

### III. The Market for Long-Haul Fiber Capacity

7. Fiber optics made possible the "bandwidth revolution" and is participating in the phenomenal growth of high-speed long-distance transmission of data of many types. Transmission of long-distance calls was an important share of total transmission as fiber networks were first built, but the explosion of growth currently underway comes almost entirely from data. It is estimated that by 2001, 80 percent of business spending for long-haul transmission will be for data and 20 percent for voice.<sup>1</sup> Fiber capacity has become a commodity. Because purchasers can also become sellers, it is impossible for sellers to discriminate among purchasers.

8. Fiber circuits are used in two ways. For standard telephone calls, a circuit of adequate bandwidth is dedicated to a call for as long as the call lasts. Even if nobody is speaking, the circuit is committed to the call. For data transmission, it is generally more efficient to place the data in packets. Circuit capacity is used to send the packets only as they are transmitted; the capacity can be used to transmit data for other users between packets. The Internet, in particular, relies exclusively on packet switching. Currently, large amounts of data move over voice circuits, despite the inefficiency. Data and fax modems convert data into a form that can be transmitted over voice circuits. Larger businesses are in the advanced stages of converting data transmission to packet-switched networks. And even the smallest user can take advantage of packet switching over the Internet.

9. The fiber and much of the associated electronics that are used in conventional switched long-haul fiber networks are the same as for packet-switched networks. To convert exiting fiber from one use to the other, only the electronics for switching and routing need to be changed. Network operators are searching for ways to move voice traffic onto packet-switched networks, to take advantage of their superior efficiency and to avoid the inefficiency of two separate types of fiber capacity. Qwest has indicated that it expects to solve the remaining problems in this area and to offer voice service on its packet-switched network within the year.<sup>2</sup>

10. Operators of fiber networks purchase the rights to lay their cables along railroad tracks, electric utility lines, and similar locations. Their capacity can be measured in various ways.

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<sup>1</sup> Andrew Kupfer, "Transforming Telecom: The Big Switch" *Fortune*, October 13, 1997

<sup>2</sup> John Keller, "Qwest Communications to Offer Calls for 7.5 Cents a Minute Around the Clock," *The Wall Street Journal*, December 17, 1997.

First is route miles. Along a given route, the operator may lay several fiber cables or sheaths, each containing several dozen fibers. Thus sheath miles is a second measure and fiber miles is a third measure. Finally, modern fiber has a higher bandwidth or information carrying capacity. A final measure is terabit-miles per second, generally measured as miles of DS-3 equivalents. Because a large fraction of the cost of building a fiber network is the cost of the conduit carrying all of the sheaths, route-miles are a relevant measure. But the other measures help understand differences among fiber networks. Newer networks tend to have more fibers in the conduit and higher transmission rates on each fiber. For example, Sprint, with an older network, has 20 fibers at the typical point in its network, whereas Qwest has 44 and Electric Lightwave has 52. Moreover, advances in electronics now enable a single strand of fiber to carry huge volumes of traffic, even more than previous generations of fiber. Capacity to be installed in the next two years will have even more fibers and carry even more data per fiber.

### A. Sellers and Shares

11. Table 1 reports available data on route miles in fiber optic networks in the United States at the end of 1996.

**Table 1. Data on Fiber Optic Networks**

<i>Owner</i>	<i>Fiber miles, 1996 (thousands)</i>	<i>Percent</i>
AT&T	1259.0	42.7
MCI	655.4	22.2
Sprint	468.7	15.9
WorldCom	276.9	9.4
QWest	113.3	3.8
IXC	70.5	2.4
Electric Lightwave	37.7	1.3
LCI	24.7	.8
Others	43.4	1.5
Total	2949.6	100

Source: Jonathan M. Kraushaar, *Fiber Deployment Update End of Year 1996*, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission

12. Although the current fiber market is supplied by just four significant players, the situation will change rapidly over the next two years. At least four additional firms have announced credible plans to build national networks—IXC, Qwest, Williams, and Level 3. Qwest and IXC have already built substantial portions of their networks. Each plans to build a national fiber network close to the size of, for example, MCI's current network of 23,000 route miles. Because these new networks will use the most advanced designs, they will have much more capacity than MCI has today. They will deploy two or three times as many fibers per sheath and use new fiber technologies that substantially increase the bandwidth of each fiber.

13. In addition to the large new entrants in the long-haul transmission market, there are significant sellers of regional fiber capacity. For example, GST deploys about 3,000 route miles of fiber capacity that has evolved out of its role as a local access provider. GST and others plan to expand this type of capacity.

14. Rather than building additional long-haul fiber capacity by itself, MCI now joins construction consortiums. On the strength of the commitments of MCI and other initial customers to use the new capacity, the consortium can obtain financing and proceed with construction on the premise that buyers for the remaining capacity can be found as time passes. Other long-distance carriers are pursuing similar strategies. As in other competitive markets, only specialists can earn market returns in the fiber construction market.

## B. Barriers to Entry

15. The current pace of new entry suggests the absence of significant barriers to entry. Even while I was writing this declaration, another substantial new entrant was announced, Level 3 Communications, Inc.<sup>3</sup> Like the other new entrants, Level 3 is planning to use its new capacity for packet-switched transport. Nonetheless, its entry and that of others building similar capacity has significant implications for long distance. As I mentioned earlier, circuit switched long-haul fiber capacity, build to carry voice traffic, actually carries many data call such as faxes. The new entrants expect to divert that traffic to their much cheaper packet-switched networks. As a result, the price of voice capacity will fall as it becomes redundant. In addition, a number of firms such as Qwest are planning to offer voice service over packet-switched networks.

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<sup>3</sup> "Ex-MFS Managers Plan Global Network Based on Internet, Rivaling Phone Firms" *Wall Street Journal*, p. A-3, January 20, 1998.

16. The new entrants seem to have no difficulty in assembling the inputs needed to build multi-billion dollar networks. Level 3 is headed by the executive who built MFS before it was purchased by WorldCom and Williams by the executive who built WilTel before its acquisition. Level 3 has been capitalized with \$3 billion in cash by its backer, Peter Kiewit Sons, Inc.

### **C. Returns to Scale**

17. Some economists have concluded that the basic transmission technology of modern long-distance service—fiber optics—has high fixed and low variable costs. In other words, according to this view, a supplier of transmission capacity must make a large investment to be in business in the first place, but can then increase its volume of business without adding much capacity or incurring additional costs that rise with volume. It would be hard for competition to thrive if smaller firms were at a disadvantage relative to larger ones because of inefficiently small scale

18. The evidence on entry reviewed earlier suggests that firms have no difficulty achieving efficient scale. The prospects of new entrants, who are currently much smaller than the incumbents, appear to be excellent. Extremely rapid prospective growth in the transmission of data also suggests that any concerns about scale will disappear rapidly.

### **D. The Pattern of Strategic Interaction among Rivals**

19. Oligopoly theory stresses that strategic interaction is a major determinant of the degree of competition among a limited number of sellers. When one firm considers cutting its price to attract a customer, that firm's concern that its rivals might cut their prices in response may moderate its price cut. The inhibition is greatest when prices paid by each customer are known to all sellers and each seller knows the prices that its rivals will charge before the customers do. The inhibition is least when each transaction is made secretly and individually, and where the customers are sophisticated in seeking the lowest possible price.

20. Judged by this standard, the market for bulk fiber capacity is one where competition works well even when there are only a few sellers. First, the purchasers (long-distance carriers, Internet service providers, and operators of data networks) are all sophisticated businesses making important transactions. Their livelihoods depend on getting the best possible terms in the capacity market. They can and do press hard to push price down close to cost.

21. Auction theory provides a useful benchmark for understanding competition under these conditions, though I do not believe that this market attains competition in exactly the sense of the theory.<sup>4</sup> If a purchaser of bulk capacity sought bids from suppliers and permitted rebidding, then bidding would continue until the seller with the lowest cost had bid just below the cost of the seller with the next higher cost. At any higher price, another bidder would be willing to make a new slightly lower bid to get the business.

22. Alternatively, if purchasers solicit a single round of bids, the Revenue Equivalence Theorem of auction theory predicts that the buyer will emerge, on the average, with as good a price as in an auction with rebidding. Although an auction with a single round does not induce any single bidder to bid all the way down to that bidder's cost, the desire to underbid others in the single round turns out to replace the effects of that process, on the average.

23. If all sellers have the same cost, then bidding theory implies that price will be forced down to cost as long as there are two or more sellers. In terms of oligopoly theory, this means that the market will be in Bertrand equilibrium, with price equal to cost. This line of thought emphasizes the value that purchasers derive when one seller begins to compete against a monopolist—price falls all the way from a high monopoly level to the perfectly competitive level.

24. Although the bidding or Bertrand model is too simple to describe the market for long-haul fiber capacity, it calls attention to features that make the market work well with only a relatively small number of significant sellers. Buyers, armed with a reasonable guess about cost, can shop for bids from all the sellers. If necessary to induce the lowest possible proposal, the buyers can promise to keep the terms of the deal completely secret. The primary factor that inhibits low pricing in other markets—that a firm setting a low price to a particular buyer will sacrifice revenue from other purchasers or induce price cuts by its rivals—is absent when each deal is separately and secretly dickered.

## E. Effects of the Merger

25. WorldCom's share of long-haul fiber capacity in 1996 was 9.4 percent and MCI's was 22.2 percent based on fiber miles. The immediate effect of the merger in 1996 would have

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<sup>4</sup> See R. Preston McAfee and John McMillan, "Auctions and Bidding" *Journal of Economic Literature*, vol. 25, pp. 699-738, 1987. Avinash Dixit and Barry Nalebuff, *Thinking Strategically*, New York: W.W. Norton, provide a highly readable less technical discussion of these issues.

been to raise the HHI by about 420 points. According to the Merger Guidelines, this amount of increased concentration calls for a full analysis of the competitive effect.

26. The factors listed earlier in this Part suggest to me that the merger would have essentially no effect on the prices actually paid by long-distance companies and other purchasers of bulk fiber capacity. First, the absence of barriers to entry means that continuing entry keeps price close to the competitive level. As recent experience has shown, there are entrepreneurs poised to build new capacity along any route and in any part of the country where the capacity can be sold at a small profit. Financial markets are generous to firms with plans to enter the rapidly expanding market for bulk fiber capacity.

27. The second important factor behind my conclusion is the nature of the market as discussed in the previous section. If WorldCom and MCI join forces, purchasers will still have a number of established sellers and a growing number of eager new entrants who are aggressively soliciting business. Because each deal is separately dickered and can be kept secret, and the purchasers are sophisticated businesses making key decisions when they purchase capacity, the factors that may elevate price when there are only around 5 players in a standard oligopoly are inoperative. Instead, even with only that number of sellers, the deals that purchasers can make are just as good with 5 sellers as with 6. Moreover, standard thinking, focusing on counting players of substantial size, omits the effects of the countless other sellers in the actual market, who also act to keep price close to the competitive level.

28. Although I believe that the merger would have essentially no effect on the degree of competition in the bulk capacity market, I nonetheless believe that continuing entry will be good for the purchasers of capacity and thus good for the consumer of long-distance services. The entrants are most likely to have the best technology and the lowest costs. As I noted earlier, auction theory teaches that the lowest-cost sellers have dominant roles in determining the outcome, even when the majority of the bidders have higher costs. The higher-cost sellers have to squeeze their margins even more to get the business, or they have to face up to the market's dictate that they write down the value of obsolescent plant in order to keep it in operation. Thus the price of bulk fiber capacity will be set by the efficient new entrants, not by the capacity currently in place and under the control of the two merging companies.

## IV. The Market for Long-Distance Service

29. In this Part of the declaration, I examine the current state of competition in long distance and the effect of the proposed merger on competition in that market. How strong is existing competition? Would the merger result in diminished competition? As noted in the previous Part, my analysis of long-distance service is based on the evidence that there is a fluid, substantially competitive market for bulk long-haul fiber capacity. In addition, long-distance carriers purchase switching in a competitive market. I do not analyze that market further in this declaration because I am not aware that there have been any suggestions that the proposed merger would affect competition in switching. With respect to local access, FCC regulations govern the terms under which regulated local carriers provide access, so that it is available in perfectly elastic supply at the regulated price. Although I believe that the merger will have favorable effects on the pricing of local access to long-distance carriers, I will not consider that topic in this declaration.<sup>5</sup>

### A. Role of the Market for Long-Haul Fiber Capacity

30. To be more precise about the upstream market for transmission capacity, the key element is that the price paid by a long-distance carrier for incremental capacity be close to the cost of supplying it. Although this condition would be satisfied under competition, it is also consistent with some amount of market power among sellers of bulk capacity. The reason is that the deal between a supplier of fiber capacity and a long-distance seller can use two-part pricing. It is mutually beneficial in striking such a deal that the provider of capacity extract the benefits of whatever market power it possesses through the fixed part of the charge. And, in fact, deals made between businesses generally do have provisions—such as quantity discounts—that amount to two-part pricing.

31. In the presence of efficient two-part pricing—or standard pricing under competition— independent long-distance carriers can compete on an equal footing with vertically integrated rivals. Both can purchase additional capacity at its cost. The fact that, in today's market, vertically integrated carriers coexist with firms that specialize either in providing long-haul capacity or in providing long-distance service supports the premise that there is a smoothly functioning market for bulk capacity where the pricing of incremental capacity is close to cost.

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<sup>5</sup> See the accompanying declaration of Dennis W. Carlton and Hal S. Sider, Part II.

## **B. Method of Analysis**

32. I have carried out a study of competition in the long-distance market using standard economic analysis. I find that the long-distance industry is substantially competitive. The industry's performance has been exceptional since divestiture in 1984—long-distance carriers have delivered steady improvements in service at continually declining prices.

33. The long-distance market in the United States is served by four larger carriers—AT&T, WorldCom, MCI, and Sprint—together with numerous others who offer services on partial national networks, facilities leased from other owners, or who resell services purchased in bulk from other carriers. In my opinion, the evidence shows strongly that these carriers compete rather than collude. The result of this competition has been benefits to the consumer in the form of substantial reductions in the price of long-distance service as well as numerous technical improvements and the development of new services.

34. The primary evidence in favor of the hypothesis of strong competition and superior performance is the behavior of prices in the long-distance market. Proper measures of price—ones that take appropriate account of the shift toward highly favorable bargain pricing plans—show huge reductions in prices. They also suggest that competition has brought the price of long distance close to the level of cost. The structure of the industry is conducive to strong competition. There are no important barriers to entry. Because there are fluid markets for basic long-distance capacity, entry can take many different forms.

## **C. Performance of the Long-Distance Industry**

35. Increasing competition in the long-distance industry has delivered important benefits to the American economy. Traditionally, long-distance service was available only from AT&T. Regulation prevented other companies from offering long-distance service. During the 1960s and the 1970s, MCI waged a successful battle to obtain the right to offer service in competition with AT&T, but there was still little rivalry in the industry by the early 1980s.

36. Divestiture in 1984 started the transition to competition in long distance. The mid-1980s saw an explosion of service by long-distance carriers other than AT&T. During this time, MCI and Sprint expanded nationwide networks and gained acceptance as alternatives to AT&T. Divestiture was successful at stimulating major new investments with corresponding increases in market shares by new entrants to the long-distance market.

## D. Prices for Long Distance

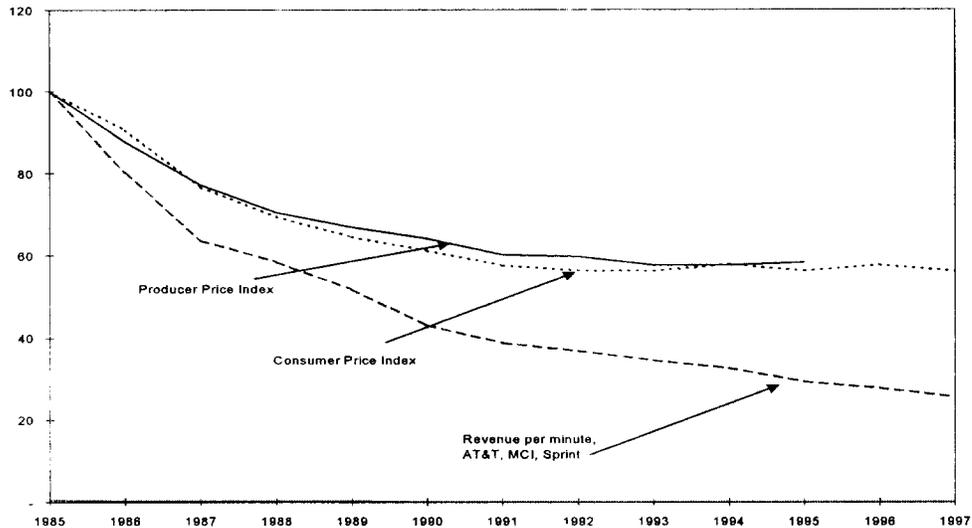
37. The public has gained substantially from this structural transformation of the long-distance industry. The primary indicator of these gains is the sharply declining price of long-distance service. Prior to the introduction of competition in long distance, the price was stable in relation to prices in general. With the advent of competition, particularly with the divestiture of long-distance services from local telephone companies at the beginning of 1984, and the provision of equal access to competing long-distance carriers, the price of long-distance service fell precipitously.

38. In my opinion, the best available way to measure the price of long distance is by revenue per minute, the ratio of toll call revenue (billed by the minute) to the number of billed minutes. Although revenue per minute is not a perfect measure of the price of long distance, it is the best available measure.<sup>6</sup> Figure 1 shows revenue per minute for AT&T, MCI, and Sprint, stated in 1996 dollars, adjusted by the GDP deflator. To avoid mix effects, these calculations exclude international calls. Figure 1 shows that revenue per minute has declined substantially and that the declines are continuing to occur.

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<sup>6</sup> One of the potential problems in revenue per minute as a measure of prices is mix effects—revenue per minute could rise even though each type of call was cheaper per minute because customers were making a larger fraction of expensive calls, such as credit-card calls. I looked at confidential MCI data by detailed product category to determine that mix effects are a minor influence on MCI's revenue per minute; essentially all the decline comes from lower prices for calls and none from changes in the mix of calls. It is entirely reasonable to conclude that mix effects are also a minor influence on revenue per minute industry-wide.

Figure 1. Index of Revenue per Minute, Relative to the General Price Level



39. Three factors were responsible for the sharp decline in the price of long-distance service relative to the general price level over the past decade: competition made possible by divestiture, improvements in productivity, and declining access charges paid to local telephone companies.

### E. The Role of Declining Access Charges in Lowering Long-Distance Prices

40. Long-distance carriers pay local telephone companies access charges for carrying long-distance calls from the caller's business or home to the point where the long-distance carrier picks up the call. They pay a second access fee to a local telephone company to deliver the call to its ultimate destination. During the 1980s, the FCC imposed important changes on the structure of access fees—early in the decade, most of the fee was imposed as a per-minute charge on long-distance calls, whereas by the end of the decade, part of the fee had been shifted to a fixed monthly charge per telephone line. These access fees have declined substantially since 1984, but long-distance carriers still pay about 40 percent of their revenues to local telephone companies as access charges.<sup>7</sup> The FCC has recently ordered further reductions in access fees.

<sup>7</sup> *Telecom Service - Long Distance*, Merrill Lynch & Co., Global Research & Economics Group, 1996, Table 6.

41. The Bells have frequently argued that long-distance rates have fallen by less than the amount that access charges have fallen. In this section I will show, on the contrary, that long-distance prices have fallen, relative to the general price level, even when access charges are netted out. Competition and productivity growth have been important factors in the improved performance of the long-distance industry over the past decade.

42. The table below shows gross revenue per minute for the three largest carriers on the top line, stated as 1996 dollars per minute. The table also shows the industry average access charge per minute of call, again in 1996 dollars per minute.<sup>8</sup> The average access charge fell from 22 cents per minute in 1985 to just under 7 cents in 1997 (in 1997 dollars). Revenue per minute after subtracting access costs fell from 30 cents per minute in 1985 to less than 7 cents in 1997 (in 1997 dollars), a decline of 78 percent. Claims that the only reason for the decline in long-distance prices is the declining cost of access are incorrect.

<i>Year</i>	<i>Revenue per minute, 1996 dollars</i>	<i>Access charge per minute, 1996 dollars</i>	<i>Revenue per minute net of access charges, 1996 dollars</i>
1985	0.528	0.217	0.311
1986	0.423	0.197	0.225
1987	0.336	0.164	0.172
1988	0.309	0.145	0.165
1989	0.273	0.125	0.148
1990	0.227	0.104	0.124
1991	0.205	0.091	0.114
1992	0.195	0.085	0.109
1993	0.182	0.081	0.101
1994	0.172	0.079	0.093
1995	0.155	0.074	0.080
1996	0.147	0.068	0.079
1997	0.135	0.067	0.068

<sup>8</sup> This calculation is based on the assumption that there are two minutes of access per minute of call (approximately one minute on the originating end and one minute on the terminating end). It also adjusts for call setup time and for access by means other than the local switched network.

43. The table shows that the fall in the price of long-distance service net of access charges occurred in both the period immediately following divestiture and in more recent years. Although falling access charges were an important factor in the substantial decline in the price of long distance over the period, other factors were also significant, reflecting the successful performance of the competitive long-distance industry in the United States.

44. Jim Lande of the Industry Analysis Division, Common Carrier Bureau of the FCC, has made calculations of revenue per minute for interstate direct dialed calls.<sup>9</sup> His results are:

<i>Year</i>	<i>Revenue per minute, net of access charges, for a direct dialed call in 1997 dollars</i>
1992	\$0.086
1993	0.083
1994	0.078
1995	0.071
1996	0.073

Net of access charges, revenue per minute in 1997 dollars fell by 15 percent over the three years from 1992 to 1995. Lande's results strongly confirm the hypothesis that declining access charges were only one of the factors leading to the declining price of long distance.<sup>10</sup> The growing efficiency and improving competitive performance of the industry also made a large contribution, as is revealed by the data calculated net of access charges.

45. Most long-distance carriers sell their products under various pricing plans. Among these is a higher rate called the standard rate. This rate is charged to a customer who signs up for service without asking about the rates that are available and without being attracted by the promotion of a better rate. Standard rates are in the range of 28 cents per minute during the day and 18 cents in the evening; they are also slightly differentiated by distance. These rates have the same role that "full fares" have in the airline business—they are paid for a small

<sup>9</sup> "Telecommunications Industry Revenue: TRS Fund Worksheet Data," December 1996.

<sup>10</sup> Differences between Dr. Lande's calculations of revenue per minute and mine include the following: (i) he uses only DDD calls; I include all calls; (ii) he uses only interstate data; I use interstate and intrastate data; (iii) he uses actual minutes; I use billed minutes; (iv) he uses average access charges; I use marginal access charges; (v) he includes all carriers, I include only AT&T, MCI, and Sprint.

fraction of the total volume of sales by people who cannot or will not arrange their lives to receive much better prices. The standard rates of AT&T, MCI, and Sprint are quite similar and tend to move together. They rose somewhat in the past few years, most recently in November 1996, and then fell in July 1997, when there was a decline in access charges.

46. Most long-distance service is purchased at far better prices than the standard rate, just as a large fraction of all airline travel is at fares that are far below the full fare. In the airline market, better fares are available in two ways: First, businesses negotiate special fares directly with airlines. Second, for individual travelers, airlines quote highly advantageous fares for travelers who take the trouble to make their arrangements in advance. Full fare transcontinental travel costs about 35 cents a mile whereas the cheaper fares are around 9 cents per mile. Similarly, the long-distance caller who seeks out a good deal can make calls across the country for 10 cents a minute. And the price paid by businesses can be pushed down even more if a way can be found to avoid the access charges of around 5 cents that would otherwise place an absolute floor on long-distance prices.

47. Here is a list of some of the deals that long-distance carriers currently offer for interstate calling for residential customers.

<i>Carrier</i>	<i>Name of plan</i>	<i>Terms</i>
AT&T	One Rate Plus	10 cents per minute at any time, \$4.95 per month
MCI	MCI One Savings	10 cents per minute evenings and Saturdays, 5 cents on Sundays, 25 cents per minute daytime, \$5 minimum.
Sprint	Sprint Sense Day Plan	15 cents per minute at any time, no fee, no minimum purchase
WorldCom	Home Advantage Easy Plan	13.9 cents per minute at any time.
Qwest		7.5 cents per minute, 24 hours, using Internet-like transmission. Requires access code and limited to a few cities.
Unidial		8.9 cents per minute at any time
Telco Communications	Great Rate Plan	10 cents per minute off-peak, 15 cents per minute peak, no minimum
	Just Ten Plan	10 cents per minute all times, \$3 minimum
VarTec Telecom	Dime Line Plan	10 cents per minute all times, 3 minute minimum, 5 cents a minute on every other call under 10 minutes, \$5 minimum
Frontier	HomeSaver	10 cents per minute off-peak, 25 cents per minute on-peak, no fee, no minimum

Source: Carriers and John Keller, "Qwest Communications to Offer Calls for 7.5 Cents a Minute Around the Clock," *The Wall Street Journal*, December 17, 1997.

These rates are substantially lower than rates available even a year ago

48. Almost 80 percent of MCI's customers use plans other than the standard rate.<sup>11</sup> Many of the advantageous plans described above are available to all users, regardless of their level of usage. Moreover, the availability of these plans is a frequent discussion point in the media. Some of the lowest rates are available without presubscription—you can take advantage of

<sup>11</sup> Based on MCI data. See elaboration in the next section.

the 10 cents per minute off-peak rate and 15 cents per minute peak rate from Telco Choice 10297 by dialing their access code, 10297, without any preliminary arrangement.

#### F. Prices Paid by Low-Volume Long-Distance Customers

49. The Bells have argued that the existence of low-price plans creates an incorrect impression of competition because most customers do not receive the benefits from some of these plans. The flat-rate bargain plans that provide the most attractive residential prices today are not volume based. Some are open to all users. Others have relatively low fixed costs of \$3 to \$5 or similar minimum purchase requirements. The breakeven point for a family that makes half its calls at nights and on Saturdays, and the other half on Sundays, under the MCI One Savings plan, relative to paying 25 cents per minute, is only 20 minutes of calling per month.

50. Most residential customers take advantage of flat-rate low-price plans. I have studied data from MCI on the distribution of customers and revenue across pricing plans, for residential customers. About 22 percent of MCI's residential customers pay the standard rates—the remaining 78 percent use plans with lower rates. Not surprisingly, those using the standard rate tend to spend little on long distance. In the month I examined, 12 percent of MCI's residential revenue came from customers using the standard rate. The remaining 88 percent of MCI's residential business was with customers using more advantageous price plans. Of those that pay standard rates, 46 percent have bills less than \$1.50 per month in an average month—corresponding to about 6 minutes of long-distance conversation.

51. The Bells' experts often cite contrary data from PNR and Associates that 65 percent of residential customers pay standard prices rather than using lower-price plans.<sup>12</sup> First, a substantial number of these customers, perhaps as many as one-fourth, do not subscribe to a low-price plan because they have no toll usage.<sup>13</sup> More importantly, the PNR sample is badly biased, through its construction, in favor of smaller users.

52. PNR wrote to 25,000 households requesting copies of their local telephone bills, long-distance bills, cable TV bills, and cellular bills. PNR paid \$5 to each responding household. PNR received telephone bills from 8,731 households, for a response rate of about 35

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<sup>12</sup> *Declaration on Behalf of BellSouth by Richard L. Schmalensee*. "BellSouth's Prospects for Success in the InterLATA Market," filed in CC Docket No. 97-208, at 7, August 18, 1997.

<sup>13</sup> PNR and Associates provided MCI with promotional documents for a program known as Bill Harvest II. The discussion in this paragraph and the next are based on these documents.

percent.<sup>14</sup> Whenever a survey is performed, an analysis of non-respondents must be done to insure that the respondents are not biased, particularly when the response rate is this low. No such study has been done to validate the PNR sample, to my knowledge. There is a presumption that the response rate will be highest in lower-income households, to whom the \$5 payment is more significant. No conclusion about long-distance customers in general can possibly be drawn in view of the bias.

53. The bias from selective response appears to be serious. MCI has carried out a comparison of data from PNR on purchases from MCI with similar data on purchases by all of MCI's customers. According to PNR, about 54 percent of MCI residential customers spent \$10 or less on long distance. In the MCI data, the corresponding fraction is only 32. Plainly, the highest usage customers were under-represented in the sample.

### G. Issues in the Measurement of Cost

54. Economists generally agree that the relation between price and marginal cost is useful for understanding issues about competition and performance. But making valid inferences about industry performance from the relation of price to marginal cost is a challenge. Although the textbook perfectly competitive seller sets its marginal cost equal to price, it is difficult to relate departures from that equality into a suitable measure of performance. An industry could have marginal cost below price but still be workably competitive. In such an industry, the potential entrant would not perceive profit. The hardware costs of the network or the prices paid to bulk capacity suppliers can be measured, but appear to be a small part of the total cost. Access charges are the single largest component of cost and are easy to measure. The remaining 5 cents or so of cost are in areas such as customer service, billing, and other office-based activities that are hard to measure on a marginal basis.

55. One approach to measuring cost is to look at the very best prices charged for different long-distance services. Long-distance transport sells for about 1.5 cents per minute, which is in line with estimates of network costs. It appears that the best available price for switched long-distance for offices or homes is a little below 10 cents per incremental minute, about 4 cents above access charges.

56. Despite the difficulties in measuring marginal cost accurately, I believe that the price-cost margin has declined substantially in the long-distance industry in the past decade. This

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<sup>14</sup> *Ibid.*, PNR information about Bill Harvesting II.

decline is consistent with increasing competition. The decline has reached the point that the industry today is not far from the limit where price just covers marginal cost.

## **H. Cost Differentials among Customers and Corresponding Price Differentials**

57. It is well known that customers with higher volumes pay less per minute for long-distance service. Some economists have been concerned that these price differences arise from the type of price discrimination that occurs when sellers have market power. Alternatively, the price differences could reflect cost differences. Pure price discrimination, not based on cost differentials, will not exist in a textbook perfectly competitive market. Price differences based on cost differences will occur even in perfect competition. In the long-distance industry, there is good evidence that favorable prices promoted mainly to high-volume customers (a common form of price differential in the industry) are the result of cost differences rather than pure price discrimination.

58. The costs that a long-distance carrier incurs to serve an additional customer for an additional month are substantial. A major component is the cost of billing. According to MCI, the cost of billing a customer with a single long-distance call is about \$.48 per month (based on MCI's contracts with local carriers). Another major component of the cost during the period under study of an additional customer is the PICC of \$.53 per line per month. Thus, just on account of these two categories, an additional customer adds over a dollar per month to a long-distance carrier's costs.

59. As I have noted earlier, there has recently been a shift toward simplified flat-rate long-distance plans and away from explicit quantity discounts, though some flat-rate plans have minimum charges. Higher-usage customers are more likely to take the trouble to seek out the best flat-rate plans. Long-distance carriers are likely to target known large users for their flat-rate promotions, because it is not worth the effort of contacting the low-usage customer.

60. If the higher rates per minute paid by the smallest customers are the result of pure price discrimination and do not reflect differences in costs, including the promotional costs of signing up the customers, then there would be an important arbitrage opportunity for resellers. Because a reseller can buy service cheaply at high-volume low prices and resell the services at higher prices to small customers, the reseller makes substantial profits when prices depart from costs. As I have discussed, there is an active market for resold service—there are hundreds of resellers of long-distance service and many more entering every week. I find it unlikely that there are large profits available to resellers that they have

failed to pursue, despite the vitality of the reselling business. A more reasonable explanation is that there is an additional cost to recruit and serve each customer. As a result, carriers offer low prices to large customers, as would be expected under competition, to reflect the recruiting cost and the fixed monthly cost of serving a customer.

## I. Structure and Competition

61. The data reviewed earlier in this section effectively demonstrate the benefits that consumers have received from the development of a competitive long-distance market. In addition, the structural factors often considered by economists in judging the likelihood of the existence and continuation of competition support the conclusion that vigorous competition is serving the interests of the long-distance consumer. These factors include the concentration of sellers, trends in market shares, the ability of rivals to observe prices, barriers to entry, profitability, and returns to scale.

### 1. Concentration

62. The domestic long-distance industry in the United States has the following competitive structure: There are four carriers with national networks (AT&T, MCI, Sprint, and WorldCom). Their current market shares are roughly 51 percent, 17 percent, 9 percent, and 7 percent, respectively.<sup>15</sup> There are at least 20 other carriers with annual revenues over \$100 million and a half-dozen near \$1 billion, including Cable & Wireless, Excel, Frontier, and LCI. In addition, numerous other carriers have smaller roles in the industry, based on their own facilities, capacity leased from other owners, and on reselling network services from other carriers. The FCC reports that there are 482 firms identifying themselves as long-distance carriers or resellers of interstate services.<sup>16</sup> The sellers other than the top four now account for 16 percent of the market.

63. AT&T's market share of just over half does not necessarily indicate a serious deficiency in competition. In any industry, but particularly in an industry where one seller has had an historical head start, one must examine a broader set of information than market share to

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<sup>15</sup>*Long Distance Market Share, Third Quarter 1997*, Table 3.1, Total Operating Revenues and Table 3.4, Quarterly Toll Revenues Reported to Shareholders, Industrial Analysis Division, Common Carrier Bureau, Federal Communications Commission, January 1998.

<sup>16</sup> *Telecommunications Industry Revenue: TRS Fund Worksheet Data*, Table 1, Industrial Analysis Division, Common Carrier Bureau, Federal Communications Commission, November 1997.

reach conclusions about the state of competition in a market. In particular, such an examination should consider trends in market shares, barriers to entry, and the prospective profits of a new entrant. It should also consider direct evidence on price-cost margins, as I discussed earlier.

64. WorldCom is now the fourth largest long-distance carrier with nearly 4.1 million customers as of 1995. It has grown both by building its own facilities and by acquisition of other carriers. In January 1995 WorldCom's predecessor, LDDS, acquired WilTel, the sixth largest carrier. Recently, WorldCom acquired Brooks Fiber, a company that provides access services to businesses in several cities. Currently, WorldCom has about a 7 percent share of the long-distance market. Allnet is the fifth largest carrier with 1.5 million customers as of 1995. Allnet has achieved its growth as a reseller. In 1995 Frontier Communications acquired Allnet's parent. Their combined market share is about two percent of the market. These two firms are just two of the many players who are aggressively challenging AT&T, MCI, and Sprint. At present, there are 130 facilities-based long-distance carriers and 260 resellers who are actively recruiting customers.

65. The market contains many aggressive, successful carriers who have every intention of taking as much business as they can away from the larger carriers. Executives in the industry who are constantly fighting to retain customers solicited by WorldCom, Allnet, and other aggressive sellers would be surprised at a portrayal of their industry as a comfortable club with just three members who have agreed not to poach on each other's territories. These other carriers could expand rapidly if competition among the larger carriers were inadequate and left prices above competitive levels. Further, the smaller carriers are increasing competition in the market through consolidations that result in a number of highly successful entities such as Frontier Communications, the fifth-largest carrier. A recent example is the merger announced on June 6, 1997, between Excel and Telco Communications Group, Inc., to create what will be the sixth-largest carrier. The smaller carriers thrive on the availability of fiber capacity in the bulk transmission market.

## 2. Trends in Market Shares

66. The changes in and current levels of market share of the long-distance carriers reveal a vigorously competitive market. Thirteen years have passed since divestiture opened the long-distance market. AT&T still has a majority share, but it continues to lose share—from 65 percent in 1990 to 51 percent in 1997—to all of its rivals, especially the smaller carriers whose collective share has grown rapidly. What market share AT&T still has, it retained only by competitive response to the aggressive attempts of its rivals to lure away its business. The rise in MCI's and Sprint's market shares accounts for about a third of AT&T's loss of share.

The remainder—two-thirds—of AT&T's loss was the gain of smaller, but fast-growing and successful, carriers.

67. Measured by the economist's favored index of market concentration, the Herfindahl-Hirschman Index (HHI), long-distance service has become ever more competitive with the passage of time. The HHI for 1996 was at a level only half of what it was in 1987. With a continuation of the downward trend observed continuously since divestiture, the long-distance industry will enter the range of a relatively unconcentrated industry within the next 10 years or so.

### **3. Communication of Prices among Rivals**

68. Economic analysis of the relation between competition and rivals' observation of price has stressed that the central question is whether a firm can take its rivals by surprise by offering terms to prospective customers that the rivals cannot match immediately. If a smaller firm can attract a significant number of customers before its rivals respond, competition is more effective in lowering prices because the firm can expand relative to its larger rival or rivals. Even a one-day advantage can be crucial—in the airline business, one carrier can run a media blitz for a special low-price offer for a single day and book a large amount of business, even if the other carriers respond with their own blitzes the next day. In the residential long-distance business, one important tool is the signup bonus. The larger carriers target their rivals periodically with mass mailings offering bonuses—the rivals learn about the tactic only after it occurs. Promotional bargain offerings come at such a fast and furious pace that rivals cannot respond quickly enough to erase the temporary advantage that each offer provides to the carrier making the offer.

69. The observability of prices by rivals is a significant issue in markets with high barriers to entry and small numbers of firms. But in the long-distance market, with hundreds of sellers, a smaller seller need not fear that its larger rivals will respond to the prices it sets. The small firm can publicize its prices as widely as it chooses. Smaller firms find viable niches in the market, knowing that larger rivals would sacrifice too much profit from their existing customers if they matched the terms that were being offered by the smaller firms to a few of its customers. The combined effect of the hundred or so smaller carriers, each nibbling at the shares of the larger carriers, is to enforce a high level of competition in the market in general.

### **4. Barriers to Entry in Long Distance Service**

70. The role of barriers to entry is prominent in all discussions of structural determinants of competition. If a small number of sellers are isolated from further competition by high

barriers to entry, the likelihood of implicit collusion is higher. In my opinion, however, the barriers to entry in the long-distance business are relatively low, so actual and prospective entry keeps the market competitive.

71. Barriers to entry in the long-distance industry are low because of the competitive bulk capacity market. If uncompetitive behavior among the existing carriers created excessive prices, the resulting profit opportunity would be seized by operators who assemble effective national service from components available today in the bulk capacity and switching markets.

72. Analyses of barriers to entry have stressed the importance of sunk costs. A sunk cost is one that cannot be recovered if entry is not successful. Few of the costs of transmission capacity in the long-distance business are sunk, because there is an active market where an unsuccessful entrant in retail long distance could sell or lease facilities to other retail sellers. In this respect, the long-distance market is quite different from the local market—in that market, the investment of an unsuccessful entrant may have little resale value, so sunk costs are a more important barrier to entry in local service than in long distance.

The fluid, substantially competitive market for long-haul fiber capacity, where transmission service can be bought and sold at prices close to cost, thus creates the environment for a highly competitive long-distance market.

## **5. Returns to Scale**

73. Competition cannot flourish in an industry where the technology has important returns to scale. When large scale brings lower cost, one firm will dominate and its cost advantage will prevent effective competition from smaller rivals. All the evidence suggests the absence of increasing returns in the long-distance market. AT&T is approximately three times as large as MCI. Under returns to scale, AT&T should have substantially lower costs per minute of service and thus higher profits. But, in fact, AT&T and MCI are about equally profitable. Further, many carriers exist in the market that are much smaller than MCI, and these small carriers are not only viable, but profitable and growing.

## **J. Conclusion on Competition and Collusion**

74. The United States has a vibrant, successful long-distance industry. Since competition was introduced to the long-distance market, there has been a large and continuing flow of technological innovations. The performance of the industry in the past decade has been a clear success, with substantial declines in prices relative to other products and the rapid

development and dissemination of advanced technologies by the competitive long-distance carriers. The price-cost margin has declined to close to its competitive minimum.

75. The force of competition among the four major long-distance carriers (AT&T, MCI, Sprint, and WorldCom) and dozens of other significant carriers has pushed prices down to the level where only an efficient firm with perceptive management can make a profit. But competition in long distance does not take the precise form of textbook perfect competition. For example, AT&T's brand name and consumer inertia dating back to the time when the company was a monopoly gives a continuing, though declining, advantage to AT&T.

76. After divestiture provided the opportunity for full competition in the long-distance market in the United States, competition acted quickly to lower prices. Increasing competition and rising productivity were driving forces, along with declining access charges, in lowering long-distance prices. The decline in the price of long distance was most rapid just after divestiture, but has continued since 1987. The economic analysis of the benefits of competition teaches that competition will drive prices toward the level of cost. During the transition from noncompetitive prices to competitive prices, large price reductions will occur. After the benefits of competition are achieved, the economy continues to enjoy low prices but cannot expect prices to continue falling at their earlier rate. Future declines in long-distance prices will come from continuing improvements in productivity and from any further declines in access charges that are granted by regulators or that result from structural changes in local telephone service.

77. In my opinion, the performance of the industry suggests vigorous competition with large consumer benefits even though AT&T still has about half of the U.S. long-distance market. There are neither natural barriers to entry nor barriers created by law in the market. If competition were inadequate, new firms would enter and those currently on the periphery would move into the core.

78. The Bells' economists have argued that the long-distance industry is distinctly non-competitive. The particular form of non-competitive organization that they diagnose is tacit collusion. In this view, each long-distance carrier is willing to stick to high prices because there is an understanding that the others will keep their prices high as well. However, the Bells' economists cite no evidence of actual collusion. The diagnosis of tacit collusion makes little sense for an industry with numerous sellers, many of whom are small enough to avoid any strategic response from the four major sellers, but collectively large enough to exploit any gap between price and cost. These sellers—currently ranked number 5 and smaller—have grown collectively in recent years and now account for an important share of the total market.

79. Sellers of long-distance pursue every conceivable strategy to capture profit opportunities in niches in the market. There is even a carrier, T-NETIX, that specializes in providing long-distance service to prisoners! As a result of the vigorous pursuit of profit opportunities, they have been largely extinguished. One of the most persuasive indications of the lack of remaining profit in long distance is the failure of the Bells to offer significant long-distance service outside their own regions—a right they have had since the passage of the Telecommunications Act of 1996 two years ago.

### K. Effects of Entry by the Bells in Their Own Regions

80. The Telecommunications Act of 1996 provides a mechanism for the Bells to sell long-distance services to their local customers. When the Bells begin to qualify for this opportunity by opening their local markets to effective competition, long-distance markets will be affected in certain ways that are predictable.<sup>17</sup>

81. The local telephone company serving Connecticut, Southern New England Telephone (SNET), began selling long-distance services in 1994. At the same time, the local toll market was opened to competition. Experience since then is helpful in understanding what will happen when other local telephone companies offer long-distance service to their own customers.

82. SNET has a huge competitive advantage in the Connecticut market for interstate long-distance calls because the Telecommunications Act prohibits responses by its national rivals that apply only to Connecticut. The national long-distance carriers would have to lower their prices nationally in order to respond to SNET's pricing. SNET has done little to take advantage of this perverse feature of the law. SNET's interstate rates are 13 cents per minute off-peak, with small discounts for high volumes. By contrast, the MCI One Savings interstate rate is 10 cents per minute off-peak and 5 cents on Sunday. The AT&T's One Rate Plus rate is 10 cents per minute at any time with a charge of \$4.95 per month. The Connecticut long-distance customer has gained no meaningful advantage from SNET's control of a long-distance subsidiary in the market. And the customer has suffered the disadvantage that SNET has withdrawn its earlier policy of cooperating with long-distance carriers.

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<sup>17</sup> For a full analysis, see *Declaration of Robert E. Hall*, in Application of BellSouth Corporation, BellSouth Telecommunications, Inc., and BellSouth Long Distance, Inc., for Provision In-Region, InterLATA Services in South Carolina, FCC Docket 97-208, October 1997

83. SNET is also the high-price seller in the local toll market. In this respect it is no different from the other local telephone companies, such as BellSouth and Ameritech, who have placed themselves toward the top of the distribution of prices in local toll markets, as these markets have been opened to competition. If you subscribe to SNET's intraLATA service, you pay 18 cents per minute during the day and 10 cents at night and on the weekend. It is an astonishing fact that I, a part-time resident of Connecticut, pay half again as much per minute to call from Guilford to Hartford using SNET as I pay to call to California. By contrast, AT&T's local toll rate in Connecticut is 5 cents per minute for One Rate and One Rate Plus, MCI's is 10 cents per minute, and Sprint's is 10 cents per minute off-peak and 15 cents during peak hours.

84. Although SNET does not offer meaningful price advantages in long-distance, it has been successful in attracting around a third of Connecticut's long-distance customers. It appears that these are mostly low-volume customers and that SNET's share of the market in dollars is smaller. SNET appeals to customers who seek simple lives with only a single telephone supplier and are willing to pay for that convenience in higher long-distance rates than they could get by shopping among carriers. It also is likely that SNET has attracted most of its long-distance customers away from AT&T.

85. Thus the pattern of market shares—especially measured by counting customers rather than revenue—is likely to be quite different in markets where the dominant local carrier becomes affiliated with a long-distance carrier. AT&T's customer count is likely to be reduced substantially. The change will have little economic substance, however. In particular, WorldCom's primary focus in long distance is the business customer, so the migration of passive low-volume residential customers from AT&T to their local phone company hardly interacts at all with the issues relevant to the merger.

## **L. Effects of the Merger**

### **1. Effects on Competition**

86. MCI's share of the long-distance services market based on revenue is about 17 percent and WorldCom's is about 7 percent. The immediate effect of the merger would be to raise the HHI by about 240 points. Again, according to the Merger Guidelines, this amount of increased concentration calls for a full analysis of the competitive effect.

87. Currently, WorldCom and MCI compete against each other actively only for business customers. Although WorldCom serves many residential customers, the company has not perceived that it would be profitable to invest heavily in attracting more of them, and there is

no reason to expect that this view would have changed absent the merger. If there were competitive harm from the merger, it would occur among the business customers who previously were able to shop for bargains from MCI and WorldCom and the many other sellers of business long-distance services.

88. For larger businesses, the process of purchasing long-distance service has the same character I discussed earlier for transactions in the bulk capacity market. A business has the incentive to shop carefully and to extract the best possible deal from alternative sellers. Again, auction theory is helpful in understanding the outcome, even if its predictions do not apply literally. The theory suggests the overwhelming value to purchasers of adding a second seller when there has been a monopoly in the past. Buyers then have a chance at pushing the price all the way down from the monopoly level to the level of cost. When MCI began competing with AT&T, businesses were the early beneficiaries of this process.

89. Today, dozens of long-distance carriers offer bargains to businesses. When the larger carriers such as AT&T succeed in retaining a business customer, it is because the overall value of AT&T's offering (benefits less the price charged) exceeds the value of competing proposals. In this environment, a merger of two players out of dozens cannot have a measurable effect. Moreover, if there were even a small effect, it would induce the entry or expansion of other sellers, who would push prices back to the level that would have prevailed without the merger.

90. The residential customer with a long-distance bill at the typical level of \$20 per month does not have the same incentive to create an informal auction for it purchases as does a business spending vastly more. As I have mentioned earlier, many residential customers are completely passive, sticking with AT&T at its standard rates despite potential gains from signing up for a better plan from AT&T or switching to a good plan on another carrier. When the dominant local phone companies offer long-distance service under their own brands, they will capture a large fraction of these passive customers, as experience in Connecticut has shown. This event will have no significance for the merger and will not convey any benefits to the passive customers or to other long-distance customers. As I have pointed out elsewhere, consumers will suffer harm in other ways from the change in incentives for cooperation that occurs when a dominant local carrier controls a long-distance carrier in its own market.<sup>18</sup>

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<sup>18</sup> *Ibid.*