

"Taxation, Corporate Leverage, and Financial Distress," Garn Institute for Finance, 1989-1990.

"Precautionary Saving in a Dynamic Model of Consumption and Labor Supply," National Science Foundation (Economics Group SES-8707997), 1987-1989, with Jonathan Skinner and Stephen Zeldes.

"Industrial Behavior and the Business Cycle: A Panel Data Study of U.S. Manufacturing," National Science Foundation (Economics Group SES-8420152), 1985-1987, with Ian Domowitz and Bruce Petersen.

"Efficient Contracting and Market Power: Evidence from the U.S. Natural Gas Market," Transportation Center, Northwestern University, Summer 1985.

"Constructing a Panel Data Base for Studies of U.S. Manufacturing," University Research Grants Committee, Northwestern University, 1985-1986.

"Economic Analysis of Multiple-Price Systems: Theory and Application," National Science Foundation (Regulatory Analysis and Policy Group, SES-8408805), 1984-1985.

"Contracting and Price Adjustment in Product Markets," University Research Grants Committee, Northwestern University, 1983-1984.

PAPERS PRESENTED

University Seminars

Carleton, University of Chicago, Columbia, Emory, George Washington, Harvard, Illinois, Indiana, Johns Hopkins, Laval, University College (London), University of Kentucky, London School of Economics, MIT, University of Maryland, Miami University, University of Michigan, University of Minnesota, New York University, Northwestern, University of Pennsylvania, Princeton, University of Rochester, Stanford, University of Texas, University of Virginia, University of Wisconsin, and Yale.

Conference Papers Presented

American Council for Capital Formation, Washington, DC, June 1994

American Economic Association, Washington, D.C., January 1995; Boston, January 1994; Anaheim, January 1993; Washington D.C., December 1990; Atlanta, December 1989; New York, December 1988; Chicago, December 1987; New Orleans, December 1985; Dallas, December 1984.

Association of Environmental and Resource Economists, Dallas, December 1984; San Francisco, December 1983.

Association of Public Policy Analysis and Management, New Orleans, October 1984; Philadelphia, October 1983.

Bipartisan Commission on Entitlement and Tax Reform, Washington, DC, June 1994.

Brookings Panel on Economic Activity, September 1994, April 1988, September 1987, September 1986, April 1986, September 1985.

Centre for Economic Policy Research Conference on Capital Taxation and European Integration, London, September 1989.

Conference on International Perspectives on the Macroeconomic and Microeconomic Implications of Financing Constraints, Centre for Economic Policy Research, Bergamo, Italy, October 1994.

Eastern Economic Association, Boston, March 1988; Boston, February 1983.

Econometric Society, Washington, D.C., January 1995; New Orleans, January 1992; Washington, December 1990; Atlanta, December 1989; New York, December 1988; Chicago, December 1987; New Orleans, December 1986; New York, December 1985; Boston, August 1985; Madrid, September 1984; San Francisco, December 1983; Pisa, August 1983.

Energy Modeling Forum, Stanford University, August 1983; February 1983; August 1982.

Federal Reserve Bank of Kansas City Symposium on "Financial Market Volatility--Causes, Consequences, and Policy Responses," Jackson Hole, Wyoming, August 1988.

Federal Reserve Bank of St. Louis, Conference on Economic Policy, St. Louis, October 1994.

The Institute of Gas Technology, Washington, DC, May 1982.

The Institute of Management Science/Operations Research Society of America, Orlando, November 1983; Chicago, April 1983.

International Association of Energy Economists, Boston, November 1986; Philadelphia, December 1985; Bonn, June 1985; San Francisco, November 1984; Washington, DC, June 1983; Denver, November 1982; Cambridge (England), June 1982; Houston, November 1981.

International Conference on the Life Cycle Model, Paris, June 1986.

International Institute of Public Finance, Innsbruck, August 1984.

National Association of Business Economists, Dallas, September 1992; New Orleans, October 1987.

National Bureau of Economic Research - IMEMO Conference on the American Economy, Moscow, August 1989.

National Bureau of Economic Research Summer Institute, July 1994; July 1993; August 1992; July-August 1991; July-August 1990; July-August 1989; July-August 1988; July-August 1987; July-August 1986; July 1985; July 1984; July 1983.

National Bureau of Economic Research Conference on Asymmetric Information, Corporate Finance, and Investment, Cambridge, May 1989.

National Bureau of Economic Research Conference on Financial Crises, Key Biscayne, March 1990.

National Bureau of Economic Research Conference on Government Expenditure Programs, Cambridge, November 1986.

National Bureau of Economic Research Conference on International Taxation, Washington, DC, April 1994; Cambridge, January 1994; New York, September 1991; Nassau, Bahamas, February 1989.

National Bureau of Economic Research Conference on Macroeconomics and Industrial Organization, Cambridge, July 1988; Cambridge, July 1987; Cambridge, July 1986; Chicago, November 1985.

National Bureau of Economic Research Conference on Pensions, Baltimore, March 1985; San Diego, April 1984.

National Bureau of Economic Research Conference on Productivity, March 1988; March 1987.

National Bureau of Economic Research Conference on Public Economics, Cambridge, April 1994, April 1993, November 1991, April 1991, March 1988, November 1987, March 1987.

National Bureau of Economic Research Conference on Tax Policy and the Economy, Washington, DC, November 1994, November 1991, November 1989

National Bureau of Economic Research Trans-Atlantic Public Economics Seminar, Turin, May 1994.

National Tax Association/Tax Institute of America, Arlington, May 1992; Seattle, October 1983.

U.S. House of Representatives, Committee on Ways and Means, Washington, DC, July 1992.

U.S. Senate Committee on Finance, Washington, DC, January 1992, December 1981.

ATTACHMENT 3

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Curriculum Vitae

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EDUCATION

Ph.D., Economics, Stanford University, 1992.
M.B.A., with distinction, The Wharton School, University of Pennsylvania, 1984.
M.S.E., Chemical Engineering, University of Pennsylvania, 1984.
B.S., Chemical Engineering, *cum laude*, University of Pennsylvania, 1979.
B.A., European History, *magna cum laude*, University of Pennsylvania, 1979.

Academic Honors: Second Prize, Graduate Student Research Award, Telecommunications Policy Research Conference, 1991; Lynde and Harry Bradley Foundation Fellowship, 1990; Stanford Fellowship, 1987

PROFESSIONAL EXPERIENCE

Graduate School of Business, Columbia University (New York, NY), Assistant Professor of Finance and Economics, July 1991 to present.

RAND Corporation (Santa Monica, CA), Graduate Student Intern, Summer 1990.

Economic Analysis Group, Ltd. (Washington, DC), Senior Consultant, 1986-1987.

"Baghdad 2000" Master Development Plan (Baghdad, Iraq), Economist and Systems Analyst, 1985-1986.

M.C.I. Telecommunications (Washington, DC), Manager of Financial Analysis, 1985; Senior Financial Analyst, 1984.

Office of Management and Budget, National Security Division (Washington, DC), Graduate Student Intern, Summer 1983.

Putnam, Hayes and Bartlett (Cambridge, MA), Research Associate 1980-1982.

TEACHING EXPERIENCE

Economics and Strategy in Media Industries, Fall 1993
Economics of Strategic Management, Spring 1993
Managerial Economics, Fall 1991, Fall 1992, Spring 1993, Fall 1993
Theory of the Firm (teaching assistant for Paul Milgrom), Fall 1989

PAPERS and PUBLICATIONS

Quality and Reliability of Telecommunication Infrastructure (editor), Hillsdale, NJ: Lawrence Erlbaum Associates, forthcoming 1994.

"The Quality of Complex Systems and Industry Structure", with Nicholas Economides, in Quality and Reliability of Telecommunication Infrastructure, edited by William Lehr, Hillsdale, NJ: Lawrence Erlbaum Associates, forthcoming 1994.

"Compatibility Standards and Industry Competition: Two Case Studies", working paper July 1993.

"Compatibility Standards and the Internet", working paper, September 1992.

"Standardization: Understanding the Process", Journal of the American Society for Information Science, vol 43, no 8 (September 1992) 550-555.

"Voluntary Standard Setting, Institutions and the Allocation of Technical Capabilities", working paper, January 1992

"ISDN and the Small User: Regulatory Policy Issues", with Roger Noll, in Integrated Broadband Networks: the Public Policy Issues, edited by Martin Elton, North-Holland, New York, 1991, 147-178.

"Incremental Costs and the Efficient Pricing of Local Exchange Services: A Synopsis of the Incremental Cost Conference", Center for Economic Policy Research Working Paper #175, Stanford University, January 1990.

WORK in PROGRESS

"Economics of Anticipatory Standard Setting", working draft, presented at the Twenty-First Annual Telecommunication Policy Research Conference, Solomon Island, MD, October 1993.

"Quality Choices in a Network of Networks", working draft, January 1993, presented to International Conference on Telecommunications Systems Modelling and Analysis, Nashville, TN, February 1993.

"Political Economics of Voluntary Standard Setting", working draft, January 1992.

"Vertical Integration in the Cable Television Industry: the Issue of Content/Carrier Separation", working draft WD-5100-MF, RAND Corporation, Santa Monica, CA, August 1990.

"ISDN: an Economists' Primer to a New Telecommunications Technology", working draft, February 1989.

3. In their replies to our submission for AT&T to the Department of Justice,¹ Professors Paul MacAvoy (hereafter, "PM") and Jerry Hausman (hereafter, "JH") reiterate their arguments that the market for long-distance services is not adequately competitive.² After reviewing their comments and additional studies which have subsequently become available, we find no basis to alter our earlier conclusion that long-distance markets exhibit vigorous competition. In the balance of this reply, we explain why we remain unconvinced by the recent submissions from PM and JH, and why we again conclude that: (i) entry barriers are not significant in long-distance markets; (ii) price-cost margins have declined over the period we considered, even after accounting for reductions in access costs; and (iii) other indicators of performance (*e.g.*, aggressive discount and promotional programs, trends in advertising and marketing expenditures, customer churn, and analysis of financial performance) support our overall finding of aggressive competition.

4. We respond to Professors MacAvoy and Hausman in turn below.

¹ *Affidavit* of R. Glenn Hubbard and William H. Lehr, "An Analysis of Competition in U.S. Long-Distance Telephone Service," December 5, 1994, *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, Civil Action No. 82-0192.

² *Reply Affidavit* of Paul W. MacAvoy, May 25, 1995, *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, Civil Action No. 82-0192; and *Reply Affidavit* of Jerry A. Hausman, May 30, 1995, *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, Civil Action No. 82-0192

I. RESPONSE TO PAUL W. MACAVOY

5. The principal support for MacAvoy's conclusion that long-distance market is not adequately competitive is his analysis of trends in the price-cost margins for AT&T, MCI, and Sprint. In our earlier filing, we showed how PM's analysis of trends in the price-cost margins (PCM) for AT&T, MCI, and Sprint were biased upward by errors both with respect to his calculation of prices and costs. We demonstrated that partial correction of these errors results in declining margins, thereby reversing PM's conclusion according to the terms of his own argument. We demonstrated why his assumption of non-access-related marginal costs of \$0.01 per conversation minute reflects a gross underestimate of true costs. Using publicly available information, we argued that true costs are more likely to be in the range of \$0.035 to \$0.063 per conversation minute. We further demonstrated how his estimates of access charges based on access minutes understate true access costs based on conversation minutes because there are typically two access minutes (origination and termination) associated with each conversation minute (of switched traffic). Finally, we explained how his selective choice of tariffs and traffic assumptions are biased in favor of finding excessively high prices, and why the use of AT&T's average revenue per minute (ARPM) measure offers a better approach to estimating prices for the computation of PCMs.

6. In addition, we pointed to a variety of other measures which suggest that long-distance market is much more competitive than alleged by PM. These included a number of techniques of standard economic analysis such as analyzing Tobin's q , financial returns, and structural and behavioral indicators of aggressive competition (*e.g.*, absence of entry barriers, customer churn, and aggressive discounting). In his reply, PM dismisses these alternative approaches by

claiming that economists have long acknowledged imperfections associated with each mode of analysis. We concur with PM that no single method is perfect, including his approach of estimating price-cost margins. Indeed, when all approaches are flawed, one may have more confidence if one can reach the same conclusion from a variety of paths. PM quibbles with this approach, but he does not assert that our analysis *in toto* is biased in any particular direction. We again conclude that none of the indicators of competition we examine provides support for his assertions.

7. In his reply, PM acknowledges several of the errors we identified in his approach to estimating prices and costs which result in his finding of increasing margins. These include the estimation of access charges, the sensitivity of his analysis to traffic assumptions, and the desirability of considering discount programs when attempting to estimate marginal transaction prices. In spite of his acknowledgement of earlier errors, we do not believe his reply comments reflect a substantive improvement over his initial submission. Rather than identifying each of the small and large points on which we think PM is incorrect, we focus on his discussion of the relevance of using average revenue per minute (ARPM) as a summary statistic for the appropriate price to include in an estimation of price-cost margins. This explanation will demonstrate again the flaws in PM's analysis. We also address below MacAvoy's discussion of discount programs, marginal costs, and financial measures of performance.

A. MacAvoy's Estimation of "Prices"

8. PM begins by arguing that his arbitrarily constructed price index is preferable to using ARPM for the estimation of PCMs; his justification is that this price index is to be preferred to

ARPM because no transaction actually occurs at the ARPM price. He further faults ARPM because it fails to account adequately for differences in customer calling patterns.³ He even claims we have "run afoul of the advice of Bernheim and Willig"⁴ by aggregating services to compute a summary price statistic. PM's own analysis demonstrates the flaws in his argument.

9. First, as we noted in our earlier submission, tariffed prices differ widely based on type of customer, geographic region, and by type of call (*e.g.*, duration, mileage, or time-of-day).⁵ In order to compute average price-cost margins, however, one needs a mechanism for "weight-averaging" the multiple tariffs to compute a price index. As PM correctly notes, no transactions occur at these prices — that is, neither at the ARPM "price" nor at price indices he reports. This is a problem with using summary statistics which are at best a noisy approximation; one

³ See MacAvoy, note 2, *supra*, page 43.

⁴ See MacAvoy, note 2, *supra*, page 42, in reference to *Affidavit* of B. Douglas Bernheim and Robert Willig, December 1994, *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, Civil Action No. 82-0192.

⁵ For example, quoting from our earlier *Affidavit* (page 22):

"When the FCC reports comparative price data, it reports the prices of calls for a number of different city pairs and for a variety of time periods and call durations in recognition of the difficulties inherent in comparing tariffs across services, across carriers, and across time. For example, while MacAvoy reports AT&T's MTS average price per minute of residential service for 1992 as \$0.2279 (January 2, 1992) and \$0.2270 (June 1, 1992), the FCC data report 1992 prices for AT&T ranging from \$0.25 (for a five-minute, daytime call between New York and San Francisco) to \$0.12 (for a five-minute, night-weekend call between New York and Philadelphia). Unfortunately, there is no simple way to compare carrier tariffs without carefully considering such issues as differences in promotional programs and customer calling patterns, which differ both by region and by customer segment. Although long-distance customers are provided with information about their own traffic patterns, thereby facilitating comparison shopping, detailed traffic distribution data across all services and all carriers are not readily available. Therefore, tariff information *per se* is not particularly useful for evaluating long-distance pricing trends."

cannot avoid computing such an index if one insists on computing price-cost margins. However, one can err in such a calculation by choosing an inappropriate weighting scheme for averaging tariffs. Because there are weighting schemes that can produce price indices which lie anywhere in the band traced out by AT&T's maximum and minimum tariff prices, the choice of weighting scheme is crucial. We emphasize ARPM because that measure reflects what actually happened — the calling patterns, the tariffs, the state of competition, and the mix of customers.

10. Alternatively, PM prefers to use an arbitrary customer calling profile to weight-average tariffed prices. We showed in our earlier analysis how PM's traffic assumptions are biased in favor of estimating high prices; his choice is, therefore, not surprising. It is possible to estimate both higher and lower "price" measures by tweaking these assumptions. PM purports to engage in sensitivity analysis of exactly this sort by examining over "60 different types of calls" for residential customers and "48 different types of calls" for small-business customers.⁶ These calling types are generated by mixing and matching an arbitrary collection of traffic pattern assumptions. He then computes the simple average of the price indices associated with each of these calling types. This is equivalent to making an assumption about the mix of actual customers, one which does not alleviate the inherent arbitrariness of PM's choice of weighting schemes. PM does not report the price indices associated with each calling-type which would be a more sensible way to demonstrate the sensitivity of his methods. For example, why not report both the highest and lowest price measures generated? Although these indices would still be based on unsupported traffic scenarios, they would demonstrate further the false precision in PM's methods.

⁶ See MacAvoy, note 2, *supra*, Appendix B.

11. We advocate using ARPM because it does not require the analyst to make an arbitrary, and potentially biased, selection of traffic weights to compute a price indicator. Using ARPM is preferable to PM's approach because it reflects actual traffic patterns, not patterns which coincide with estimating high prices.

12. Of course, ARPM can change even when tariffed prices remain constant because of changes in the mix of customer calling patterns. For example, if customers switch to discount calling programs, ARPM will fall even if the prices for the underlying services are unchanged. Customers may switch for a variety of reasons, including because advertising better informs them of their options or because of the addition of new features or improved quality. It is possible for changes in the mix of calls to permit tariffed prices and ARPM to move in opposite directions. Because the ability of customers to substitute among products and suppliers is crucial to the successful functioning of a dynamic, competitive market, it is important that the measure of prices reflect these substitution patterns.⁷

13. Moreover, PM uses calculations of price-cost margins to determine whether firms are earning supranormal profits. To be useful, such calculations must depend on a firm's *actual* revenue and costs, not on what revenues and costs *might have been* under a scenario in which customers make a lot of expensive calls, competition is weak, and costs are low. PM's preference for price indices constructed from biased assumptions avoids the inconvenience of confronting actual data which reflect the full extent of competition in long-distance markets.

⁷ One recent study examines several variables that might theoretically reduce ARPM without producing actual consumer benefits, and finds that, if anything, the decline in ARPM underestimates the benefits to consumers. See John Haring, Jeffrey H. Rohlfs, and Harry M. Shooshan, "Disabilities of Continued Asymmetric Regulation of AT&T," Bethesda: Strategic Policy Research, June 30, 1995.

Finally, MacAvoy offers no response to our criticisms of his regression analysis of determinants of price-cost margins.⁸

B. MacAvoy's Analysis of Discount Programs

14. PM's analysis of discount programs, which are included when we use ARPM but were not included in PM's price index, is flawed. Since PM devotes a great deal of space discussing how he reestimates PCMs after taking into account discount programs,⁹ it is worthwhile explaining why his discussion of these programs is incomplete and misleading. First, note that in his recitation of the "four reasons why long-distance carriers may offer discounts",¹⁰ he fails to include what would appear to be the most natural interpretation: the desire to respond to competition. Later, when he examines the desire to "pass on cost savings",¹¹ he argues that discounts for this reason are "competitively neutral" and that, because even a monopolist would be likely to lower prices when costs decline, "such volume-related discounts are of no probative value to ascertaining the presence or absence of competition".¹² While we agree with PM that even a monopolist will reduce prices as costs fall, we feel he goes too far when he argues *as if* such a passthrough of cost changes is equally likely in competitive and non-competitive markets. We note that reductions in access charges

⁸ See Hubbard and Lehr, note 1, *supra*, page 32.

⁹ See MacAvoy, note 2, *supra*, pages 22-40.

¹⁰ See MacAvoy, note 2, *supra*, page 24.

¹¹ See MacAvoy, note 2, *supra*, page 25.

¹² See MacAvoy, note 2, *supra*, page 25.

have been more than fully accounted for by reductions in prices, as we concluded in our earlier analysis and as has been confirmed in recent work by Haring, Rohlfs, and Shooshan,¹³ and similarly, by the FCC¹⁴.

15. When PM discusses his second rationale for discounts (*i.e.*, "to cheat on tacitly collusive prices"), he argues that "discounts should be more common for specialized contract offerings than for MTS".¹⁵ Only a few pages later, however, PM lists a large number of discount programs which are available to MTS customers. We are accordingly puzzled about how to interpret PM's use of the words "more common." PM's third rationale for discounting is to "offer lower prices to a select group of price-sensitive customers." Evidence that there are price discounts in all product classes suggests, not surprisingly, that *all* customers are price-sensitive. The expansion of these programs by AT&T and its competitors (as noted in our earlier *Affidavit*) suggests that price sensitivity may be increasing, which is consistent with increased competition. PM's fourth rationale for discounting is to "limit resellers' share in the market for MTS services." His discussion of how this would be effected is too brief to be interpreted and seems in conflict with his second rationale. To summarize, PM's pseudo-theoretical discussion of pricing theory¹⁶ seems designed to obfuscate what might otherwise appear obvious: evidence of aggressive discounting suggests the existence of aggressive competition.

¹³ See Haring, Rohlfs, and Shooshan, note 7, *supra*.

¹⁴ See *Price Cap Performance Review for Local Exchange Carriers*, CC Docket 94-1, Paragraph 61, April 7, 1995.

¹⁵ See MacAvoy, note 2, *supra*, page 25.

¹⁶ See MacAvoy, note 2, *supra*, pages 24-26.

16. When PM turns to consider the empirical evidence on discounting programs, his analysis does not improve. He alleges that the majority of AT&T's customers have bills for amounts too low to take advantage of discount programs.¹⁷ This is an argument which is also echoed by JH,¹⁸ but is simply not correct. AT&T data show that 60 percent of residential MTS calls are billed under the terms of some kind of discount program.¹⁹ Furthermore, when PM lists the relevant discount programs, he fails to include such important and clearly relevant programs as *True Savings*, which offers a 25 percent discount for monthly bills between \$10 and \$50 and higher discounts on larger bills.²⁰ Once a customer enrolls, he or she receives a discount in *every* month when bills exceed \$10; those eligible for discounts even include a large share of those consumers whose bills may on *average* be less than \$10 per month (because monthly phone bills fluctuate). Moreover, he is at pains to argue that customers who select a block-calling program such as *Reach Out America* can pay higher than discounted rates if they make too few calls.²¹ This is not surprising: The whole point of offering a menu of discount programs is to offer programs which appeal to customers with different calling patterns.

Finally, it is impossible to know how PM derived all the assumptions he makes about volume, length, frequency, time of day, and weighting of calling patterns that are the core of

¹⁷ See MacAvoy, note 2, *supra*, page 24.

¹⁸ See Hausman, note 2, *supra*, page 5.

¹⁹ See "Comments of AT&T," on *Policy and Rules Concerning Rates for Dominant Carriers*, CC Docket No. 87-313, and on *Revisions to Price Cap Rules for AT&T*, CC Docket No. 93-197, filed July 3, 1995, page 33.

²⁰ This program superseded the "True USA" program to which PM refers (see MacAvoy, note 2, *supra*, page 26-27).

²¹ See MacAvoy, note 2, *supra*, page 31.

his comparison between *Reach Out America* and nondiscounted rates. Nonetheless, his claim that the "weighted-average price index price for AT&T's *Reach Out America* plan shows that customers paid approximately 95 percent of the standard MTS rate is almost surely incorrect.²² On the first page of Table Two, Appendix A,²³ MacAvoy lists one of the *Reach Out America* programs, which provides an hour of calling for \$7.50 per month, or calling at a rate of \$0.125 cents per minute, which is much less than 95 percent of AT&T's ARPM.

C. MacAvoy's Reconsideration of Marginal Costs

17. PM's reconsideration of marginal costs is also flawed. First, he disputes our use of the term *incremental costs* by arguing that "as a threshold matter, the measurement of incremental costs is irrelevant since the calculation of price-cost margins uses marginal costs not incremental costs," citing standard microeconomic theory text books in support of his claim.²⁴ As PM is surely aware, standard textbooks usually assume such things as constant returns to scale technologies, static equilibrium, homogeneous goods, and so forth when explaining the computation of PCMs — assumptions which do not prevail in telecommunications markets, but which PM conveniently neglects to discuss in his analysis of PCMs. His cavalier dismissal belies the difficulty in defining marginal costs in the context of telecommunications services. In a textbook which explicitly focuses on the relevant industry, Mitchell and Vogelsang consider the conceptual difficulties of defining the appropriate marginal cost when capacity is added in

²² See MacAvoy, note 2, *supra*, page 33.

²³ See MacAvoy, note 2, *supra*.

²⁴ See MacAvoy, note 2, *supra*, page 5.

fixed increments as occurs in telecommunications.²⁵ The definition of marginal costs depends upon both the time horizon and one's measure of output. By including the \$0.01 in annual recurring costs associated with the addition of network capacity, PM seems to be tacitly acknowledging the importance of accounting for the long-run cost implications of expanding, and does not believe that the appropriate measure should be the instantaneous change in AT&T's total costs measured when it carries one more minute of traffic. Our use of the term "incremental cost" in our earlier submission makes it clear that the relevant cost to use is an approximation of long-run marginal cost which accounts for all of the implications for total costs when traffic is expanded.

18. PM's next step is to criticize each of our suggested revisions. He begins by admitting his error in computing access-related costs based on access minutes instead of conversation minutes, (noting somewhat surprisingly in a footnote that in another, earlier filing he had not made this mistake).²⁶ With his revised access cost estimates, *his* marginal costs for interstate switched services are almost 20 percent higher than in his earlier *Affidavit*.

²⁵ B. Mitchell and I. Vogelsang, *Telecommunications Pricing, Theory and Practice*, Cambridge: Cambridge University Press, 1991. On page 39, they state:

"Marginal-cost prices must be defined with respect to the time frame of output expansion. Should marginal cost be seen with reference to an immediate expansion of output using existing capacity (short-run marginal cost), or with respect to a planned permanent expansion (long-run marginal cost), or with respect to some intermediate case? The first case clearly is well-defined, and causality can be clearly established. The problem is that in telecommunications, short-run marginal cost at less than full capacity utilization is close to zero. At the capacity limit, it quickly moves to infinity. Of course, an infinite price is not achievable; rather, in times of capacity shortage, the price cannot exceed the one that rations demand at the capacity limit. Thus, pricing at short-run marginal cost may lead to wildly fluctuating prices. In addition, at times of excess capacity, such prices may not even come close to covering capacity cost."

²⁶ See MacAvoy, note 2, *supra*, footnote 7.

19. PM criticizes our estimate of incremental network costs by questioning our use of a 1989 Bell Laboratories study which suggested direct network capital costs might be \$0.023 per minute. PM argues that this estimate conflicts with AT&T expert testimony from John Sumpter in another matter from 1990. Again, we acknowledge that it is difficult to estimate network costs and that reasonable experts may disagree with respect to point estimates. However, PM takes as his best estimate the lower bound on the range of available estimates. Furthermore, we should note that John Sumpter's testimony referred to circumstances which are not applicable in the present context and so there is no contradiction.²⁷ Finally, and most importantly, we used this estimate *only* to compute the higher of our two estimates of non-access related costs cited above.²⁸

20. PM makes a similar mistake when he criticizes our attempts to estimate marginal customer costs. He assumes that these are exactly zero, or that AT&T's marketing and sales costs, including customer support services, do not change *at all* when AT&T's traffic expands. Clearly, this is incorrect. With additional traffic come additional calls to customer service, expansions to the sales force, increases in advertising and promotion expenditures and increases

²⁷ He measured the same recurring expense to which MacAvoy refers in a different context, and not the incremental cost figure we emphasize. Sumpter's estimate is not inconsistent with our *Affidavit*. See *Direct Testimony of John Sumpter on Behalf of AT&T Communications of California, Inc.*, June 18, 1990, *Application of AT&T Communications of California, Inc. (U 5002 C) for Authority to Provide Intrastate AT&T 800 READYLINE Service*.

²⁸ Our goal in estimating a potential range for network costs of between \$0.035 to \$0.063 (see Hubbard and Lehr, note 1, *supra*, page 27) was to demonstrate the magnitude of the bias inherent in PM's estimation of PCMs. This should not be construed as an upper bound since true incremental network costs will vary depending on where and how network capacity is constrained.

in billing costs. This does not include other direct adjustment costs associated with customer churn (*e.g.*, updating billing files, mailing of new customer or terminated customer information, etc.). We acknowledged the difficulty of estimating these costs precisely by suggesting a conservative range of \$0.02-\$0.03 per conversation minute. This estimate is low when compared with many other consumer products companies. Because accepting even the lower estimate of \$0.02 would result in almost a 30 percent further increase in PM's estimated costs, it is remarkable that he again chooses to ignore important costs.

21. Finally, PM chastises us for suggesting that lost revenue for uncollectibles be treated as a cost, arguing that "an allowance for uncollectible bills is not a marginal cost, but rather a reduction in revenues."²⁹ Accepting this interpretation, why does PM not adjust his price index based on tariffed prices downward to reflect the fact that for each minute of traffic billed, less than one minute of revenue will be received? Because we did not have accurate data on how uncollectibles vary by service category, it was not possible for us to directly adjust our estimates of ARPM. Note, however, that even though revenue is not collected, network and access costs are still incurred.

22. To summarize, were PM to correct fully his earlier marginal cost and price estimates, instead of only partially and selectively correcting them, he would be forced to reverse his conclusion regarding the trend in PCMs.

²⁹ See MacAvoy, note 2, *supra*, page 11.

D. MacAvoy's Discussion of Financial Measures of Performance

23. As we noted earlier, we considered a number of indicators of competition, none of them perfect, to establish a *prima facie* argument that long-distance markets are competitive. PM criticizes our use of accounting rates of return, Tobin's q , and our discussion of his event studies. With respect to accounting rates of return, we do not find PM's presentation of data informative as he does not describe how his measures are constructed. PM's discussion of Tobin's q offers little discussion not contained in our earlier submission. His disavowing of the use of stock market valuations for a firm as a whole is somewhat surprising given his reliance on firm stock market prices to events. Finally, just as PM selects among convenient assumptions in his analysis of "prices," his event study picks and chooses among events to prove his argument. His revision reduces by half his earlier estimate of the appreciation in market valuation. This sensitivity demonstrates again the force of our critique of his conclusions and their susceptibility to the selection of which events are deemed relevant.

II. RESPONSE TO JERRY A. HAUSMAN

24. In his *Reply Affidavit*, JH³⁰ offers several responses to our analysis. We review and respond to his principal points briefly below. We believe that none of his points alters our general conclusion that markets for long-distance service are competitive. Below we address his comments about sunk costs and prospects for entry, trends in ARPM, price cap issues, discounting plans, lockstep pricing, and economies of scope.

³⁰ See Hausman, note 2, *supra*.

A. Sunk Costs and Prospects for Entry

25. JH claims that we ignore the sunk costs of facilities-based networks in our characterization of competition. In response, JH ignores competition from non-facilities-based carriers. Because there is significant excess fiber-optic capacity and the market for leased bulk capacity is competitive, it is no longer necessary to be a facilities-based carrier to offer effective competition in long-distance markets. Moreover, new cellular and satellite technologies further reduce costs of entry, especially into markets for bulk transport. This is significant, because the three largest long-distance carriers would need to control the market in order to forestall competition and discipline competitors following the reseller route.

26. We note that the failure of a new firm to grow as large as AT&T, MCI, or Sprint does not *per se* demonstrate that the market is not competitive. In the first place, other carriers have purchased facilities to a variety of degrees. In our *Affidavit*, we discussed the success of LDDS/WilTel, a carrier that built itself up over time to a substantial position as a facilities-based carrier. In that regard, the April 14, 1995 Value Line analysis of LDDS stated that it had an approximately five percent share of the long-distance market and that its projected 1995 revenues are \$3.8 billion. LDDS recently spent \$2.5 billion to acquire WilTel, which has a network of more than 11,000 mile of fiber optic cable. Moreover, the size difference among carriers need not reflect entry barriers. Surely, JH is not alleging that AT&T, MCI, and Sprint are colluding to manipulate Basket 3 prices in such a way as to preclude effective entry by resellers. Furthermore, as long as there is an actively competitive lease market for bulk bandwidth, this should be the preferred mode of entry if current facilities-based long-distance carriers are exploiting their alleged market power by setting "prices above the competitive price for a

significant amount of time."³¹

There are advantages to such a non-facilities-based strategy. First, entry via leased services (*e.g.*, via one of the many virtual private network tariff offerings) is fast and need be neither large nor permanent. Accordingly, small-scale "hit and run" competition is feasible, as seems plausible based on the entry/exit history of the reseller industry. This is more attractive than facilities-based entry in which the costs of exit are substantial (that is, sunk costs are large). Moreover, the existence of bulk transport tariffs that permit relatively small-scale entry (*i.e.*, relative to the market shares of an MCI, Sprint, or LDDS/WilTel), implies that the large facilities-based carriers would find it costly to lower the *alleged* price umbrella to discipline such entrants.³² An alternative explanation for the fact that we do not see excessive entry by resellers is that they do not see excessive profits being earned and that the costs of marketing and customer acquisition are higher than those alleged by JH (or for that matter, by PM).

B. Trend in ARPM

27. JH argues that the trend in ARPM is flat in nominal terms and that this trend demonstrates an absence of competition. First, even if ARPM had a flat trend, one could not reject the hypotheses of competition without information on costs. Second, JH's calculations use published price indices that were not our principal source of analysis. (In particular, the CPI

³¹ See Hausman, note 2, *supra*, page 12.

³² The theory which supports this point is the same as is used by PM when he seeks to explain why AT&T's market share fell rapidly before 1990; see MacAvoy, note 2, *supra*, page 12.

and PPI indices to which he refers³³ rely on basic rates and fail to take discount programs properly into account. The Bureau of Labor Statistics is now redefining the CPI so as to phase in discounts gradually, and the CPI is diminishing as a result.³⁴) Third, he considers only a subperiod of that considered in our analysis.

C. Price Cap Issues

28. JH asserts that the price caps for AT&T are always binding; he further asserts that the price cap productivity adjustments are half of what he estimates productivity to be based on "his experience." First, AT&T price data are not consistent with the first assertion. Second, he offers no specific evidence that productivity adjustments are too low. In our *Affidavit*, we did not argue that the opposite is the case, but rather that it might be. Absent evidence to the contrary, one cannot accept his presumption. Third, in our *Affidavit*, we cited a number of reasons for why non-network variable costs such as those associated with marketing and sales might be expected to have increased during the period. These included increased customer churn induced by aggressive competition, entry by new competitors, and the introduction of new and more complex products.

³³ See Hausman, note 2, *supra*, page 9.

³⁴For example, over the period from March 1994 to March 1995, there was a two percent decrease. See *FCC Monitoring Report*, CC Docket No. 87-339, Table 5.4, released May 1995.