

**Affidavit of Robert Crandall and Leonard Waverman
in Support of the Application of Ameritech Michigan for
Provision of In-Region, InterLATA Services in Michigan**

1. Robert Crandall is a Senior Fellow in Economic Studies at the Brookings Institution in Washington, DC, a position that he has held since 1978.¹ Prior to that he was Acting Director, Deputy Director, and Assistant Director of the Council on Wage and Price Stability in the Executive Office of the President, and in 1974-75 he was an adviser to Commissioner Glen Robinson of the Federal Communications Commission. He was an Assistant Professor and Associate Professor of Economics at MIT between 1966 and 1974. He has written widely on telecommunications policy, the economics of broadcasting, and the economics of cable television. He is author or co-author of four books on communications policy published by the Brookings Institution since 1989: *Changing the Rules: Technological Change, International Competition, and Regulation in Communications* (with Kenneth Flamm), 1989; *After the Breakup: U.S. Telecommunications in a more Competitive Era*, 1991; *Talk is Cheap: The Promise of Regulatory Reform in North American Telecommunications* (with Leonard Waverman), 1996; and *Cable TV: Regulation or Competition?* (with Harold Furchtgott-Roth), 1996.

2. Leonard Waverman is Professor of Economics at the University of Toronto and from July, 1989 to December, 1996 was the Director of the University's Center for International Studies. He was a Board Member of both the Ontario Energy Board (part-time) and the Ontario Telephone Service Commission, and was a member of NARUC for six years. He is currently a Visiting Fellow at the Brookings Institution and chair of the Government of Canada's Advisory Committee on Telecommunications Infrastructure Statistics and Economic Analysis. He has published widely on telecommunications and regulatory economics. He recently co-authored *Talk is Cheap: The Promise of Regulatory Reform in North America* with Robert Crandall for the Brookings Institution. Forthcoming books include *It Takes Two to Tango: The International Marketplace for Telecommunications* (for the American Enterprise Institute); and *Competition Policy in a Global Economy: Modalities for Cooperation* (edited with William Comanor and Akira Goto, Routledge Press).

¹ The views expressed herein are solely my own and should not be taken to represent the views of the Brookings Institution, its other staff members, or its Trustees.

I. INTRODUCTION

3. The Telecommunications Act of 1996 authorizes the entry of Regional Bell Operating Companies (RBOCs) into interLATA services. Immediate entry is allowed for out-of-region services, but in-region entry requires approval by the Federal Communications Commission (FCC). In this affidavit, we provide an analysis of the prospective benefits from the entry of Ameritech into the provision of interLATA services from in-region locations, showing that such entry is likely to improve economic welfare substantially. Because interLATA services are still far from perfectly competitive, with evidence of oligopolistic or tacitly cooperative pricing, the entrance of one or more new, large players into this business should place downward pressure on rates and profit margins, lead to new service offerings and pricing plans, and ultimately place downward pressure on carrier costs.

4. Earlier exercises in trucking, railroad, and airline deregulation led to new entry and consequent improvements in economic welfare that have been estimated to be in excess of \$30 billion per year in current dollars.² In this affidavit, we show that the entry of new carriers into cellular markets has had similarly beneficial effects on prices and service options in the United Kingdom (UK). The opening of the long distance telecom market in Chile to unfettered competition has reduced prices substantially. Likewise, the entry of new firms into unregulated oligopolistic industries, such as luxury automobiles and steel in the United States, has also created substantial improvements in economic welfare.

5. Given the size and concentration of the few firms providing interLATA services in Ameritech's five-state region, the benefits from new, large-firm entry should be very large indeed. The interLATA business has evolved into an oligopoly of three large national firms,³ a few smaller facilities-based carriers, and a large number of resellers. In 1995 long distance services generated revenues of almost \$84 billion nationally. In the five Ameritech states, we estimate long distance generated about \$12.5 billion in revenue.⁴ The current national average rates for interLATA services appear to be substantially in excess of long-run incremental cost

²Winston, Clifford, "Economic Deregulation: Days of Reckoning for Microeconomists," *Journal of Economic Literature*, September 1993, pp. 1263-89.

³ In 1995 AT&T had a 53.0% share of total toll service revenues, MCI held 17.8% and Sprint held 10.0%. LDDS Worldcom, the next largest carrier, held only a 5.0% share. *Source: FCC, Statistics of Communications Common Carriers (SOCCC) 1995, Table 1.4.*

⁴ *SOCCC*, 1995 edition. This is based on total toll revenue times the ratio of toll calls originating in the Ameritech region to all toll calls originated nationally.

(LRIC) for the wholesale service plus access costs. As we demonstrate below, these costs sum to about 6.5 cents per minute while the national average interLATA revenue per minute is currently more than 15 cents.⁵ We conclude that the difference -- currently absorbed by AT&T's (and other IXCs') marketing and overhead costs plus excessive returns to capital -- is likely to be reduced substantially by new entry or be redirected to activities that bring value to customers.

6. Paul MacAvoy has shown that interLATA rates, net of access charges, fell from 1984 through 1989, but that margins have turned upward since then.⁶ More importantly, there is a distinct pattern of price leadership in long distance, as the rates charged by MCI and Sprint tend to follow those of AT&T with very short lags, but have not responded to recent changes in incremental cost, such as those caused by declining access charges. MacAvoy attributes this interdependent pricing to the absence of new large-scale entrants and the regulatory requirements of tariff filings and rate caps on AT&T services until 1995. Given the continued decline of access rates, technological progress that inevitably reduces the IXCs' costs, and prevalent excess capacity, MacAvoy concludes that the behavior of interLATA rates in the 1990s is far from what would be expected from a competitive market.

7. As we demonstrate below, much of the difference between AT&T's revenues and incremental costs is absorbed by enormous administrative and marketing expenses. Marketing costs are clearly endogenous, increasing with increases in the margin between price and long-run incremental cost. Moreover, administrative costs continue to reflect the past effects of regulation and protection from entry. Were the margin reduced from the current level of approximately 130 percent over LRIC to more competitive levels, these costs would undoubtedly decline. In other deregulated markets, costs have fallen by about 30 percent when entry barriers were lifted.⁷ We expect a similar response to further competitive entry in long distance.

8. In short the anticipated public benefits from allowing Ameritech into out-of-region inter-LATA services are substantial--lower prices, as the non-competitive pricing among the three existing major firms is disturbed, innovative service offerings, and pressures for lower costs.

⁵ These are estimates of revenues and incremental costs averaged over the entire day. Obviously, the incremental cost is lower during off-peak periods and higher on-peak. There are no data on average off-peak and on-peak revenues per minute.

⁶ MacAvoy, Paul W., *The Failure of Antitrust and Regulation to Establish Competition in Long Distance Telephone Service Markets*, MIT Press, Cambridge, MA, 1996.

⁷ Winston, Clifford, "U.S. Industry Adjustment to Economic Deregulation," The Brookings Institution, unpublished manuscript, September 1996.

II. OLIGOPOLISTIC RIVALRY

9. The literature describing possible equilibrium prices in homogeneous oligopoly industries is vast.⁸ Within that literature it is generally agreed that the equilibrium price can easily be above the competitive price and that the actual price level depends on the conditions of the specific market, the level of market information available to market participants, and the nature and length of the relationship among the various participants.

10. The maintenance of supracompetitive prices in such a market does not depend on any one of the firms having “market power” by itself.⁹ All that is required is that each participant believe that a reduction in price will only lead to a reduction of its profits. The maintenance of a supracompetitive equilibrium price depends heavily on the endurance of those beliefs. The situation is similar to that illustrated by the familiar prisoner’s dilemma game. Joint profits are maximized by each of the suppliers charging the current supracompetitive price and sharing the market in the current proportions. Individual profits could be increased in the short run by reducing price and capturing more than one’s “normal” share. However, if each of the participants can immediately detect a price change by any other participant and has the productive capacity to sustain an equal or greater price reduction, the result of any unilateral price reduction will be that all members of the market end up selling somewhat larger quantities at lower prices. In a market with a relatively low overall price elasticity of demand, i.e. where a reduction in price results in a less than proportional increase in volume, the aggregate profit will be less than at the higher price and all participants will be worse off. It is easy to see that the result of a series of such price reductions will ultimately lead to all participants selling at the competitive price and earning substantially lower profits.

11. Maintaining the confident belief that none of the suppliers will unilaterally reduce price is facilitated by several conditions. First of all, high market concentration, due to a limited number of suppliers, facilitates cooperation. Second, prices that are common knowledge and cannot be hidden from any of the participants will serve to assure each that none of the others is making a unilateral reduction. Third, the existence of the credible capacity of rivals to meet any price

⁸ See, for example, Scherer, *Industrial Market Structure and Economic Performance*, Third Edition, Houghton Mifflin, Boston, MA (1980); Tirole, *The Theory of Industrial Organization*, MIT Press, Cambridge, MA (1988); Shapiro, *Theories of Oligopoly Behavior*, in Schmalensee and Willig, *Handbook of Industrial Organization, Volume I*, Elsevier Science Publishers, Amsterdam, (1989); Carlton and Perloff, *Modern Industrial Organization*, Harper Collins, New York, (1994).

⁹ “Market power” is generally described as the ability to unilaterally and profitably raise price.

reduction or perhaps retaliate with an even greater reduction reduces the incentive for price cutting. Such responses require that the other suppliers be able to supply an additional quantity sufficient to maintain the lower price. Fourth, the similarity of costs across suppliers facilitates tacit coordination by making it easier to differentiate between a price reduction and a cost difference. If costs are not the same, a price reduction cannot be unambiguously interpreted by rivals as a competitive move. Similarities in cost are also important for preventing any one firm from being able to serve the entire market at a lower cost than its rivals.

12. We show below that the supply of interLATA and interstate long distance services retains these characteristics. In addition, there are significant entry barriers so that in the thirteen years since the AT&T divestiture, no significant brand-name entrant or competitor has emerged. These two businesses remain three player oligopolies. RBOC entry would disturb and end the supra-competitive price equilibrium. It is significant that in the face of falling costs and while opposing prospective RBOC entry, AT&T announced, on November 27, 1996, its largest across the board price rise in three years.¹⁰

13. History plays an important role in determining the equilibrium price in oligopolistic markets. The ability to maintain a supracompetitive price does not imply the ability to establish such a price. Raising price above the competitive level in a competitive market would seem to require more than tacit coordination. In an historically regulated market such as long distance, prices are often set above the competitive level to encourage investment or to cross-subsidize other services. The lifting of regulatory pricing restrictions gives each seller the freedom to set prices to maximize its own profits, but it does not assure that the resulting price level will in fact be "competitive." Where the conditions facilitating tacit price coordination are well established, the supracompetitive price established by regulation may prove quite persistent in the absence of entry, as it has in long distance.

III. EVIDENCE FROM NON-TELECOMMUNICATIONS MARKETS

14. The effect of significant new entry, missing from the interLATA and interstate marketplaces, on prices and product quality can be observed in oligopolistic markets outside and inside telecommunications. In the United States, two important industries—automobiles and steel—emerged from a long period of somnolence when buffeted by new entry. In this section we

¹⁰ "AT&T Raises Basic Residential Rates 5.9 Percent", *Washington Telecom Newswire*, November 27, 1996.

describe the effects of this entry on the luxury-car market and on carbon-steel prices. In a subsequent section we examine three telecom markets where significant new entry led to significant price reductions—the UK cellular market, the domestic long distance market in Chile and the long distance market in Connecticut.

A. The Luxury Car Market

15. The U.S. luxury car market provides an excellent example of a tight oligopoly that was disrupted by the entry of major new players. From the 1930s through the 1950s, the number of U.S. motor vehicle producers steadily declined until only three remained in the luxury car market: General Motors, Ford, and Chrysler. In the late 1970s, Chrysler's brush with bankruptcy essentially forced it to abandon this market as well, leaving it to General Motors (Cadillac) and Ford (Lincoln), and the relatively minor participation of two German imports—BMW and Mercedes—that became much less competitive after the 1985-87 depreciation of the dollar. The two domestic players clearly had open knowledge of one another's prices, similar costs of production, and sufficient assembly capacity to expand output to discipline one another's attempt to capture market share through competitive price reductions. A stable oligopoly thus emerged that could only be disrupted by major new entry—entry that eventually came from large, successful Japanese vehicle producers.

16. Honda began to sell its Acura model in the United States in the 1986 model year, but this was not a "luxury" car, rather an upscale, fairly sporty sedan that competed with other Japanese imports and with larger U.S. sedans. In the 1990 model year, however, Nissan and Toyota introduced their Lexus and Infiniti models that were truly luxury cars. The Lexus LS400 and the Infiniti Q45 were offered at a manufacturer's suggested retail price (MSRP) of more than \$35,000 each, prices that were higher than most of the basic Cadillac and Lincoln models by \$1,000 to \$6,000. By most accounts, these new imports were thought to be superior to the Cadillacs and Lincolns with which they competed.

17. If the appearance of the Lexus and Infiniti models actually succeeded in disciplining the price behavior of Ford and GM in the luxury-car market, we would expect to see a slowdown in the latter companies' price increases for the Lincoln and Cadillac cars. In fact, this slowdown did occur as the data in Table 1 attest.¹¹ The real prices of every model except for the Cadillac Seville rose at a more modest rate in 1990-92 than in 1984-90. In some cases, the difference was

¹¹ The prices shown in Table 1 are unadjusted for quality changes because there are so few data on the important performance aspects of these cars in *Consumer Reports*.

very large. By comparison, the rate of real-price increase for all new cars in the CPI was actually greater in 1990-92 than in 1984-90 (-0.6% per year versus -1.1% per year).¹² Luxury cars were going against this trend because the U.S. luxury car market was being assaulted by two new major players, Nissan and Toyota.

Table 1
**Manufacturers' Suggested U.S. Retail Prices (MSRP) of Luxury Cars,
 1984-1990 and 1992¹³**

Car Model	1984 MSRP (current \$)	1990 MSRP (current \$)	1992 MSRP (current \$)	Annual % Change in Real MSRP 1984-90	Annual % Change in Real MSRP 1990-92
Cadillac 4-Dr. DeVille	18,125	28,110	31,750	3.5	2.5
Cadillac Seville	22,959	31,400	35,000	1.4	1.8
Lincoln Town Car	18,595	28,541	31,200	3.3	0.9
Lincoln Continental	22,281	29,977	32,250	1.1	0.1
Lincoln Mark VII	23,454	29,801	32,050	0.2	0.1

18. The effects of the Japanese entry on luxury-car sales were dramatic. Imported luxury car sales increased, but domestic sales fell. The import share thus rose from about 32 percent to nearly 36 percent between 1990 and 1994. (See Table 2). Virtually all of the increase in imported cars came from Japan despite the fact that the yen appreciated by 30 percent against the dollar in this period.

¹² The negative rate of price change is the result of quality adjustments in the CPI.

¹³ Sources: *Consumer Reports*, Annual Automotive Issues; CPI Deflator – BLS.

Table 2
U.S. Luxury Car Sales, Selected Years¹⁴

	1986	1988	1989	1990	1991	1992	1993	1994
American	458,206	449,223	465,924	499,939	399,971	380,663	378,967	388,893
Japanese			17,374	77,472	85,931	84,428	90,910	98,838
Jaguar	24,464	9,648	18,967	18,728	9,376	3,329	10,792	9,872
BMW	96,759	73,212	64,881	57,703	44,767	49,785	46,193	35,281
Mercedes	99,314	65,604	75,767	78,375	23,562	40,248	30,068	73,002
Total Luxury	678,743	597,687	642,913	732,217	563,607	558,453	556,930	605,886
Import Share	32%	25%	28%	32%	29%	32%	32%	36%

19. The challenge from Japan has not gone unanswered, and the most successful answers have been quality improvements and innovation rather than simple price cuts. Since 1994, Mercedes and BMW have introduced several new and updated models, surging past the more staid Lexus and Infiniti which now look dated. Helmut Werner of Mercedes admitted that, “[w]e had to understand that the world had changed, and the philosophy Mercedes had pursued so successfully had come to an end.”¹⁵ The effect of new entrants on marketing strategies is evident from the following quote from another Mercedes official, Jürgen Hubbert: “In the early 1980s we had six competitors in the luxury segment, which totals 900,000 vehicles a year. Now we have 15. The pieces of cake are smaller. We had to look for more market chances.” Both Mercedes and BMW are now entering into the luxury sport utility vehicle market—Mercedes with its new M class and BMW through purchase of Britain’s Rover Group, manufacturer of Land Rover and Range Rover.

20. While the initial quality and customer satisfaction ratings of the Lexus and Infiniti remained well above that of the Lincoln and Cadillac, both of the U.S. models improved their scores between 1991-1993, while the scores of the Japanese models remained constant or even worsened.¹⁶ The initial quality gap between domestic and Japanese models was reduced from 47

¹⁴ Source: *Ward’s Automotive Yearbook* 1990 and 1995, “U.S. Import Sales by Year”

¹⁵ Taylor, Alex III, “Speed! Power! Status!,” *Fortune*, June 10, 1996.

¹⁶ J.D. Power and Associates, *Power Report on Automotive Marketing*, various issues, 1990-1993.

problems per 100 cars in 1989 to 21 problems per 100 cars in 1993.¹⁷ In the luxury car field, Lincoln narrowed the gap between itself and the Japanese luxury models from 59 problems per 100 cars to only 17 problems per 100 cars.¹⁸

B. Minimill Entry Into the Carbon-Steel Industry

21. Between the two World Wars, the United States steel industry developed into a set of regional oligopolies protected from each other by high transportation costs. Bethlehem Steel and Republic Steel dominated the eastern markets. U.S. Steel, Jones & Laughlin, Pittsburgh Steel, and to a lesser extent Wheeling Steel and Youngstown Sheet and Tube were dominant in the Pittsburgh and Cleveland region. Farther west, U.S. Steel, Inland, Youngstown, and Republic were the principal producers in the Chicago area. Armco produced in southern Ohio while Colorado Fuel and Iron was the only western producer until U.S. Steel and Kaiser began operating plants built by the government in Utah and California during World War II.

22. The stability of supracompetitive prices in these oligopoly markets was documented by Stigler and Kindahl in 1970.¹⁹ These stable oligopoly prices derived from the high levels of concentration in each regional market, low price elasticity of demand for most steel products, the similarity of the large producers' costs (due to industry-wide collective bargaining, joint ownership of iron ore mines, and common technology), a "basing-point" posted price system, and substantial excess capacity.

23. These regional oligopolies began to weaken somewhat when U.S. Steel moved east to the Philadelphia area in the 1950's and Bethlehem moved west to northern Indiana in the early 1960's. Moreover, imports began to enter the U.S. in fairly sizable quantities during the long strike in 1959. The oligopolies, though weakened, remained in most steel products until the entry of new, small minimills in the 1960's and 1970's.

¹⁷ J.D. Power and Associates, *Power Report on Automotive Marketing*, June 1993.

¹⁸ J.D. Power and Associates, *Power Report on Automotive Marketing*, various issues, 1990-93.

¹⁹ Stigler, George J. and James K. Kindahl, *The Behavior of Industrial Prices*, National Bureau of Economic Research, 1970, pp. 73-74.

1. Integrated Producers Versus Minimills

24. The steel industry had traditionally been dominated by firms with large-scale facilities—blast furnaces, open-hearth furnaces, and rolling mills.²⁰ These firms are called *integrated* producers. The technological innovations of the 1950's and 1960's even increased the economies of scale to the point that a single plant might produce 6 or 7 million tons of steel, or more than 5 percent of national output. But U.S. steel producers, protected from vigorous competition by high transportation costs, fell behind the Japanese and even some European producers in productive efficiency during the 1960's. Though Bethlehem, U.S. Steel, and Inland had very large plants and a few efficient new furnaces, their production costs were relatively high.

25. For several decades, an alternative technology – the melting of scrap steel in electric furnaces – had been used to make raw steel. In the United States, this technology was largely used to produce high-priced stainless or “specialty” steels. One Midwestern producer, Northwestern Steel and Wire, also used electric furnaces to produce carbon steel wire rods in the interwar period.

26. In the 1960's, however, small entrepreneurial companies began to enter regional steel markets as producers of the small diameter “long products,” such as concrete reinforcing rods or inexpensive steel bars and shapes. Nucor and Florida Steel were among the pioneers in this activity, building several small-scale plants in the South. During the 1960's, these small companies expanded from about 2 million tons of raw-steel production to 7 million tons, still a very small share of a 150 million ton industry. The small entrepreneurial electric-furnace companies evolved into “minimills” that used modern electric furnaces, continuous casters, and bar or rod mills to produce a narrow array of products much more efficiently than could the larger, integrated companies. As a result, these minimill companies steadily eroded the larger firms' market shares of the smaller, inexpensive steel products.

2. The Effect of Minimills on the Prices of “Long” Products

27. In the decade after the 1973-74 world steel “shortage,” the inflation-adjusted prices of U.S. minimill products (rebars and wire rods) fell to 24 percent below their pre-shortage 1971 levels, while the products produced solely by the integrated firms (sheets, plates, etc.) fell by

²⁰ Much of this material is derived from Barnett, Donald F. and Robert W. Crandall, *Up from the Ashes: The Rise of the Steel Minimill in the United States*, The Brookings Institution, 1986.

only 3 percent.²¹ The difference was clearly due to the competition from minimills since the integrated firms' costs would have changed at the same rate in producing long products, sheet products, or tubular products. Each product requires virtually the same raw steel from which it is rolled.

28. By the mid-1980's, the minimills had captured about 20 percent of U.S. production, all but driving the integrated companies from the production of reinforcing rods, wire rods, steel bars, and small structural shapes. The integrated firms continued to dominate the production of sheet, plates, large structurals and tubular products. By the end of the 1980's, however, the minimills had entered the large-structural market and drove the remaining integrated producers, U.S. Steel, Bethlehem, and Inland, from this market by 1994. The most stunning move, however, was the minimill entry into sheet products, beginning with Nucor in 1989.

3. Minimill Competition in Sheet Products

29. For much of the 1970's and 1980's, the minimills had been dismissed as troublesome gnats that had taken the low-valued, long-product markets from the integrated producers, forcing the closure of numerous facilities in the Buffalo, Pittsburgh, Youngstown, and Chicago areas, but not affecting the core of integrated operations -- the sheet products. The closures were of older facilities that the integrated companies had not maintained. Their real bread and butter products were the sheet products used in the automobile, appliances, business-equipment, and container industries.

30. In 1989, Nucor shocked the steel industry by completing the construction of a minimill devoted to the production of sheet products. This plant, located near Indianapolis, utilizes a thin-slab casting process that produces slabs only 1.5 inches thick as opposed to the conventional 8-12 inch slabs. As a result, Nucor could build a hot-strip (rolling) mill with far fewer rolling stands than those used by the larger, integrated companies. More important, Nucor's new plant requires only 1 hour of labor per finished ton of steel. Even the best of the integrated companies use 3 or 4 hours of labor to produce hot-rolled sheet, and the average is probably close to 6. Because Nucor's minimill uses only electric furnaces, a thin-slab caster, and a modest rolling mill, it can be built for only one-fourth of the cost of a new integrated mill. It is not surprising, therefore, that there are now eight such plants in production or under construction. By the end of

²¹ Barnett and Crandall, *op. cit.*, p. 33.

the century, the U.S. may have as much as 20 million tons of minimill sheet capacity to compete for a 55-60 million ton U.S. market and perhaps in some export markets.

31. The effect of this entry has been quite striking. While the minimills still cannot produce the highest grade of sheet used for external surfaces of automobiles or appliances, they have revolutionized the market for lower-grade sheet products, transforming it from an oligopoly with sticky prices to a commodity market with highly-flexible prices. An econometric analysis of the average realized prices of hot-rolled carbon sheet in 1970-94 shows that Nucor's entry reduced prices by about 9 percent. (For details see Appendix 1.)

IV. EVIDENCE OF THE BENEFITS FROM ENTRY IN TELECOMMUNICATIONS MARKETS

32. Similar examples of the effects of entry may be found in the telecommunications sector, where government policies in various countries have traditionally limited entry. We demonstrate the effect of major new entry in three quite different telecommunications markets: wireless telephone (cellular) services in the United Kingdom, long distance services in Chile and long distance services in Connecticut. In these examples, stable non-competitive prices were assured by government control of entry. When entry was liberalized, major new suppliers began offering service, thoroughly disrupting the old order.

A. Competition in the United Kingdom Mobile Communications Market

1. Introduction

33. The UK mobile telecommunications industry got its start shortly after the privatization of British Telecom (BT), the erstwhile landline monopoly carrier. Two licenses for analog cellular service were created in 1982. Service by Cellnet, partially owned by BT, and Vodafone began in January of 1984. These carriers utilized the same technology so their costs were similar and each could rapidly expand capacity by dividing cells. Entry by additional network providers was blocked by government mandate.

Initially, Cellnet and Vodafone were not allowed to market services directly to end users. The retail function was performed by "service providers" and the two carriers provided wholesale network services to them at published prices from which the carriers were not allowed to depart. Moreover, the carriers could own service providers as long as they were operated at arm's length. Apparently, carrier ownership of service providers gave the carriers substantial influence over retail prices. Thus, regulation provided a convenient mechanism by which the

carriers could signal their pricing intentions and by which deviations in price levels could be detected²²

34. The authorization of two additional providers in 1993, Orange and One-2-One²³, provided a remarkable stimulus to the personal communications market, reinvigorating subscriber growth. Prices were substantially reduced for the traditional business subscriber, but the greatest reduction was for the very low volume users.

2. Subscriber Growth

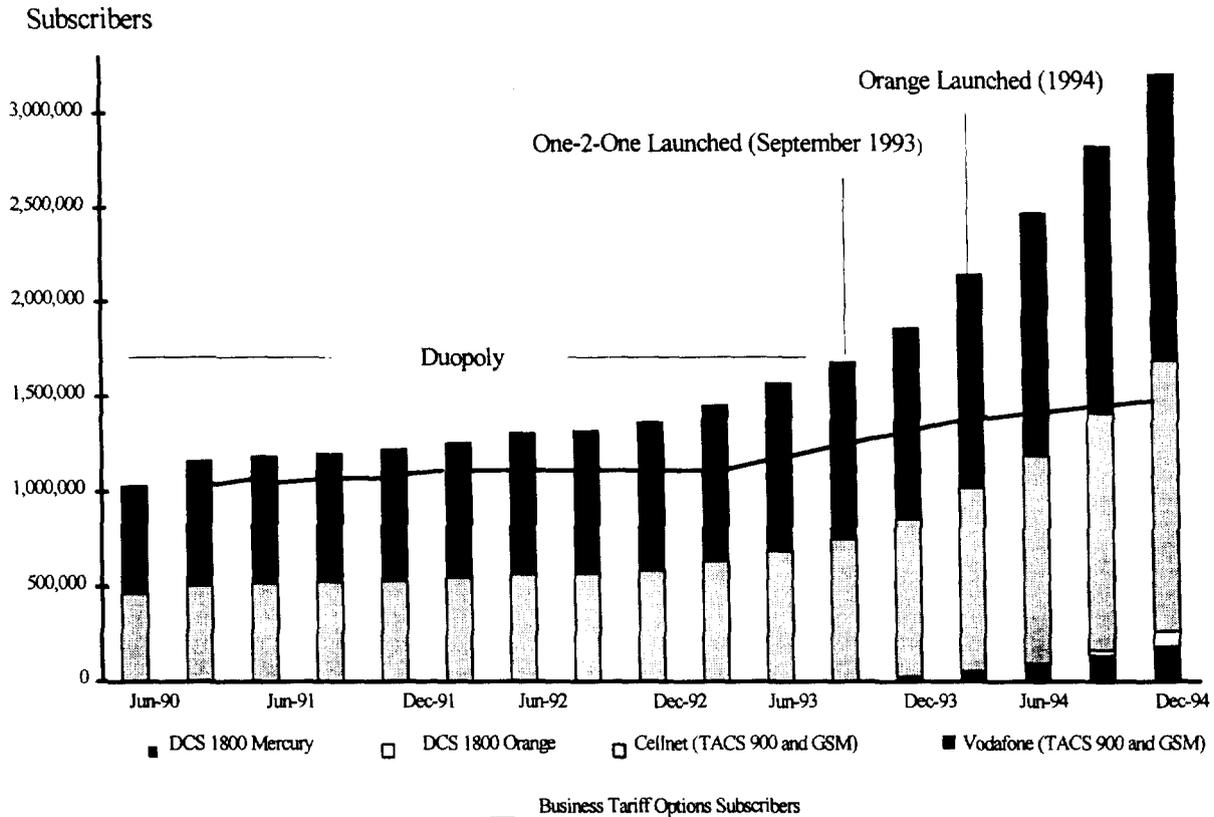
35. By the first quarter of 1991 the growth in new mobile subscribers to the original two UK cellular networks, Cellnet and Vodafone, had dropped to an annual rate of less than three new subscribers per 1000 inhabitants. Shortly after the authorization of entry by Mercury One-2-One in July 1993 but before its actual launch, the two incumbent carriers introduced flexible tariff options aimed at the personal communications market. During that year, 107,000 customers took advantage of Cellnet's "Lifetime" package, while only 4,000 new customers signed up for existing tariff options. (See Figure 1.) That year the rate of subscriber additions jumped to more than 13 new subscribers per 1000.²⁴

²² U.K. Office of Telecommunications (OfTel), *Fair Trading in Mobile Service Provision*, May 1996, section 2, obtained from OfTel's web site: www.open.gov.uk/oftel/oftelhm.htm.

²³ After the new entry, all carriers were allowed to market directly to end users which all have done. The carriers tariff wholesale rates and recommend retail rates. *Ibid.*

²⁴ OECD, *Mobile Cellular Communication: Pricing Strategies and Competition, Information and Communications Quality Report No. 39*, 1996, p. 5.

Figure 1
Cellular Subscribers in the UK



36. By 1994, Cellnet and its service providers were signing up four new customers on personal tariffs to every one customer on business tariffs. For Vodafone and its affiliates the ratio was six to one even though its digital service, launched in December 1991, was beginning to attract significant numbers of business users for the first time.

37. It is interesting to note that although the new entrants, One-2-One and Orange, have not accounted for a large percentage of the increase in subscribers, their entry appears to have stimulated a pricing response and therefore greater subscriber growth by the incumbents. Nevertheless, Flemmings Research projects that 75 percent of the future growth in UK mobile subscribers will be generated by the new personal communications services.²⁵

3. Changes in Pricing

38. Entry by additional competitors in a market can have effects beyond that of simple price reduction. Increased competition stimulates innovation in marketing as well as innovation in

²⁵ Flemmings Research, *Vodafone: Margins Reconsidered*, London, March 3, 1995.

technology. In the UK mobile market one of the more interesting innovations after the 1993 entry of a third cellular provider was “location pricing.” By charging the user different rates depending upon his or her location, One-2-One was able to begin to compete not only with other mobile carriers, but with the wireline networks. In this particular pricing scheme, a user is charged a rate competitive with the wire-based network at one specific location and normal mobile rates everywhere else, allowing a business customer to avoid the fixed costs of an office phone and providing the added convenience of a single contact number for its customers.

39. Analysis of prices in mobile telecommunications markets is complicated by the several components of price: connection charge, monthly fee, and time charges that are usually differentiated between on-peak and off-peak periods. The issue is further complicated in the UK by the pricing innovations introduced after 1992. Rates may differ depending on the location of the caller, location of the call recipient, and whether the call is between two subscribers of the same company. In order to make a simple comparison of prices over time, we construct baskets for two hypothetical users. The first, a “business” subscriber, uses 500 minutes of conversation time per month, 90 percent of which is in peak time. The other, a “personal” subscriber, uses only 20 minutes per month, 90 percent of which is in non-peak time.

40. In 1991, the best package available for the first user was Cellnet which would have cost about £170 per month. In 1994, although Cellnet’s “normal” price had not changed, Orange was offering “Orange Talk 360,” which would cost the business user only £115 per month. Orange’s innovation was to offer 360 minutes per month free for a substantially higher monthly fee. The effective rate per minute was much lower than under “normal” pricing, £0.32 per minute versus £0.47 per minute, a 32% reduction in price.

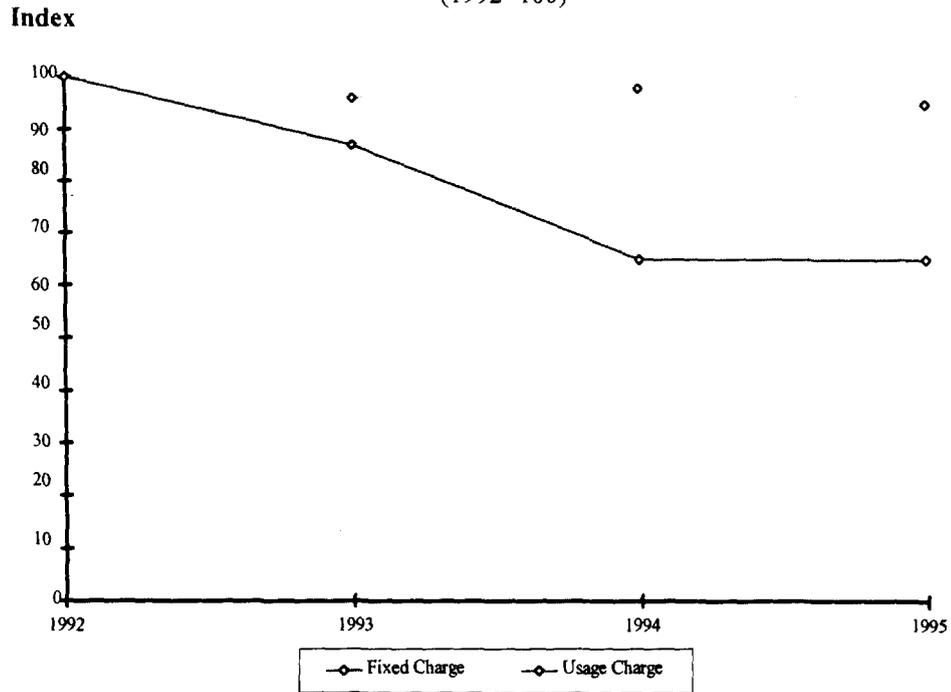
41. For our “personal” user, the price reduction was larger and her optimal choice of plans was the opposite of that chosen by our “business” user. In 1991 our personal user’s 20 minutes of time would have cost about £35 per month. In 1994 the cost would have been £20 per month, a 43% reduction. Orange again offered the lowest cost package, this time with a low monthly fee and higher per minute rates. An OECD study of mobile tariffs for 24 OECD countries finds that UK prices fell about 25 percent between 1992 and 1995 with most of the decline being in the usage charge (see Figure 2),²⁶ but it uses a broader basket of calls than the one we employ.

²⁶ OECD, *op. cit.*, figures 13 and 14, pages 54 and 55.

Figure 2

Mobile Tariff Trends in the U.K.

(1992=100)



4. Conclusion

42. The UK cellular experience shows that increased competition can result in more than price reductions. New entry often leads incumbent providers to search for additional revenues by repackaging their product in ways that suit the needs of new customers. Pricing and service-quality innovations may be as important to economic welfare as simple rate reductions.

B. Long Distance Services in Chile²⁷

1. Introduction

43. Prior to the August 1994 passage of a law liberalizing telecommunications services, the long distance market in Chile was shared by two government franchised monopoly carriers. The

²⁷ The primary source for this analysis is Flemmings Research, *Cia. De Telecomunicaciones de Chile (CTC)*, January 1996.

new Chilean regime is similar to that being implemented in the U.S. in that it opens both the local and long distance markets to entry. The system differs from the U.S. model in that presubscription to one of several long distance carriers is possible only for business customers. All others must elect their long distance carrier each time a call is made. The system minimizes brand loyalty and maximizes price competition since the cost of switching between carriers at any time is very close to zero. It also limits the ability of carriers to differentiate their product through “packaging” of services, since a knowledgeable consumer can always choose the lowest rate for each of his calls.

2. Market Entry

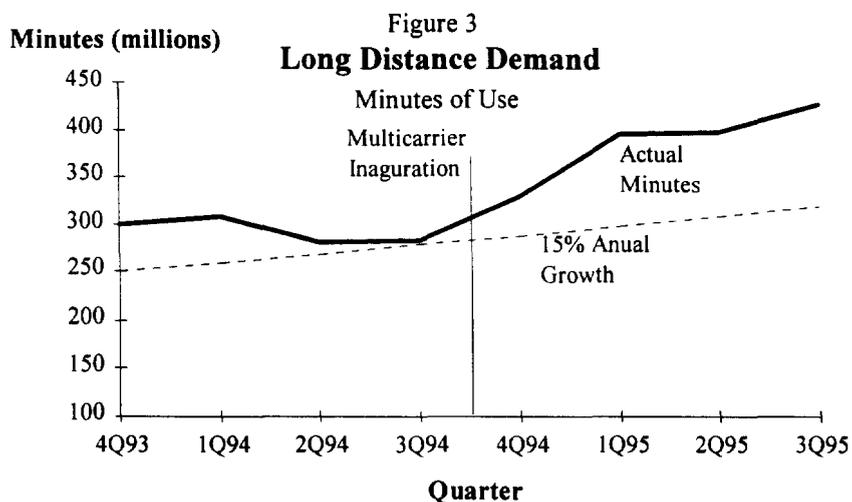
44. Prior to 1994, Compañia de Telefonos de Chile (CTC) was the only integrated telecommunications carrier, owning 95% of the local lines and limited long distance capacity between Santiago and nearby areas of Los Andes. At that time, 85 percent of the domestic long distance traffic was handled by the two long distance carriers, ENTEL and Telex-Chile. By opening both the long distance and local markets to competition and allowing all carriers to provide integrated services, Chile has obviated any tendency of the previous monopoly long distance carriers to restrain price competition. As a result of the liberalization there are now eight companies providing long distance service. Three more have obtained concessions, but have yet to begin service. Competition in long distance is now so intense that many providers have adopted a strategy of becoming integrated providers, concentrating on a particular set of customers rather than a set of services.

45. ENTEL and Telex-Chile have already received 30-year licenses to provide limited facilities-based local services in the Santiago area, a region that contains 60 percent of the national local lines. Consistent with the government’s commitment to competition in long distance, entry concessions are freely granted to anyone making a serious request to operate local or long distance service. The concession requires that service begin within two years and also requires CTC to begin to provide interconnection within six months. Local tariffs are regulated, but only a maximum tariff is set by Subtel, the telecommunications regulator. Although there is no requirement for number portability at this time, the issue is being investigated by the ministry.

3. Long Distance Carrier Selection

46. As noted above, there is only limited contracting between customers and long distance carriers in Chile, and a customer can always opt for any one of the providers. Even with these

restrictions, however, as of September 1995, 38 percent of the domestic long distance traffic was provided under contract at an average discount of 46 percent. In order to generate as much brand loyalty as possible, the highest discounts are provided to businesses that program their PBX systems so that their employees cannot override the management designated long distance provider.



4. Changes in Rates and Demand

47. The effect of the Chilean system on prices has been remarkable. ENTEL, one of the two incumbent long distance carriers, introduced a 75 percent decrease in tariffed rates only two weeks after the implementation of the multicarrier system. By September 1996, average long distance rates had fallen by more than 50 percent since liberalization, and domestic long distance traffic had risen by 51.2 percent. Long distance minutes of use increased dramatically along with the reduction in price. The increase in excess of the normal 15% annual growth in demand (shown in Figure 3) is consistent with a price elasticity of - 0.7, the consensus value for U.S. markets.

5. Consumer Benefits

48. We can easily calculate the increase in consumer surplus due to the price reduction in Chilean long distance services and the associated increase in minutes of use. Since we do not have a complete quarterly series for rates, we assume that the entire change in price took place in

the fourth quarter of 1994 and that the demand increased over the entire four quarter period from 4Q94 to 3Q95. The total increase in consumer surplus over these four quarters is estimated to be \$116 million dollars per year.

49. Chilean consumers will also benefit as competitive providers integrate and tailor their offerings to particular customer bases in order to generate brand loyalty. Providing integrated services is so essential today in Chile that nearly all long distance carriers have plans to compete against CTC in the local loop. Carriers are concentrating on being the integrated carrier of a particular customer base rather than providing a particular service for all customers.

C. The Experience in Connecticut

1. Introduction

50. The opening of the Connecticut long distance marketplace offers an excellent example of what will occur when the current IXCs are faced by large scale competition from a local exchange carrier. In the summer of 1993, both interstate and intrastate long distance services in Connecticut were opened to competition. The change allowed IXCs access to the intrastate marketplace and perhaps more significantly, allowed SNET America, a subsidiary of Southern New England Telecommunications Corporation (SNET),²⁸ to provide interstate long distance service. A year later, in April of 1994, Southern New England Telephone Company, the local service provider, and SNET America were allowed to jointly market their products, giving their customers "one-stop shopping" for telecommunications services.

51. SNET has consolidated its marketing operations and now offers all of its products, including multimedia, cellular and paging services as well as Internet access, under the SNET brand name. It holds a state-wide cable TV license and has undertaken a ten year, \$4.5 billion investment program to install a fiber optic and coaxial cable network capable of carrying voice, video and data simultaneously.²⁹ In February of 1996, SNET announced a new retail business

²⁸ *Annual Report of The Southern New England Telephone Company* for the fiscal year ended December 31, 1993, p. 3.

²⁹ "A Telecom Yankee Defends Its Turf," *Business Week*, October 28, 1996, p. 167.

alignment to position itself in the competitive telecommunications market, and the formation of a marketing services organization responsible for collection, analysis and maintenance of customer data critical to the success of the company's customer and product units.

2. Long Distance Market

52. The Connecticut long distance market was opened to full competition in 1993, and many companies are selling or planning to sell long distance services in the state. By 1995, "over 85 telecommunications providers had received approval from the Connecticut Department of Public Utility Control (CDPUC) to offer "10XXX" or other competitive intrastate long distance services."³⁰ The more interesting events have occurred in interstate services.

53. SNET began reselling Sprint Corp. out-of-state long distance service in April, 1994.³¹ From the time of its entry into interstate services, SNET has used postage stamp prices of \$0.23/minute for peak time calls and \$0.13/minute for off-peak calls. These rates cover calls to any location within the United States with discounts only for calls within the Northeast. Undiscounted AT&T rates for comparable calls are \$0.27 and \$0.17, 17% and 30% above the SNET rates.³² SNET follows the same pattern for intrastate services with prices of \$0.18/minute peak and \$0.10/minute off peak anywhere within the state. SNET offers a number of pricing options including a 25 percent discount on all calls to three customer selected states, volume discounts for business with the option of including the volume of a home-office phone, one second billing and free Internet access. As shown in Table 3, by late 1996 SNET's estimated share of the interstate business in Connecticut had climbed to about 30% on the basis of subscribers.³³

³⁰ The *Annual Report of The Southern New England Telephone Company* for the fiscal year ended December 31, 1995, p. 4.

³¹ "A Telecom Yankee Defends Its Turf," *op. cit.*

³² FCC, *Reference Book: Rates, Price Indexes and Household Expenditures for Telephone Service*, Washington, DC, November, 1995.

³³ "Bell Impact Debated", *Communications Daily*, December 3, 1996.

Table 3
SNET Share of Interstate Long Distance Services

Date	SNET Customers	Access Lines in Connecticut	Share (SNET Customers/Access Lines)
Sep-95	240,000	2,056,000	11.67%
Mar-96	434,000	2,090,000	20.77%
Jun-96	525,000	2,114,000	24.83%
Sep-96	616,000	2,145,000	28.72%

Source: December 4, 1996 telephone conversation with Bette Massick-Colombo, managing director of Bear Stearns & Co. in New York.

54. SNET experienced rapid growth in its long distance service customers at two points in 1996: “(1) In June, when [the] company severed [its] billing agreement with AT&T, it picked up [a] ‘surprisingly large’ number of customers who didn’t want to pay two separate bills. (2) In August, when SNET offered 7 hours of free Internet access to customers who have SNET local and long distance service.”³⁴

55. SNET’s aggressive entry into interstate long distance services has allowed it to capture about 12 percent of AT&T’s Connecticut revenue and reduce AT&T’s share from 60% before SNET’s entry to 50% by October 1996.³⁵ Responding to SNET’s inroads, in May 1996, AT&T offered Connecticut residents a flat 5 cents a minute rate for in-state calls made any time of day, one half of SNET’s quoted in-state off-peak rate and less than one third of its peak time rate.³⁶ One day later SNET countered that promotion by introducing a new plan which included billing all in-state toll calls in one-second increments, rather than rounding the time on each call to the next minute like AT&T and other competitors.³⁷

³⁴ *Ibid.*

³⁵ “A Telecom Yankee Defends Its Turf,” *op. cit.*

³⁶ Connecticut represents only an insignificant portion, about 1%, of AT&T’s overall revenue. AT&T may have responded through the intrastate rate because of the geographic averaging requirement on interstate rates.

³⁷ “A Telecom Yankee Defends Its Turf,” *op. cit.*

56. The effects of competition are readily apparent in SNET's financial results. Interstate and international toll revenues have increased from less than \$1 million in 1993 to more than \$39 million in 1995 as a result of growth in customers. Over the same period intrastate toll revenues decreased almost 23 percent from \$340 million to \$266 million while intrastate minutes of use decreased by only about 4 percent. The decline in intrastate revenue was attributable to a decrease in rates brought about by the introduction of several discount calling plans that provide competitive options to business and residential customers. Accompanying the decrease in intrastate revenues was a 4 percent increase in network access revenues resulting primarily from a 6 percent annual growth in interstate minutes of use and in spite of a 3 percent reduction in rates in August of 1995.³⁸ The rate of increase in minutes of use was greater than the 3.2 percent increase in access lines, indicating a significant increase in the minutes of use per local access line.

3. Conclusion

57. The entry of the local exchange carrier into the long distance market in Connecticut has resulted in effective reductions in intrastate toll rates of at least 10 percent per year.³⁹ The AT&T 5 cent intrastate rate represents an even greater discount. The response of AT&T shows that it was willing to reduce rates substantially in order to maintain its market share. It may also indicate that it is willing to reduce its interstate rates if faced by widespread competition from large LECs. The increase in access revenues, *in spite of rate reductions*, shows that LECs do indeed have an interest in stimulating growth in the long distance market.

V. THE CONDITIONS FOR TACIT PRICE COORDINATION IN THE U.S. INTERLATA MARKET

58. In section II, we detailed the necessary conditions for supracompetitive prices in an oligopolistic industry. These conditions apply to U.S. long distance as we show below. First, each of the major IXCs' capacity is large and each can make capacity additions at relatively low cost.⁴⁰ InterLATA providers also often agree to provide backup to their competitors in case of

³⁸ *Proxy Statement and 1995 Annual Report of The Southern New England Telecommunications Corporation*, for the fiscal year ended December 31, 1995, p. 23.

³⁹ Based on reductions in SNET's intrastate toll revenue of 13.1% and 8.9% in 1994 and 1995 with reductions in minutes of use of 2% in each year.

⁴⁰ Brand, Hallas, Jamer, Orbino, Rom, Rustwick and Wild (Brand, et. al.), *An Updated Study of AT&T's Competitors' Capacity to Absorb Rapid Demand Growth*, April 19, 1995.

outages. Second, costs are similar or regulatory intervention keeps them similar. Third, price elasticity of demand is less than unity. Finally, prices are known and all three major firms know their rivals' capacity.⁴¹

59. In interLATA long distance prior to 1995,⁴² prices were often set above the competitive level to encourage investment or to cross-subsidize other services. The supracompetitive price structure in long distance has persisted since 1989-90 as MacAvoy has shown, and margins have increased.

A. Capacity

60. One of the primary goals of the AT&T divestiture was to establish a competitive long distance market. In order to encourage new entrants to the market, primarily MCI and Sprint, AT&T was restrained from engaging in price competition. Prices and access charges were set in a manner that would encourage investment by both MCI and Sprint. This policy appears to have worked. Between 1985 and 1995 MCI and Sprint increased their combined fiber miles from 266,300 to 1,034,600,⁴³ a level approaching the 1,417,600 controlled by AT&T.⁴⁴

61. The technology used by the IXCs has also made a substantial contribution to establishing the conditions favorable to tacit coordination. At the time of divestiture it was recognized that optical fiber is the most efficient method of transmission. Installation of fiber-optic cable is relatively expensive relative to the cost of the cable itself. It is therefore often prudent to install more cable than is required to meet current demand, deferring full provisioning of the fiber-optics until it is actually required. These characteristics induced the installation of substantial excess fiber capacity. In 1995 only 47.3 percent of AT&T's installed cable and 77.1 percent of

⁴¹For example, in attempting to prove non-dominance, AT&T was able to estimate not only its two rivals capacity but what proportion was excess, and the costs and time to bring excess capacity on stream. See *In the Matter of Motion of AT&T Corp. to be Reclassified as a Non-Dominant Carrier* (AT&T Non-dominance Order), FCC at 95-427, released October 23, 1995.

⁴² AT&T was declared non-dominant in 1995 but all IXCs were still required to make their rates publicly available. *In the Matter of Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefore*, CC Docket No. 79-252, Fourth Report and Order, October 19, 1983.

⁴³ If MFS-Worldcom is included, the total is 1,300,800 miles.

⁴⁴ FCC, *Fiber Deployment Update*, 1995, Table 2. AT&T's 1985 fiber miles were 136,200, less than that of MCI and Sprint.

Sprint's was "lit", i.e. fully provisioned and operational, and much of that was no doubt utilized at less than full capacity.⁴⁵

62. The rapid development of fiber-optic transmission technology has also contributed to excess transmission capacity by allowing carriers to increase their effective capacity by simply upgrading the electronics in their previously-deployed cable. As AT&T asserts, "[t]he 15% of AT&T's demand that could be handled instantaneously does not require any new investment, as well as the additional 17% of AT&T's 1993 demand that could be handled within 3 months. To handle approximately 63% of AT&T's 1993 demand within 12 months, an investment by competitors of approximately \$660 million would be required. Finally, the total investment [necessary] to handle [all] of AT&T's 1993 demand is approximately \$2.2 billion."⁴⁶ These conditions would certainly seem to indicate that the participants' capability for retaliatory price reductions is not substantially restrained by a lack of capacity.

⁴⁵ *Fiber Deployment Update*, 1995, Table 3. Numbers for MCI are not available.

⁴⁶ Brand, et. al., *op. cit.*