He served as a consultant to the Federal Trade Commission in the proposed acquisition by the parent of Monster.com of HotJobs, Inc. Previously, Dr. Williams was an economist with the U.S. Department of Justice, Antitrust Division. While at the Antitrust Division, Dr. Williams analyzed the competitive implications of Westwood One, Inc.'s acquisition of NBC Radio and Turner Broadcasting System, Inc.'s attempted acquisition of CBS. Dr. Williams holds a B.A. degree in economics from the University of California, Santa Barbara, and he received his M.A. and Ph.D. degrees in economics from the University of Chicago.

3. Padmanabhan Srinagesh is a Principal at ERS Group. Recently, he helped analyze the acquisition of two newspapers by a large national chain. He has submitted expert reports on telecommunications regulations for use in proceedings before the FCC, Latin American regulatory agencies, the World Trade Organization, and the Australian Competition and Consumer Commission. Previously, he was a Member of Technical Staff at Bellcore (now

Telcordia), and taught at Williams College and the University of Illinois at Chicago. Dr. Srinagesh received his Ph.D. in economics from the University of Rochester.

4. Elements of our professional background are particularly relevant to local television ownership rules. First, while Professor Froeb was Bureau Director at the FTC, the staff developed a comprehensive database on the FTC's merger enforcement for the period 1996 to 2003 and used it to gain a better understanding of the relationship between merger enforcement practice and the well-known conceptual framework described in the *Horizontal Guidelines.*[3] Dr. Froeb oversaw the data collection and analysis of the data[4] which can inform the development of rules for the ownership of local television stations. He also organized and presided over FTC hearings on "Estimating the Price Effects of Mergers and Concentration in the Petroleum Industry: An Evaluation of Recent Learning," that studied the effects of consummated mergers. Second, Professor Froeb and Dr. Williams have studied the welfare effects of mergers for over a decade, and their research has resulted in the publication of a number of articles on the effects of mergers. This line of research can inform the Commission's efforts to promote competition and diversity in broadcast media. In this Joint Declaration, we will summarize for the Commission the findings in these two specific areas and explain how these findings[5] can help the Commission predict the effects of local television ownership rules so that it can advance its policy goals most effectively. More information on our backgrounds is provided in the attached curricula vitae.

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[3] *Horizontal Merger Guidelines* issued by the U.S. Department of Justice and the Federal Trade Commission, 57 Fed. Reg. 41552 (dated Apr. 2, 1992; revised Apr. 8, 1997). Henceforth, *Guidelines*.

[4] Malcolm B. Coate and Shawn W. Ulrick, Transparency at the Federal Trade Commission: The Merger Review Process, 1996-2003, 71 ANTITRUST L. J. 253 (2003).

[5] The literature includes two papers co-authored by Dr. Froeb and one paper co-authored by Dr. Williams that were cited by the Commission in its *2002 Biennial Review Order*.

II. THE DIMINISHING IMPORTANCE OF STRUCTURAL CONDITIONS IN MERGER ANALYSIS

5. In recent years, the theory and practice of merger analysis and enforcement have been moving away from a focus on structural conditions towards the analysis of competitive effects. Structural conditions (including measures of concentration) now serve primarily as a screen for identifying mergers that are unlikely to cause competitive harm, i.e., a "safe harbor." In the *Guidelines*, when the post-merger Herfindahl-Hirschman Index (HHI) is below 1000 (the threshold for "moderately concentrated" industries) or when the increase in the HHI is below 50, mergers are considered unlikely to have adverse competitive effects and ordinarily require no further analysis.

6. For mergers outside the safe harbor, the Agencies bring cases only when they predict that the mergers will have anticompetitive effects. The analysis requires consideration of a number of factors because merger effects are complex, subtle, and varied. The *Guidelines* recognize a number of different mechanisms through which mergers can affect consumer welfare: unilateral effects, coordinated effects, entry, product repositioning, and merger-specific efficiencies. Given the number of ways that firms compete with one another (how much to produce and sell, what price to charge, whether to enter the market and what capacity to install, how to position or differentiate their products, which distribution channels to use, and how to promote or advertise), and the variety of selling mechanisms (spot pricing, long-term contracts, contingent contracts, auctions, and negotiations), it would be surprising if merger effects were predicted well by something as simple as market shares or concentration.

7. In the markets that the Commission has identified as being served by local television stations—the delivery of programs to viewers, the provision of desirable audiences to advertisers, and the purchase of programs from producers—a wide range of market structures

and contractual arrangements have evolved. Advertisements are sold according to long-term contracts and also by negotiation; firms compete for advertisers by adjusting prices, and by trying to appeal to various groups of viewers; firms compete for viewers (or subscribers) by selecting content that is expected to draw desirable audiences; and programming is produced or purchased using a wide range of short and long term contractual arrangements. In such a complex environment, it would, again, be surprising if simple structural indicators could predict merger outcomes.

8. As part of the analysis supporting its revised local television ownership rules in the *2002 Biennial Review Order*, the Commission cited two papers co-authored by Professor Luke Froeb and one paper co-authored by Dr. Michael Williams.[6] These papers are part of a much larger literature on the competitive effects of mergers.[7] The paper by McAfee and Williams studied a Cournot-Nash model in which symmetric firms have increasing marginal costs and charge a price at which market demand equals total industry output. For this model, Williams and McAfee found that when the elasticity of market demand was above 2/3 (in absolute value), the creation of a new largest firm through merger reduced economic efficiency. But before using conclusions from their model to inform policy, we would caution the FCC to make sure that the model fits the facts of the industry under consideration.[8] For example, several

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[6] Luke M. Froeb, Gregory J. Werden and Timothy J. Tardiff, "The Demsetz Postulate and the Effect of Mergers in Differentiated Product Industries," republished in *Economic Inputs, Legal Outputs—The Role of Economists in Antitrust*, Fred McChesney (ed.) (Chichester: John Wiley & Sons, 1998), pp. 141-8; Gregory Werden and Luke M. Froeb, The Effects of Mergers in Differentiated Products Industries: Logit Demand and Merger Policy, 10(2) J. L. ECON. ORG. 407-16 (1994); and R. Preston McAfee and Michael Williams, "Horizontal Mergers and Antitrust Policy," J. INDUS. ECON., Volume XL, No. 2, June 1992, 181-187. The three papers are cited in the *2002 Biennial Review Order* at ¶194.

[7] *See, e.g.*, Gregory J. Werden and Luke M. Froeb, "Unilateral Competitive Effects of Horizontal Mergers," in *Handbook of Antitrust Economics*, Paolo Buccirossi (ed.), (Boston: MIT Press, forthcoming), for a recent summary.

[8] Gregory J. Werden, Luke M. Froeb, and David T. Scheffman, A *Daubert* Discipline for Merger Simulation, *Antitrust*, 18:3 (Summer, 2004), pp. 89-95.

features of this model, such as quantity competition, symmetry, homogeneous products, and increasing marginal costs do not seem to characterize competition well in the broadcast media industry. In fact, the FCC itself acknowledged that the industry produces differentiated products.[9] It would seem unwise to rely on the conclusions of this stylized model to design merger policy for the industry.

9. The two articles co-authored by Professor Froeb cited in the *2002 Biennial Review Order* analyze a model of differentiated goods oligopoly in which firms with constant marginal costs choose price and customers make mutually exclusive purchase decisions. These articles show that in addition to any cost reduction that may result from a reallocation of production between the merging firms, post-merger average costs may fall when production shifts to more efficient *non-merging* firms. While differentiated goods oligopoly models are more suitable than homogeneous goods models for the study of local television markets, we note that these are models of single-sided competition, whereas in the delivered video programming (DVP) market, firms compete for both audience as well as advertising revenue.

10. With this caveat, we note that the Froeb *et al.* paper concludes that structural rules should recognize that "high concentration may not merit greater restraints on the mergers of smaller firms."[10] Indeed, an application of the theoretical model to Japanese long distance telecommunications services showed that even in this *highly concentrated* market (with an HHI exceeding 1800) consisting of only four firms, three of the six possible mergers resulted in an increase in total (consumer plus producer) welfare. For this example, a structural rule that

[9] *2002 Biennial Review Order* at ¶195.

[10] Luke M. Froeb, Gregory J. Werden and Timothy J. Tardiff, "The Demsetz Postulate and the Effect of Mergers in Differentiated Product Industries," republished in *Economic Inputs, Legal Outputs—The Role of Economists in Antitrust*, Fred McChesney (ed.) (Chichester: John Wiley & Sons, 1998), p. 146.

prohibited mergers among the top four firms, or a rule that prohibited common ownership of two or three firms unless the market had at least twelve or eighteen firms, respectively, could have the effect of preventing mergers that would increase total welfare.

11. In our view, a basic lesson of these papers is that the policy implications of one model may be quite different from those of another model. The McAfee-Williams paper drew attention to the inefficiencies of creating a new largest firm producing homogeneous goods, while the paper by Froeb *et al.* uncovers a mechanism through which mergers of two of the top four firms in a market can increase total welfare. The more general lesson is that an inflexible structural rule for merger-based policy is likely to be wrong under some set of circumstances almost certain to be encountered in practice. A case-by-case approach would not be subject to this limitation.

12. However, case-by-case decision-making is costly, time consuming, and the results are not easily predicted in advance. The Commission has stated that it prefers bright-line rules despite their lack of flexibility because "they provide greater certainty, conserve resources, reduce administrative delays, lower transactions costs, increase transparency of our process, and ensure consistency of decisions."[11] Errors resulting from the rigid applications of the rules might be addressed by a discretionary review or in considering waiver requests and petitions to deny.[12]

13. Discretionary review and waiver requests notwithstanding, bright-line rules generate two types of errors: Type I errors (blocking mergers that benefit consumers) and Type II errors (allowing mergers that harm consumers). Stricter rules increase Type I errors and simultaneously reduce Type II errors; more lenient rules reduce Type I errors and increase Type

[11] *2002 Biennial Review Order* at ¶82.

[12] *2002 Biennial Review Order* at ¶¶80-85.

II errors. This tradeoff is unavoidable. An efficient bright-line rule would minimize expected error costs, the sum of costs of each error type weighted by the frequency of its occurrence.

14. An efficient bright-line rule might possibly be constructed if we had good studies on the effects of actual mergers and we had good predictors of their effects. While we do have some studies of consummated mergers, it is difficult to find common factors across the studies that would allow us to predict merger effects or inform the construction of an efficient rule for mergers. The best information that we have may come from the enforcement data released by the FTC in 2004. Since the enforcement data represent the results of detailed case-by-case analysis, the data can be used to "benchmark" the existing and any proposed FCC rules.

III. LESSONS FROM FTC ENFORCEMENT DATA

15. This section provides data on recent FTC enforcement actions in horizontal merger investigations. The FTC[13] issued a report in 2004 reviewing its enforcement actions for all horizontal mergers for which the FTC issued a "second request"[14] during the fiscal years 1996 through 2003.[15] Investigations were either "enforced" (the FTC sought relief or the parties abandoned the transaction after a full review) or they were "closed" (the FTC did not seek relief). Figure 1 presents information on outcomes of the FTC's investigations in the category "all other markets," which excludes groceries, oil, chemicals, and pharmaceuticals.[16] Media markets would fall in this category.

[13] We focus on the FTC enforcement data as it is more detailed than the enforcement data released by the DOJ, with data on a number of structural indicators.

[14] A second request is a subpoena that marks the beginning of the second stage in a merger investigation.

[15] FTC, Horizontal Merger Investigation Data, Fiscal Years 1996-2003 (revised Aug. 31, 2004).

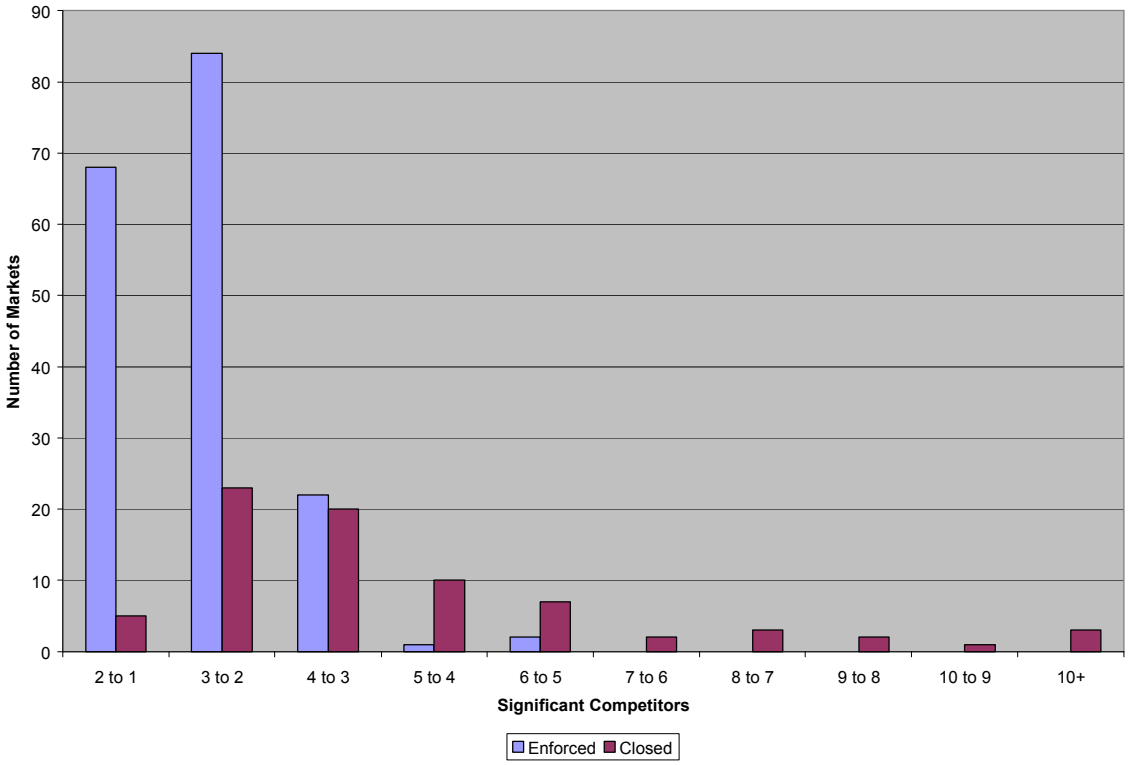
[16] These four industries accounted for approximately 56 percent of the markets in the horizontal merger data during this period.

16. The most significant feature in Figure 1 for our analysis of local television ownership rules is the large number of mergers that the FTC declines to challenge in very concentrated markets. The darker, purple bars indicate the number of "closed" investigations in relation to the number of significant competitors in the affected markets. The left-most bar indicates the number of closed investigations of mergers to monopoly (going from two to one significant competitors). Even for these most concentrated markets, the FTC decided not to challenge five mergers, or about 7% percent of the total in this category. For three-to-two mergers, the percent of closed investigations increases to 22%; for four-to-three mergers, 48%; for five-to-four mergers, 91%; and for six-to-five mergers 78%.

17. Of course, interpreting these data is difficult because they come from a selected sample of the mergers that the FTC decided to investigate. But we can pose the question: how many of these mergers would have been blocked by the proposed FCC rules? The answer is: all of them. All of the four-to-three, three-to-two, and two-to-one mergers would have been blocked by the FCC's proposed rule prohibiting mergers among the top four firms; and all the other mergers would have been prohibited by the FCC's proposed rules on "duopolies" and "triopolies."[17]

[17] The terms "duopoly" and "triopoly" as used in this context are idiosyncratic. Generally, they refer to an industry of two firms or an industry of three firms, respectively.

Figure 1
FTC Horizontal Merger Investigations
Number of Significant Competitors
"Other" Markets
FY 1996 through FY 2003



18. It follows that, relative to FTC enforcement, the FCC rules are stricter and have bigger Type I errors. As noted above, we cannot say that the FTC enforcement rules are more efficient because we do not have the kind of detailed post-merger studies that would allow us to verify this claim. However, we do know that that Type I errors can be extremely costly to our economy.

19. The movement of assets to higher-valued uses is the wealth-creating engine of capitalism, and our biggest and most valuable assets are corporations. Mistakenly preventing the movement of assets via merger could impose large costs on our economy. The costs of Type I errors may be especially high in industries undergoing rapid technological change, as is the case

with the delivered video programming market. More generally, the rapid pace of technological change over the last three decades has substantially altered the external competitive environment for traditional media, including television broadcasters. This has resulted in an increase in both the number of viewing options for consumers and advertising options for firms (e.g., craigslist and Google). These changes would tend to mitigate any potential anticompetitive merger effects.

20. The Hearst-Argyle proposal to adopt a bright-line rule is modeled on the thresholds of the *Guidelines* and would be much stricter than FTC enforcement.[18] To show this, we use the prediction formulas estimated by Coate and Ulrick[19] characterizing the FTC enforcement decisions as a function of the level and change in the HHI, and the number of significant competitors. Even when entry is difficult and six significant competitors remain post-merger, the probability of a merger challenge in a market with an HHI of 1800 and a change in HHI of 50 is less than one percent. In other words, the Hearst-Argyle proposed rules are still much stricter than FTC enforcement under its current case-by-case approach. They represent only a small step away from the FCC's previously proposed rules towards actual FTC enforcement as measured by outcomes.

21. In addition, if the FCC is worried that a small movement away from its current or its previously proposed rules would increase Type II errors (allowing mergers that harm

[18] The Hearst-Argyle proposal would permit mergers between local television stations if the combined audience share were below 30% and the merger satisfied a rule based on an Audience Market Index (AMI). The Hearst-Argyle AMI is defined to be equal to the sum of squares of the individual audience shares of all local television stations in the relevant DMA. In many DMAs, the local television stations have only a 40-50% total audience share when other sources of video programming are considered. The AMI is therefore lower than the HHI (assuming this is a relevant market) by an amount equal to the sum of squares of the remaining competitors. In many cases there are a hundred or more channels that split the remaining 50-60% percent share. In those cases in which multiple channels are not commonly owned, the difference between HHI and AMI will be small, but not zero. Delta AMI is, however, exactly equal to delta HHI.

[19] Malcolm B. Coate and Shawn W. Ulrick, Transparency at the Federal Trade Commission: The Merger Review

(continued . . .)

competition), some of these errors would be caught by the Agencies when they review the mergers. For mergers of local television stations that are large enough to trigger a review by the DOJ or the FTC, the case-by-case approach of these Agencies will lead to challenges of some or all of the mergers that are likely to cause consumer harm. Thus, it follows that for the larger mergers, at least some increased Type II errors resulting from the adoption by the FCC of the Hearst-Argyle proposal would be corrected by the Agencies in the normal course of review. This "backstop" provides some assurance to the FCC that Type II errors will not increase appreciably if it were to adopt more liberal standards for permitting mergers.

IV. POST-MERGER PRODUCT REPOSITIONING

22. The Commission has stated that "limits imposed on television station combinations designed to protect competition in local delivered video markets necessarily also protect diversity; indeed they are more protective of competition in the broader marketplace of ideas given the difference in market definition."[20] Regarding the effects of mergers on diversity, the Commission has been even more specific: "When formerly strong rivals merge, they have incentives to coordinate their programming to minimize competition between the merged stations. Such mergers harm viewers."[21] We disagree with the Commission's conclusion that such mergers would necessarily result in harm to viewers because the merged firm has an incentive to "move" its products away from one another which reduces incentives to raise price while simultaneously increasing product diversity.

Process, 1996-2003, 71 ANTITRUST L. J. 253 (2003).

[20] *2002 Biennial Review Ord*er at ¶178.

[21] *2002 Biennial Review Ord*er at ¶200.

23. The conventional wisdom on mergers, as reflected in the *Guidelines*, is based on a model of differentiated products and assumes that firms compete on price, given their product characteristics. A potentially significant limitation of the assumption of "price-only" competition is that it neglects other dimensions in which firms compete, including product positioning. Professor Froeb's research[22] focuses on analyzing the effects of mergers in "price-location" models that permit firms to compete by choosing both price and product characteristics.[23] This research shows that in "the price-location model, combining close substitute products creates a strong incentive for the merged firm to separate these products, and that separation greatly reduces the incentive to raise prices."[24] Merging firms reposition their products relatively far away from each other to reduce sales cannibalization, and non-merging firms reposition their products in between those of the merged firm, increasing competition for consumers of these products. The net result of the repositioning mitigates the anticompetitive effects of the merger on consumer welfare—an effect that has not been considered by the *Guidelines*, case law, or the record in this proceeding.

24. The theory has not yet been subjected to direct empirical tests, but other empirical studies tend to support the hypothesis that a merged firm has the incentive to separate products that were close substitutes before the merger. Berry and Waldfogel[25] found that for 158 markets, increases in concentration of radio station ownership between 1993 and 1997 were associated

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[22] Amit Gandhi, Luke Froeb, Steven Tschantz and Gregory J. Werden, "Post-Merger Product Repositioning," J. INDUS. ECON., (forthcoming). Henceforth, Gandhi et al.

[23] We note that some basic features of the model are consistent with the DVP markets, while some others are not.

[24] Gandhi et al, p. 2.

[25] Steven T. Berry and Joel Waldfogel, Do Mergers Increase Product Variety: Evidence from Radio Broadcasting, 116 Q. J. ECON. 1009 (2001).

with increases in variety. Sweeting[26] analyzed radio stations' playlists and found that stations with similar formats tended to differentiate their playlists when they came under common ownership. The empirical work supports, but does not confirm, the theory. The theoretical model addresses markets where firms operate in one output market, while the media markets studied in the empirical papers address two-sided markets where firms simultaneously serve advertisers and listeners.

25. In sum, models of post-merger repositioning suggest that more limited "price-only" models may overstate harm to consumer welfare likely to arise from increased mergers because the simpler models fail to consider product repositioning. Additionally, the empirical work on post-merger repositioning suggests that the FCC's concern that concentration will lead to reduced variety may be exactly misplaced—the available evidence suggests that increased concentration leads to *greater* diversity.

VI. CONCLUSIONS

26. In light of foregoing, we conclude that the FCC's existing and proposed structural rules for television station mergers, such as the prohibition of mergers between two "top four" stations and restrictions on the common ownership of two or three local television stations are likely to be overly restrictive and thwart the FCC's fundamental goals of competition and diversity. In our view, these objectives could be better served by adopting an approach based on a case-by-case analysis of each merger. However, we understand the desire of the Commission to adopt bright-line rules. By benchmarking the proposed FCC rules to the FTC enforcement data we found that the FCC rules would prohibit all of the "other" mergers (i.e., all mergers

[26] Andrew Sweeting, "Too Much Rock and Roll? Station Ownership, Programming and Listenership in the Music Radio Industry," Northwestern University Working Paper (Jan. 15 2006).

considered outside of pharmaceuticals, oil, chemicals, and grocery stores) that the FTC investigated and then declined to challenge. It follows that, relative to the FTC practice, the FCC's previously proposed rules would have much larger Type I errors, and with the Agencies as a backstop, would have larger Type II errors only for small television stations that would not be routinely investigated by the Agencies.

27. We conclude that liberalization of the structural thresholds utilized by the Commission to regulate broadcast television mergers would likely reduce Type I errors, and increase Type II errors for smaller transactions that are not reviewed by the Agencies. If the FTC's enforcement practice represents an optimal trade-off between Type I and Type II errors, the Hearst-Argyle proposal, which moves policy closer to the practice of the Agencies, would likely benefit consumers. Hearst-Argyle's local television ownership rule proposal, which is more liberal than the Commission's rules, is therefore a step in the right direction, yet, in relation to the enforcement practice of the FTC, it remains quite conservative.

28. We understand that the Commission will periodically evaluate whether its ownership rules remain necessary. Relaxation of the current and proposed FCC rules on mergers will give the Commission the opportunity to gain experience with mergers among firms that it has prohibited until now. With this experience, we would expect the Commission to be able to further adjust structural limits in a future review proceeding, if warranted.

Signature Page

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Education

Stanford University, A.B. (1978), Economics, with honors and academic distinction.
University of Wisconsin, Ph.D. (1983), Econometrics, passed with distinction.

Experience

1993- Asst./Assoc.(1998)/chaired (2000) Professor of Management, Vanderbilt University. Teach managerial economics to both MBA's and executive MBA's, and assorted topics in non-degree programs. Co-teach undergrad math class Mathematical Models in Economics, with Steven Tschantz.

2003-5 Director, Bureau of Economics, U.S. Federal Trade Commission. Managed 110 employees, including 75 PhD economists who provided economic analysis to support enforcement of antitrust and consumer protection laws.

1986-92 Economist, Antitrust Division, U.S. Department of Justice. Merger and price-fixing cases and policy: litigation support; expert witness; data analysis; policy analysis. Work for Sentencing Commission.

1989 Kramer Foundation Fellow, University of Chicago Law School

1984-5 Asst. Professor, Department of Economics, Tulane University. Taught grad and undergrad econometrics; grad industrial organization; undergrad micro

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Recent Talks

Dec, 2005 A Positive Antitrust Enforcement Agenda
CEPR Conference, Brussels, Belgium

Nov, 2005 If Merger is the Answer, What is the Question?
The First Lisbon Conference on Competition Law and Economics, Portugal

Oct., 2005 If Merger is the Answer, What is the Question?
CFO conference, Huntsville, Alabama

Aug, 2005 Health Care Competition: Can we make it work?
Health care MBA Advisory Board, Vanderbilt, Nashville, TN

Aug, 2005 Health Care Competition: Can we make it work?
Breakfast Roundtable Discussion, Vanderbilt, Nashville, TN

June, 2005 International Regulatory Risk
Pioneer Investments, New Hampshire

June, 2005	Antitrust and Intellectual Property ABA Antitrust and Intellectual Property Conference, UC-Berkeley
June, 2005	Regulatory Risk Legg-Mason Conference, Nashville, TN
June, 2005	Merger Analysis Bates-White Conference, Washington, DC
May, 2005	Vertical Restraints, What Next? LECG Panel, Washington, DC
May, 2005	Vertical Restraints AEI/Brookings Joint Center Antitrust Program
May, 2005	Vertical Restraints George Mason Law School Bundling Roundtable
April, 2005	Post Merger Product Repositioning International Industrial Organization Conference
April, 2005	Breakfast with the Bureau Directors ABA meetings, Washington DC
April, 2005	Did the FTC Approve Too Many Oil Mergers? ABA meetings, Washington DC
March, 2005	Consumer Protection Economics Colby College
March, 2005	International Antitrust Vanderbilt Development Economics graduate students
Feb, 2005	Critical Enforcement Issues Roundtable Discussion at Charles River Associates Annual Conference
Jan, 2005	Use of Economics in Competition Law Keynote speech, IBC Conference, Brussels
Dec, 2004	Competition Advocacy and Industry-Wide Antitrust at the FTC Office of Fair Trading and Competition Commission, London,
Dec, 2004	Effects-Based Analysis: Mergers and Vertical Restraints British Institute of International and Comparative Law, London
Dec, 2004	Antitrust Enforcement R&D: Mergers and Vertical Restraints Kings College, London
Dec, 2004	Vertical Restraints: What about the Evidence? American Bar Association, Fall Forum, Washington, DC

Nov, 2004	Demand-Pull Research for Antitrust Policy University of Virginia, Dept. of Econ.
Nov, 2004	Post-Merger Product Repositioning University of Virginia, Dept. of Econ
Oct, 2004	Quantitative Methods in Merger Control Summit at Como: A Discussion of Competition Policy, Law & Economics, Italy.
Oct, 2004	Vertical Restraints: What about the Evidence? George Mason University Law Review Program, Washington, DC
Sep, 2004	Enforcement R&D EC/US Bilateral Consultations, Brussels, Belgium.
Sep, 2004	Economics and Antitrust: Enforcement R&D Keynote Address at Annual Meeting of the European Association in Industrial Economics (EARIE), Brandenberg Academy of Sciences, Berlin, Germany
Jun, 2004	Post-Merger Product Repositioning University de Toulouse, IDEI, Toulouse, France
Jun, 2004	Use of Economic Evidence in Competition Cases OECD Roundtable, Paris, France
Apr, 2004	Variance and Smoothness Screens for Collusion International Industrial Organization Conference, Chicago, IL
Apr, 2004	Merger Effects, Promotion and Price Duke University, Durham, NC
Apr, 2004	Breakfast with the FTC Bureau Directors American Bar Association Spring Meeting, Washington, DC
Mar, 2004	Economic Analysis of Mergers: Recent Developments American Bar Association Spring Meeting, Washington, DC
Mar, 2004	Economics in Antitrust: A U.S. Perspective The Office of Fair Trading, London, UK
Mar, 2004	The View from Brussels and Washington AEI-Brookings Joint Center for Regulatory Studies, Brussels
Mar, 2004	Economics in Antitrust: A U.S. Perspective European Commission, Brussels
Mar, 2004	Economists, Damages, and Daubert Pitfalls Utah State Bar and Law and Economics Society, Salt Lake City
Mar, 2004	Unilateral Effects and Economic Models 2004 Antitrust Conference: The Conference Board, NY.

Feb, 2004	Unilateral Effects and Economic Models Charles River Associates Annual Meeting, Washington, DC
Jan, 2004	Merger Effects When Firms Compete by Choosing Both Price and Advertising, FTC Bureau of Economics Seminar
Jan, 2004	Whither Merger Simulation ABA Economics Committee Brown Bag, Washington, DC
Dec, 2003	Using Structural Models to Simulate IP Damages ABA Antitrust Section & Intellectual Property Committee, Washington, DC
Nov, 2003	Mergers among Firms that Practice Yield Management INFORMS Annual Meeting, Atlanta, GA
Nov, 2003	Price Discrimination and Competition: Implications for Antitrust American Bar Association Fall Forum, Washington, DC
Nov, 2003	Role of Expert Economic Testimony in Antitrust Litigation The Committee on Antitrust and Trade Regulation of the Bar of the City of NY
Aug, 2003	Continuity in Economics at the FTC ABA Antitrust Brownbag
May, 2003	Merger Simulation and Market Delineation Two-day training seminar at the Canadian Competition Bureau, Ottawa
April, 2003	Merger Simulation and Market Delineation Two-day training seminar at the Office of Fair Trading, London
May, 2002	Quantitative Cost-Benefit analysis of Mergers Three-day training seminar Swedish Competition Authority, Stockholm
April, 2002	Vertical Restraints and Upstream Horizontal Mergers: Does the retail sector matter? University of Florida, Gainesville

Antitrust Consulting

2003-2005 FTC (antitrust, consumer protection, competition policy)
2002 AT&T-Comcast; Princess-Carnival.
2001 Reed Elsevier-Harcourt, Pepsi-Gatorade
2000 Sprint-WorldCom, Brahma-Antarctica, U.S. Department of Justice
1999 Central Parking Systems-Allright
1998 Lockheed-Grumman; Monsanto-American Home Products
1997 U.S. Department of Justice-Antitrust Division (wrote software)
1996 L'Oreal-Maybelline; General Mills-Ralston; Campbell Soup-Van de Kamps

Older Research (by topic)

Antitrust Policy

Froeb, Luke, Daniel Hosken, Janis Pappalardo, Economics Research at the FTC: Information, Retrospectives, and Retailing, *Review of Industrial Organization*, 25:4 (Dec., 2004) 353-374.

Werden, Gregory J., Luke M. Froeb, and David T. Scheffman, A Daubert Discipline for Merger Simulation, *Antitrust Magazine*, 18:3 (Summer, 2004) pp. 89-95.

Werden, Gregory J., Luke M. Froeb, and David T. Scheffman, Whither Merger Simulation? *Antitrust Source*, (May, 2004).

Auctions

Froeb, Luke, Steven Tschantz & Philip Crooke, Second-price Auctions with Mixtures of Power-related Distributions: Owen Working paper (REVISED 2/21/01).

Brannman, Lance, and Luke Froeb, Mergers, Cartels, Set-Asides and Bidding Preferences in Asymmetric Second-price Auctions, *Review of Economics and Statistics*, 82(2) (2000) 283-290.

Tschantz, Steven, Philip Crooke, and Luke Froeb, Mergers in Sealed vs. Oral Auctions, *International Journal of the Economics of Business*, 7(2) (July, 2000) 201-213.

Froeb, Luke, Robert Koyak & Gregory Werden, What is the Effect of Bid-Rigging on Prices, *Economics Letters,* 42 (1993) pp. 419-423.

Froeb, Luke, and Steven Tschantz, Mergers Among Bidders with Correlated Values in *Economic Issues in Measuring Market Power--Contributions to Economic Analysis*, Vol. 255, edited by Daniel J. Slottje, Amsterdam: North-Holland Publishing, 200X.

Mergers

Froeb, Luke and Steven Tschantz, How Much Information is Required to Accurately Predict Merger Effects?, Owen Working paper (6/01).

Froeb, Luke and Steven Tschantz, Merger Effects When Firms Compete by Choosing Both Price and Advertising, Owen Working paper (6/20/01).

Werden, Gregory, and Luke Froeb, The Antitrust Logit Model For Predicting Unilateral Competitive Effects, *Antitrust Law Journal*, 70(1), (2002).

Froeb, Luke, Steven Tschantz & Philip Crooke, Bertrand Competition with Capacity Constraints: Mergers Among Parking Lots, *Journal of Econometrics* 113(1) (March, 2003) 49-67.

Froeb, Luke, and Gregory Werden, An Introduction to the Symposium on the Use of Simulation in Applied Industrial Organization, *International Journal of the Economics of Business*, 7(2) (July, 2000) 133-137.

Crooke, Philip, Luke Froeb, Steven Tschantz, and Gregory Werden The Effects of Assumed Demand Form on Simulated Post-Merger Equilibria, *Review of Industrial Organization*, 15(3), (November, 1999) pp. 205-217.

Werden, Gregory, and Luke Froeb, The Entry-Inducing Effects of Horizontal Mergers, *Journal of Industrial Economics*, 46 (4), (1998) pp. 525-543.

Froeb, Luke and Gregory Werden, A Robust Test for Consumer Welfare Enhancing Mergers Among Sellers of a Homogeneous Product, *Economics Letters*, 58 (1998) pp. 267-269.

Werden, Gregory, Luke Froeb, and Timothy Tardiff, The Use of the Logit Model in Applied Industrial Organization, *International Journal of the Economics of Business*, vol. 3, no. 1, (1996) pp. 85-107.

Werden, Gregory and Luke Froeb, The Effects of Mergers in Differentiated Products Industries: Structural Merger Policy and the Logit Model, *Journal of Law, Economics, & Organization,* 10 (1994) pp. 407-426, reprinted in *Antitrust and Competition Policy* (Andrew N. Kleit ed., 2005)

Froeb, Luke, Evaluating Mergers in Durable Goods Industries, *Antitrust Bulletin,* 34 (spring, 1989) 99-119.

Werden, Gregory, and Luke Froeb, and , Calibrated Economic Models Add Focus, Accuracy, and Persuasiveness to Merger Analysis in the *Pros and Cons of Merger Control*, edited by the Swedish Competition Authority, Swedish Competition Authority, Stockholm, 2002.

Froeb, Luke, Timothy Tardiff, and Gregory Werden, The Demsetz Postulate and the Effects of Mergers in Differentiated Products Industries, *Economic Inputs, Legal Outputs: The Role of Economists in Modern Antitrust,* London: John Wiley & Sons, edited by Fred McChesney, 1998.

Froeb, Luke, and Gregory Werden, Simulating Mergers among Noncooperative Oligopolists, in *Computational Economics and Finance: Modeling and Analysis with Mathematica,* edited by Hal Varian (TELOS, Springer-Verlag) 1996.

Werden, Gregory, and Luke Froeb, Simulation as an Alternative to Structural Merger Policy in Differentiated Products Industries, chapter 4 in *The Economics of the Antitrust Proces*s, edited by Malcolm Coate and Andrew Kleit, Boston: Kluwer Academic Press, 1996.

Law & Economics

Froeb, Luke, and Bruce Kobayashi, Evidence production in Adversarial vs. Inquisitorial Regimes, *Economics Letter*s 70(2), (2001) pp. 267-272.

Froeb, Luke, and Bruce Kobayashi, Naive, Biased, yet Bayesian: Can Juries interpret Selectively-Produced Evidence, *Journal of Law, Economics, & Organization,* vol. 12, no. 1 (1996) 257-276.

Froeb, Luke, The Adverse Selection of Cases for Trial, *International Review of Law and Economics,* 13(3), (June, 1993) 317-324

Patent Damages

Werden, Gregory J., Luke M. Froeb, and James Langenfeld, Lost Profits from Patent Infringement: The Simulation Approach, *International Journal of the Economics of Business*, 7(2) (July, 2000) 213-227.

Werden, Gregory J., Luke M. Froeb, and Lucian Wayne Beavers, Economic Analysis of Lost Profits from Patent Infringement With and Without Noninfringing Substitutes, *American Intellectual Property Law Association Quarterly Journal*, 27 (1999) pp. 305-333.

Werden, Gregory J., Lucian Wayne Beavers, and Luke M. Froeb, Quantity Accretion--The Mirror Image of Price Erosion from Patent Infringement, *Journal of the Patent and Trademark Office Society*, 81 (1999) pp. 479-482.

Econometrics

Froeb, Luke, An Innovation Variance Ratio Test, Owen working Paper (1996)

Crooke, Philip, Luke Froeb, and Steven Tschantz, Maximum Likelihood Estimation, *Mathematica in Education and Research*, 8(1) (winter, 1999) pp. 17-23.

Cooil, Bruce, and Luke Froeb, A Difference Estimator for Testing Equality of Variances for Paired Time Series, *Journal of Time Series Analysis,* 19(3) (May, 1998) pp.285-290.

Froeb, Luke, & Robert Koyak, Measuring and Comparing Smoothness in Time Series: The Production Smoothing Hypothesis, *Journal of Econometrics,* 64 (1994) 97-122.

Froeb, Luke, Log Spectral Analysis: Variance Components in Asset Prices, in *Computational Economics and Finance: Modeling and Analysis with Mathematica*, edited by Hal Varian (TELOS, Springer-Verlag) 1996.

Critiques of Empirical Market Delineation

Werden, Gregory, and Luke Froeb, Correlation, Causality, and all that Jazz: the Inherent Shortcomings of Price Tests for Antitrust Market Delineation, *Review of Industrial Organization,* 8 (June, 1993) 329-354; reprinted in the *Journal of Reprints for Antitrust Law and Economics*, 28(1) (1999) p. 175.

Froeb, Luke and Gregory Werden, The Reverse Cellophane Fallacy in Market Delineation, *Review of Industrial Organization,* 7 (1992) 241-247.

Froeb, Luke and Gregory Werden, Residual Demand Estimation for Market Delineation: Complications and Limitations, *Review of Industrial Organization,* 6 (1991) 33-48, reprinted in the *Journal of Reprints for Antitrust Law and Economics*, 28(1) (1999) p. 357.

Critiques of Structure-Performance Studies

Evans, William, Luke Froeb, and Gregory Werden, Endogeneity in the Concentration-Price Relationship: Causes, Consequences, and Cures, *Journal of Industrial Economics,* 41 (September, 1993) 1-8.

Amel, Dean, and Luke Froeb, Do Firms Differ Much?, *Journal of Industrial Economics,* 39 (March, 1991) 23-31.

Froeb, Luke, and John Geweke, Long Run Competition in the Post-war U.S. Aluminum Industry, *International Journal of Industrial Organization,* 5 (1987) 67-78.

Miscellaneous

Crooke, Philip, Luke Froeb & Steven Tschantz, Teaching MBA Students to Compete in Simulated Oligopoly Environments, *Interactive Learning: Vignettes from America's Most Wired Campuses*, edited by Donald Brown, Bolton, MA: Anker Publishing, 2000.

Crooke, Philip, Luke Froeb & Steven Tschantz, Pedagogy using Mathematica through the Web, *ALN Magazine,* 2:2 (October 1998).

Crooke, Philip, Luke Froeb & Steven Tschantz, Simulate Mergers On-Line, *Antitrust* 11 (Spring, 1997) 29.

Froeb, Luke, Bid Rigging Against the Government, *Owen Manager,* (Spring, 1994).

Froeb, Luke, Richard W. Oliver, and David Weiskopf, Geographic Variation in Internet Connectivity, Papers & Proceedings of the Twenty Ninth IEEE *Hawaii International Conference on Systems Sciences*, vol. 29, 1996.

Book Reviews

Froeb, Luke, Book Review of *Modern Competitive Analysis* by Sharon Oster, *Managerial and Decision Economics,* vol. 21 (July-August 2000), pp. 209-10.

Froeb, Luke, Teaching Business Economics to the MTV Generation, Book Review of *Business Economics* by Maria Moschandreas, *Managerial and Decision Economics,* 16 (1995) 93-94.

Software

Crooke, Philip, Luke Froeb, and Steven Tschantz, Maximum Likelihood Estimation, *Mathematica* package (1998).

Crooke, Philip, Luke Froeb, and Steven Tschantz, Sim Merger™, a *Mathematica* package that simulates the effects of mergers, commissioned by the U.S. Department of Justice (1998).

Froeb, Luke, *Click&Learn Regression*, interactive software that teaches regression analysis to lay persons (1993)

Awards, grants, professional activities

2005	Outstanding Professor of Vanderbilt's Executive MBA program
2005	ABA Economic Evidence Task Force
2005	Editorial Board of *Competition Policy International*
2002	Dean's Award for Outstanding and Widespread Research Impact
2001	Klebler-Gerry Lecturer, St. Olaf's College.
2001	Dell STAR (Strategic Technology And Research) Grant to update web-based Mathematica simulation games.
2000	Dean's Award for Teaching Excellence.
1999	Outstanding Professor of the Vanderbilt International Executive MBA program
1998	Outstanding Technological Innovation in Business Education for web-based Mathematica simulation games. Awarded by Price-Waterhouse and the University of Virginia McIntire School of Commerce.
1998	Editorial Board of *International Journal of the Economics of Business*
1995	Grant Recipient, the Provost's Initiative on Technological Innovation in the Classroom to develop the Vanderbilt University Mathematica Web Server.
1994-02	Editor, *Antitrust Policy*, an on-line resource linking economic research, policy, and cases.
1993	Steering Committee Member for the Undergraduate Computation and Engineering Sciences project to promote the emerging field of computational science, 1993-1997.

MICHAEL A. WILLIAMS

Dr. Williams specializes in analyses involving antitrust, industrial organization, and regulation; he has conducted economic research and prepared testimony on a variety of antitrust and regulatory issues in the telecommunications, electric power, natural gas, oil and pipeline, and numerous other industries. He has published articles in a number of academic journals, including the *American Economic Review, Journal of Economics and Management Strategy, Journal of Industrial Economics, Behavioral Science, Economics Letters, Antitrust Bulletin, Texas Law Review, Review of Industrial Organization, Yale Journal on Regulation,* and *Quarterly Journal of Economics and Business.* He has provided testimony and comments before the Federal Communications Commission, the U.S. Securities and Exchange Commission, and the U.S. Postal Service, as well as a number of state regulatory commissions, the U.S. Court of Federal Claims, and U.S. District Court in Texas. He has consulted on matters involving competition in telecommunications markets for spectrum auctions, MFJ waiver requests, and such services as long-distance and wireless communications. Dr. Williams' research includes:

- Analyses of market definition, market power, and regulation in the computer, energy, telecommunications, and other industries;
- Studies of horizontal and vertical mergers to determine whether they would lead to the exercise of market power in such industries as airlines, avionics, bus and truck transportation, electric utilities, gaming, music, natural gas pipelines, petroleum, radio and television programming, satellites, and other industries;
- Analyses of antitrust issues, including monopolization, price fixing, resale price maintenance, and tying arrangements, in a variety of industries;
- Evaluation of rate and entry regulation in the natural gas, electric power, postal service, securities, and telecommunications industries;
- Market definition analyses for both antitrust and economic markets; and
- Analyses of liability and damages in issues involving breach of contract.

Previously, Dr. Williams was an economist with the U.S. Department of Justice, Antitrust Division and was a Vice President of Analysis Group/Economics. Dr. Williams holds a B.A. degree in economics from the University of California, Santa Barbara, and he received his M.A. and Ph.D. degrees in economics from the University of Chicago.

SELECTED CASEWORK

FEDERAL TRADE COMMISSION
Valero L.P.'s proposed merger with Kaneb Services LLC

Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger, 2005.

NEVADA GAMING COMMISSION AND STATE GAMING CONTROL BOARD
Harrah's Entertainment, Inc.'s proposed merger with Caesars Entertainment, Inc.

Consultant to Gaming Commission and Gaming Control Board. Expert report on economic analysis of the competitive effects of the proposed merger, 2005.

NEVADA GAMING COMMISSION AND STATE GAMING CONTROL BOARD
MGM Mirage's proposed merger with Mandalay Resort Group

Consultant to Gaming Commission and Gaming Control Board. Expert report on economic analysis of the competitive effects of the proposed merger, 2004-2005.

AMERICAN ARBITRATION ASSOCIATION
Ford Dealer Computer Services, Inc. n/k/a Dealer Computer Services, Inc. v. Woodville Ford, Inc.

Deposition and arbitration testimony regarding economic analysis of antitrust claims, 2004-2005.

FEDERAL COMMUNICATIONS COMMISSION
In the Matter Unbundled Access to Network Elements, Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers.

Consultant to T-Mobile USA, Inc. Expert report on economic analysis of transmission links, 2004.

UNITED STATES DISTRICT COURT
United States of America, et al. v. Oracle Corp.

Consultant to the U.S. Department of Justice, Antitrust Division. Economic analysis of the competitive effects of Oracle's proposed acquisition of PeopleSoft, 2003-2004.

UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF GEORGIA
In re Gemstar Development Corporation Patent Litigation, Master File No. MDL-1274-WBH

Economic analysis of antitrust claims and patent misuse defenses. Expert reports and depositions, 2003-2004.

FEDERAL TRADE COMMISSION
In the Matter of Rambus Inc.
Consultant to Federal Trade Commission. Economic analysis of the competitive effects Rambus's actions, 2003.

UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF TEXAS, DALLAS DIVISION
Exxon Mobil Corporation v. United States of America, Civil No. 3-00CV0815-M.
Expert report, deposition, and court testimony for the United States on the representative market or field price of gas for the purpose of establishing depletion allowance, 2002.

FEDERAL TRADE COMMISSION
Phillips Petroleum Company's proposed merger with Conoco Inc.
Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger, 2002.

SUPERIOR COURT OF THE STATE OF CALIFORNIA, FOR THE COUNTY OF LOS ANGELES
Alan Wayne et al. v. BP Oil Supply Company, No. BC244334.
Economic analysis of petroleum prices, 2002.

FEDERAL TRADE COMMISSION
TMP Worldwide, Inc.'s (parent of Monster.com) proposed acquisition of HotJobs, Inc.
Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger, 2001-2002.

U.S. DEPARTMENT OF JUSTICE, ANTITRUST DIVISION
United Airlines' proposed acquisition of US Airways.
Consultant to U.S Department of Justice, Antitrust Division. Economic analysis of the competitive effects of the proposed merger, 2001.

AMERICAN ARBITRATION ASSOCIATION
Elk River Ford-Mercury, Inc. v. Dealer Computer Services, AAA Case No. 54 117-0057-97.
Expert report (with Michael J. Doane and David S. Sibley). Economic analysis of antitrust claims, 2001.

AMERICAN ARBITRATION ASSOCIATION
Ford Dealer Computer Services, Inc. v. Prestige Ford, AAA Case No. 54 117 00326 98.
Expert report (with Michael J. Doane and David S. Sibley). Economic analysis of antitrust claims, 2001.

AMERICAN ARBITRATION ASSOCIATION
Ford Dealer Computer Services, inc., Inc. v. Trademark Motor Co., AAA Case No. 70 177 189 00.

Expert report (with David S. Sibley). Economic analysis of antitrust claims, 2001.

UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF OHIO
RE/MAX International, Inc., et al. v. Realty One, Inc., et al.

Economic analysis of price-fixing claims, 2000.

FEDERAL TRADE COMMISSION
Time Warner's proposed acquisition of EMI.

Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger, 2000.

FEDERAL TRADE COMMISSION
Midwest Gasoline Price Investigation.

Consultant to Federal Trade Commission. Economic analysis of gasoline prices in the Midwest, 2000.

FEDERAL TRADE COMMISSION
Equilon's proposed acquisition of terminal facilities from GATX.

Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger, 2000.

FEDERAL COMMUNICATIONS COMMISSION
In the Matter of Application of MCI WorldCom Inc., and Sprint Corporation for Transfer of Control of Sprint Corporation to MCI WorldCom, Inc.

Economic analysis of the competitive effects of the proposed merger in long-distance telecommunications markets, 2000.

FEDERAL TRADE COMMISSION
British Petroleum Corporation's proposed acquisition of Atlantic Richfield Corporation.

Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger, 1999-2000.

FEDERAL TRADE COMMISSION
Exxon Corporation's proposed acquisition of Mobil Corporation.

Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger, 1999-2000.

FEDERAL COMMUNICATIONS COMMISSION

Application by New York Telephone Company (d/b/a Bell Atlantic – New York), Bell Atlantic Communications, Inc., NYNEX Long Distance Company, and Bell Atlantic Global Networks, Inc., for Authorization to Provide In-Region, InterLATA Services in New York.

Economic analysis of the effects of entry by Bell Atlantic into interLATA phone services, 1999.

TEXAS STATE DISTRICT COURT, TRAVIS COUNTY, TEXAS

BMC Software, Inc. v. Peregrine/Bridge Transfer Corp., Skunkware, Inc, NEON Systems, Inc. Wayne E. Fisher, and John J. Moores v BMC Software BMC Software, Inc. and Max P. Watson.

Economic analysis of product tying and predatory pricing claims. Economic analysis of damage claims, 1999.

FEDERAL ENERGY REGULATORY COMMISSION

Natural Regulation of Short-Term Gas Transportation Services, Docket No. RM98-10; Regulation of Interstate Natural Gas Transportation Services, Docket No. RM98-12.

Economic analysis of proposed auction of pipeline capacity, 1999.

NEBRASKA PUBLIC SERVICE COMMISSION

In the Matter of the Commission, On Its Own Motion, To Investigate GTE Midwest Incorporated's Cost To Establish Rates For Interconnection, Unbundled Network Elements, Transport And Termination And Resale Services, Application No. C-1416.

Testimony on stranded costs, 1998.

NEW MEXICO STATE CORPORATION COMMISSION

In the Matter of the Consideration of the Adoption of a Rule Concerning Costing Methodologies, Docket No. 96-310-TC, Volume XI; In the Matter of the Implementation of New Rules Related to the Rural, High Cost, and Low Income Components of the New Mexico Universal Service Fund, Docket No. 97-334-TC.

Testimony on stranded costs, 1998.

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport, and Termination, and Resale for GTE Northwest Incorporated, Docket No. UT-960371.

Testimony on stranded costs, 1997.

ARKANSAS PUBLIC SERVICE COMMISSION

In the Matter of the Request of GTE Southwest Incorporated and GTE Arkansas Incorporated for Determination of Status as a Rural Telephone Company, Docket No. 96-446-U.

Testimony on economically efficient prices for unbundled network elements and wholesale services, 1997.

FEDERAL COMMUNICATIONS COMMISSION
In the Matter of Application by Ameritech Michigan for Authorization under Section 271 of the Communications Act to Provide In-Region, InterLATA Service in the State of Michigan, CC Docket No. 97-137.

Economic analysis of the effects of entry by Ameritech into interLATA phone services, 1997.

HAWAII PUBLIC UTILITIES COMMISSION
In the Matter of the Petition of Sprint Communications Company L.P. for Arbitration of Interconnection Rates, Terms, Conditions, and Related Arrangements with GTE Hawaiian Telephone Company Incorporated, Docket No. 96-0375.

Testimony on economically efficient prices for unbundled network elements and wholesale services, 1996.

MICHIGAN PUBLIC SERVICE COMMISSION
In the Matter of the Interconnection Contract Negotiations Between AT&T Communications of the Midwest, Inc. and GTE Michigan, Pursuant to 47 U.S.C. Section 252.

Testimony on economically efficient prices for unbundled network elements and wholesale services, 1996.

MINNESOTA PUBLIC UTILITIES COMMISSION
In the Matter of the Interconnection Contract Negotiations Between AT&T Communications of the Midwest, Inc. and Contel of Minnesota, Inc. d/b/a GTE Minnesota, Pursuant to 47 U.S.C. Section 252, Docket No. P-442,407/M-96-939.

Testimony on economically efficient prices for unbundled network elements and wholesale services, 1996.

MISSOURI PUBLIC SERVICE COMMISSION
In the Matter of AT&T Communications of the Southwest, Inc.'s Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Interconnection Agreement Between AT&T and GTE Midwest Incorporated, Case No. TO-97-63.

Testimony on economically efficient prices for unbundled network elements and wholesale services, 1996.

NEBRASKA PUBLIC SERVICE COMMISSION
In the Matter of the Interconnection Contract Negotiations Between AT&T Communications of the Midwest, Inc. and GTE Midwest Incorporated Pursuant to 47 U.S.C. Section 252, Docket No. C-1400.

Testimony on economically efficient prices for unbundled network elements and wholesale services, 1996.

NEBRASKA PUBLIC SERVICE COMMISSION
In the Matter of Western Wireless Corporation Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 of the Rates, Terms, and Conditions of Interconnection with GTE, Docket No. C-1410.

Testimony on economically efficient prices for termination services, 1996.

TEXAS PUBLIC UTILITY COMMISSION
Petition of Western Wireless Corporation d/b/a Cellular One for Arbitration of Unresolved Interconnection Issues with GTE Southwest, Inc. Pursuant to the Telecommunications Act of 1996, Docket No. 16402.

Testimony on economically efficient prices for termination services, 1996.

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION
In the Matter of the Petition of Sprint Communications Company L.P. for Arbitration of Interconnection Rates, Terms, Conditions, and Related Arrangements with GTE Northwest Incorporated, Docket No. UT-9603485.

Testimony on economically efficient prices for unbundled network elements and wholesale services, 1996.

FEDERAL TRADE COMMISSION
In the Matter of: Mattel, Inc. and Hasbro, Inc.

Economic analysis of the proposed merger, 1996.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION
Rulemaking on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish a Framework for Network Architecture Development of Dominant Network Carriers. Docket No. R.93-4.

Economic analysis of proposed pricing rules, 1996.

FEDERAL COMMUNICATIONS COMMISSION
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996. CC Docket No. 96-98.

Economic analysis of the Act, 1996.

FEDERAL COMMUNICATIONS COMMISSION
In the Matter of Market Entry and Regulation of Foreign-Affiliated Entities, IB Docket No. 95-22, Reply Comments of Telefonica Larga Distancia de Puerto Rico, Inc.

Economic analysis of the effects of the Commission's Notice of Proposed Rulemaking on international telecommunications services, 1995.

FEDERAL ENERGY REGULATORY COMMISSION
Alternative Ratemaking Procedures, Docket No. RM95-6-000.

Economic analysis of alternatives to traditional cost-of-service ratemaking, 1995.

UNITED STATES HOUSE OF REPRESENTATIVES, COMMITTEE ON WAYS AND MEANS, SUBCOMMITTEE ON OVERSIGHT
Hearing on Coal Industry Retiree Health Benefit Act of 1992, June 22, 1995, Comments of the Reachback Tax Coalition
Economic analysis of the Act, 1995.

FEDERAL ENERGY REGULATORY COMMISSION
SFPP, L.P., Docket Nos. OR92-8-000 et al, Comments of Chevron Refining Company and Navajo Refining Company.
Economic analysis of rate making for petroleum products pipeline, 1995.

MICHIGAN PUBLIC SERVICE COMMISSION
In the Matter of the Commission's Own Motion to Establish Permanent Interconnection Arrangements Between Basic Local Exchange Service Providers, Case U-10860, Comments of Ameritech Michigan, Inc.
Economic analysis of efficient interconnection and wholesale prices for local exchange services, 1995.

ILLINOIS COMMERCE COMMISSION
AT&T Communications of Illinois, Inc., Petition for a Total Local Exchange Service Wholesale Tariff from Illinois Bell Telephone Company d/b/a Ameritech Illinois and Central Telephone Company Pursuant to Section 13-505.5 of the Illinois Public Utilities Act, Docket No. 95-0458, Comments of Ameritech Illinois, Inc.
Economic analysis of efficient interconnection and wholesale prices for local exchange services, 1995.

PUBLIC SERVICE COMMISSION OF WISCONSIN
Investigation of the Appropriate Standards to Promote Effective Competition in the Local Exchange Telecommunications Market in Wisconsin, Docket No. 05-TI-138, Comments of Ameritech Wisconsin, Inc.
Economic analysis of efficient interconnection and wholesale prices for local exchange services, 1995.

FEDERAL ENERGY REGULATORY COMMISSION
Louisiana Gas System Inc. and Conoco Inc. v. Panhandle Eastern Corporation and Centana Energy Corporation, et al., Docket No. CP95-349-000.
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Cooper Industries, Inc.'s acquisition of Westinghouse Electric, Corp.'s Lighting Fixture Business.

Southwestern Public Service Company's acquisition of New Mexico Electric Service Company.

ITT-Continental Baking Company's acquisition of Bost Bakery, Inc.

Williams Companies' acquisition of Northwest Energy, Corp.

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CONSENT DECREES

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United States of America v. Greyhound, Corp.

United States of America v. Balley Manufacturing, Corp.

PADMANABHAN SRINAGESH, Ph.D.

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PROFESSIONAL EXPERIENCE:

Dr. Srinagesh has analyzed interconnection arrangements among providers of telecommunications services including local interconnection, local-long distance interconnection, wireless-wireline interconnection, and Internet interconnection, including the use of engineering economics models of telecommunications networks, and analyzed several mergers of large telecommunications firms, and mergers and antitrust allegations in markets for telecommunications equipment. Dr. Srinagesh has also supported bidders in spectrum auctions, analyzed allegations of "sham bidding" in spectrum auctions, and developed strategic and business analyses of emerging telecommunications technologies, including wireless technologies. He has analyzed methodologies for calculating renewal prices for spectrum licenses in New Zealand. More recently, he has analyzed allegations of anticompetitive behavior in local telecommunications markets, the use of imputation tests, and damages arising from insufficient coverage by a provider of mobile telephone services. Apart from traditional telecommunications, he has analyzed damages resulting from alleged bid-rigging, from the sale of equipment alleged to be Y2K-noncompliant, from violations of intellectual property rights (both lost profits and reasonable royalty), breach of contract, alleged monopolization or attempted monopolization in telephone equipment markets, attempted monopsonization and predatory behavior in markets for timber and lumber, and damages in breach of contract cases.

ERS Group

• Principal (2006 – present)

Dr. Srinagesh has analyzed mergers of newspapers, and co-authored a study on efficiencies generated by the merger of contiguous newspapers. He has analyzed vertical arrangements in the U.S. wine industry, the competitiveness of roaming arrangements in the U.S. cellular industry, and allegations of abuse of monopsony power in the DRAM chips.

Charles River Associates

• Principal (1996 – 2006)

Traditional Telephony. Analyzed and co-authored declarations on the claimed cost and revenue synergies of the SBC-Ameritech and GTE-Bell Atlantic mergers; analyzed the cost basis of interconnection rates for clients in the US, Colombia, Mexico, and Australia using engineering economics or cost proxy models developed for the US; analyzed cost proxy models in Australia and the U.K., analyzed the use and misuse of international cost benchmarks for clients in Australia, the US, Colombia, Mexico and New Zealand; reviewed differences in service of quality between rural and non-rural telephone companies; analyzed whether lifting the rural exemption would be unduly economically burdensome to a rural carrier; land calculated damages to a Competitive Local Exchange Carrier that resulted from alleged anticompetitive behavior by an Incumbent Local Exchange Carrier. Conducted cost-benefit analysis of local number portability in Hong Kong. Analyzed competitiveness of ILEC special access offerings after pricing flexibility was granted.

The Internet. Co-authored reports identifying relevant Internet markets and analyzing the competitive effects of the WorldCom-MCI and proposed MCI-Sprint mergers on the Internet backbone market, represented clients before the US Department of Justice and the European Commission on issues related to Internet backbones; developed business and strategic analyses of the market for converged/consolidated telecommunications services in Canada and Australia; and analyzed antitrust issues pertaining to high-speed DSL-based Internet access.

Wireless. Advised a mobile carrier on the development of an engineering-economics model of a wireless network to identify the traffic-sensitive costs of call completion; submitted a white paper on the forward-

looking costs of PCS networks to the FCC on behalf of Sprint PCS; represented a wireless company before the FCC on interconnection arrangements between wireless and wireline companies. Helped evaluate spectrum and support bidders in spectrum auctions in the US, Canada and Australia. For a wireless provider in the UK, analyzed the OFTEL/Analysys engineering-economics model of a mobile provider's forward-looking costs. Analyzed the regulation of mobile call termination in calling party pays regimes, with applications to Latin American markets. Analyzed damages arising from a cellular service provider's alleged failure to provide adequate coverage and capacity. Analyzed proposed regulations of international roaming charges in the EU.

Cable. Analyzed "open access" proposals for cable modem services in the US and Canada.

Other. Analyzed reasonable royalties for a software patent for computer-based futures trading, analyzed damages from the alleged sale of Y2K non-compliant telecommunications equipment, analyzed damages from the failure of a hotel chain to honor a contract for the provision of telecommunications services, and analyzed liability and damages in cases involving allegations of monopolization in markets for telecommunications equipment, mergers of telecommunications equipment vendors, and allegations of monoposonization and predatory behavior in timber and lumber markets. Analyzed the effects of franchise fees for the use of municipal rights of way on competition in the market for local telephone services. Calculated damages in a patent infringement case related to golf grips.

Bell Communications Research

- Senior Economist (1995 – 1996)
- Member of Technical Staff (1988 – 1995)

Developed quantitative models of optimal pricing for telecommunications products (peak load pricing, real time pricing, optional calling plans); analyzed national information infrastructure initiatives and Internet growth; analyzed pricing structures to support multiple QoS on packet networks; developed business and economic analyses of Internet growth and Internet interconnection arrangements. Taught courses on strategic marketing in telecommunications to senior executives of Matav (Hungary Telephone) in 1994 and the Philippines Long Distance Telephone Company in 1996. Consulted on Internet-related issues with OSIPTEL, the telecommunications regulator in Peru.

Awarded the *Bellcore President's Recognition Award*, 1993, for contributions to Bellcore's NII program. Co-authored policy statement on the NII, signed by the CEOs of 14 large telecommunications companies, including the seven Regional Bell Operating Companies (RBOCs), AT&T, MCI, Sprint, GTE, Southern New England Telephone, Cincinnati Bell, and Bellcore. The industry position was a key factor in shaping the current Internet architecture, in which the NSF's high-speed backbone (vBNS) is strictly limited to experimental users.

Awarded the *Bellcore Information Networking Service Quality Award*, 1992, for work on the public policy related to the Internet and the NII, in support of a task force comprising the seven RBOCs.

Williams College

- Assistant Professor (1983 – 1988)

Taught undergraduate courses including Principles, Intermediate Micro- and Macroeconomics, and Econometrics. Developed and taught courses on the Economics of Uncertainty and the Economics of Sports. Research on nonlinear pricing, quality discrimination and product line pricing, and duality theory.

University of Illinois

- Assistant Professor (1979 – 1983)

Taught courses in the undergraduate, Ph.D. and MBA programs. Research on nonlinear prices and dynamic choice under uncertainty.

EDUCATION:

Ph.D., Economics, University of Rochester
M.A., Economics, Delhi School of Economics, India

B.A., Economics Honors, St. Stephen's College, Delhi University, India

SPECIALIZATION:

Telecommunications, auctions, antitrust.

EXPERT REPORTS:

Submitted a report "Efficiencies Associated with ANG's Acquisition of Knight Ridder Newspapers", With Luke Froeb and Michael Williams, to the Department of Justice. July 6, 2006.

Submitted a report, "Economic Analysis Of Fixed-To-Mobile Call Termination Charges". With Bridger M. Mitchell. To BellSouth International for use in Latin American regulatory proceedings. July 2003.

Submitted a report, "International Comparisons of Interconnection Rates – United States and Mexico." With Jose L. Alberro and Bridger M. Mitchell. To Telmex SA for use in WTO Proceedings, 2000.

Submitted a report, "Transport and Termination in PCS Networks." With Bridger M. Mitchell. To the Federal Communications Commission on behalf of Sprint PCS, 2000.

Submitted a report, "Review of the PIE Model." With Bridger M. Mitchell. To the Australian Competition and Consumer Commission on behalf of Telstra Corporation Limited, 1999.

Submitted a report, "An Economic Analysis of the Proposed Bell Atlantic/GTE Merger." With Stanley M. Besen and John R. Woodbury. To the Federal Communications Commission on behalf of Sprint Communications Company, L.P., 1998.

Submitted a report, "An Economic Analysis of the Proposed SBC/Ameritech Merger." With Stanley M. Besen and John R. Woodbury. To the Federal Communications Commission on behalf of Sprint Communications Company, L.P., 1998.

Submitted a report, "An Economic Analysis of the Impact of the WorldCom-MCI Merger on the Provision of Internet Backbone Services." With Stanley M. Besen and John R. Woodbury. To the Federal Communications Commission and the European Commission on behalf of Sprint Corporation, 1998.

Submitted a report, "An Economic Analysis of Terminating Access." With Bridger M. Mitchell and Steven R. Brenner. To the Federal Communications Commission, 1997.

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PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS:

Refereed for *The American Economic Review*, *The Quarterly Journal of Economics, The Journal of the American Statistical Association, The International Economic Review, The Journal of Industrial Economics, The International Journal of Industrial Organization, The Journal of Regulatory Economics, Economics and Philosophy, The Journal of Economics & Management Strategy, The Journal of Public Economics, The Cambridge University Press, The Information Society, Computer Communications Review*, and *IEEE/ACM Transactions on Networks*.

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