

one of the existing networks could carry all of the nation's long-distance traffic at lower cost than any new entrant, so that incumbents could repel that entrant from the long-distance market business by signaling decreases in prices.

Further, AT&T probably is the carrier with the greatest cost advantages, stemming from the size of its network: With its fiber system costs spread over larger message volumes, its unit operating costs converge to a level only slightly in excess of its access charges per call. Between 1990 and 1993, AT&T's fiber miles grew from 0.9 to 1.2 million miles; over the same period, MCI's grew from 0.4 to 0.6 and Sprint's grew from 0.45 to 0.47 million miles.³⁰ AT&T realizes further cost advantages in switching and access, again because of its volume of calls. In 1991 CompTel, the trade association of smaller interexchange carriers, insisted that if the FCC allowed access charges to be based on cost, AT&T would enjoy advantages amounting to \$698 million per year, "twice the combined 1988 net income of those AT&T rivals that were profitable that year. That amount is eight times the combined 1988 net income of third tier carriers with revenues in excess of \$10 million."³¹

CompTel added that AT&T's advantages "[prevent] carriers from using available interexchange transmission capacity to discipline AT&T in any way."³² Sprint agreed; it found that volume discounts "favor AT&T in practice simply because its enormous size advantage over other carriers makes it most likely to have the volumes necessary in any given location to take full advantage of these discounts."³³ CompTel found that access charges were 1.04

30. FCC FIBER DEPLOYMENT UPDATE—END OF YEAR 1994, table 2 (July 1995); see also *Price Cap Revisions*, 10 F.C.C. Rcd. at 3017-18 ¶¶ 24-25.

31. Comments and Request for Further Proceedings of CompTel at 33, MTS and WATS Market Structure, No. 78-72 (FCC Feb. 22, 1991).

32. *Id.* at 4. CompTel adds that "[i]f AT&T takes all the monopoly profits made possible by current access imbalances, the appearance of 'competition' might survive because some firms would still have room to offer service despite their cost disadvantages. But AT&T would control that competition, not the Commission." *Id.* at 23.

33. Reply Comments of Sprint at 6. Expanded Interconnection with Local Telephone Companies, No. 91-141 (FCC Sept. 20, 1991); see also Comments of WilTel at 34-35, MTS and WATS Market Structure. Transport Rate Structure and

cents per minute lower for any carrier with a 65 percent market share over any carrier with a 10 percent share and that a carrier must control at least 25 percent of the market to compete with AT&T.³⁴ Otherwise the carrier could not “approach the switched transport cost of AT&T.”³⁵ Investment analysts familiar with the revenues and costs of the interexchange carriers have reached similar conclusions.³⁶

Market shares stabilized after 1990 as the fiber networks were completed. AT&T had 63 percent, and MCI *plus* Sprint had 30 percent, of all long-distance revenues by the end of 1993.³⁷ AT&T had 47 percent of the total fiber miles, compared with all other long-distance carriers, who had 53 percent of the fiber miles.³⁸ The disparity between revenue and capacity shares has led to the speculation that shares stabilized because “[i]n 1990, AT&T openly declared its intention to stabilize its share position. By 1992, the company had resolved to ‘grow share’ and ‘at the same time . . . retain the margins in our business.’ . . . However unwelcome the fact may be to policy makers of various shades, AT&T can, and does, unilaterally decide what share it will hold or cede in the long-distance market.”³⁹

An industry analyst wrote in 1991 that “it is difficult to imagine how MCI and Sprint will take meaningful share from AT&T now that AT&T has demonstrated it doesn’t want to lose any

Pricing, No. 91-213 (FCC Nov. 22, 1991).

34. See Comments and Request for Further Proceedings of CompTel at 22, MTS and WATS Market Structure, No. 78-72 (FCC Feb. 22, 1991).

35. *Id.*

36. See, e.g., MERRILL LYNCH, UNITED STATES TELECOM SERVICES: LONG DISTANCE SECOND-TIER: PUMP UP THE VOLUME 9 (Oct. 13, 1993) (three major long distance providers exhibit oligopolistic behavior and stable pricing); BROWN BROTHERS HARRIMAN & CO., AT&T BASIC REPORT 7 (Mar. 31, 1992) (should FCC establish cost-based access charges, it “would benefit AT&T more than its competitors.”); RAYMOND JAMES & ASSOCS., INC., TELECOMMUNICATIONS INDUSTRY REPORT: OUTLOOK FOR THE INTER-STATE ACCESS CHARGE 3 (Feb. 10, 1992) (bringing access charges to costs would be “a positive for AT&T, and a negative for AT&T’s interexchange competitors”).

37. FCC LONG-DISTANCE MARKET SHARES, FOURTH QUARTER (1993), tables 5, 6.

38. *Price Cap Revisions*, 10 F.C.C. Red. at 3017 ¶ 23.

39. GEODESIC NETWORK II, *supra* note 117, at 3.10 (quoting AT&T MTS Volume, Revenues Up in First Quarter. Pelson Says, THE REPORT ON AT&T, May 4, 1992, at 11).

more share.”⁴⁰ Other carriers held similar views: Sprint in 1990 described the Commission’s belief that AT&T’s market share would erode further as “unfounded.”⁴¹ AT&T, said Sprint in 1991, had shown that it could “flex its economic muscle to halt erosion of its market share.”⁴²

The reality of today’s long-distance markets is that the gains from scale in new technologies have turned out to be significant. Now that each of the three large interexchange carriers has the capacity to serve as a monopoly, mutual destruction would follow from each individual firm’s taking price to levels where the firm would gain market share. Since AT&T probably has the lowest cost, it would hardly be profitable for MCI and Sprint to contest AT&T’s shares in any of the key message toll or business service markets.

CHANGES IN CONCENTRATION AND CONDUCT OF THE MAJOR CARRIERS

In markets with from two to three large carriers, the level of service activity of any one firm depends on the conduct or strategies of the others as to their pricing and service offerings. Any one carrier has to anticipate the actions of the others with respect to price structures inherent in their tariffs and the effects of those actions on its own prices and service levels. Together, the three large carriers had the capacity to determine the nature and extent of offerings through the four large markets both domestically and on outbound traffic from this country. But the extent to which they determined price levels as a result depended on the nature of their interactions on their separate and collective conduct.

There are quite different ways in which the three large providers could interact. In a dynamic setting, in very general terms, they could set out strategies implying that they would

40. PAINE WEBBER INC., INDUSTRY REPORT NO. 1105870, LONG-DISTANCE INDUSTRY 2, 4 (Feb. 25, 1991).

41. Reply Comments of Sprint at 47. Competition in the Interstate Interexchange Marketplace, No. 90-132 (FCC Sept. 18, 1990).

42. Comments of Sprint, at ii. MTS and WATS Market Structure, No. 78-72 (FCC Feb. 22, 1991).

cooperate in their separate tariff submissions, or make adjustments to each other's presence short of cooperation, or compete by setting out independent tariffs designed to take away market share. The implications for the competitiveness of prices would be quite different across those general strategies.

With cooperation, service providers' tariffs would be close to identical on the critical dimensions of price schedules and service offerings. Any one tariff would be established to set out that carrier's price schedule so that its price-cost margins would result in no changes in revenue shares of the individual firms. But when they do not cooperate to that extent, price-cost margins would decline as carriers take market share away from each other. That is, changes in concentration determine noncooperative price-cost margins (or $(p - mc)/p = f(HHI)$). That relationship of price level to the number of equal-sized firms is not yet specified, however. It still depends on the type of non-cooperative interfirm behavior. When each provider takes current levels of others' shares as given and reduces its index price-cost margin to increase its share, then company-to-company margins converge, declining from the monopoly level to lower levels proportional to the HHI. That is, each carrier sets prices so that price-cost margins are equal to the HHI divided by the elasticity of market demand ($(p - mc)/p = HHI/e$). But with service providers seeking actively to reduce others shares of service, price-cost margins would be driven to zero ($(p - mc)/p = 0$ for a price index designated as "p" and incremental costs including access charges as "mc"). In other words, the dynamics of price competitiveness depend on the specific company strategy as to share taking from others in various markets.⁴³

43. Bresnahan asserts, "[E]ven such simple theories as Cournot, Bertrand, and collusion lead to very different $h(n)$ in $[p - mc(q/n) = h(n)]$ for per-firm output q/n and equal-sized firms n , where the 'toughness of price competition' refers to 'the slope of $h(n)$ not its level.'" Timothy J. Bresnahan, *Sutton's Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration*, 23 RAND J. ECON. 137 (1992). Since the cooperative strategy is more profitable than the competitive one, other things being equal, cooperative-type results may be the goal for individual firms, even if a noncooperative framework is in place to avoid accusations of collusion in violation of antitrust laws. *Id.* But full competitive "toughness," as the second and third providers increased share, would imply falling price-cost margins, and no competitive "toughness" with inbound share stability would

But there are market conditions that favor the assumption that one strategy is being utilized over another. The historical changes that have taken place in market shares, and in regulation, provide credence for certain hypotheses as to the more likely strategies. When one carrier is responsible for almost all of the sales volume, and regulatory conditions result in a floor under that carrier's prices, then the other two would most plausibly seek to increase their market shares. A successful strategy of this genre should lead to more equal shares but also to declines in price-cost margins. When shares of the second and third largest firms increase to levels more comparable if not the same as that of the largest firm, and regulation eliminates price floors for the largest firm, the second and third firms would not clearly be advantaged from further individual initiatives to increase their shares. With two to three equal-sized firms, any one can credibly threaten its rivals with large price reductions if these rivals seek to have shares further redistributed. As shares equalize, the original carrier's threat to cut prices to halt its loss of share becomes much more credible (since its intramarginal losses are less from doing so). It is more credible to expect that each firm sets out its own tariff, with the preconception that all firms will do the same, in order to maintain previous shares.⁴⁴

The alternative hypothesis is that competitive pricing takes hold as further equalization of shares leads to more intense rivalry to gain further share. That set of strategies to shift percentage points of share would lead to deep discount tariffs to supplant prices in standard tariffs. As shares destabilize, margins decline sharply.

Model constructs support the development of the first hypothesis. Sibley and Wilkie⁴⁵ analyze the behavior of duopolists in repeated games, one of which is under regulation in a case where the regulatory regime changes at a known time to price cap control

imply no reduction in higher than competitive margins.

44. Cf. Daniel Orr & Paul MacAvoy, *Price Strategies to Promote Cartel Stability*, 32 *ECONOMICA* 186 (1965), where general conditions are given in table 2 for three equal-sized firms or their equivalent (that is, $HHI = 0.33$) to have stable tacit collusion.

45. David S. Sibley and Simon J. Wilkie, *A Repeated Game of Price Cap Regulation*. UNIVERSITY OF TEXAS WORKING PAPER (Revised: January 1996).

processes. That switch stabilizes shares and price-cost margins. According to them, the switch by the Federal Communications Commission in July 1989 from a rate-of-return to price cap regime should have been the cause for price increases. At that point, AT&T's prices were in effect "grandfathered" into the price cap system. These prices were those prior to the regime switch, under asymmetrically applied rate-of-return regulation, and were set at levels based on the condition that it could not cut prices in response to competitive initiatives of other carriers. But the new price cap regime sustains cooperative outcomes by making the threat of responsive price cuts credible. Assuming that the regime is put in place at a known time, the lag between announcement and implementation allows any nondominant firm to signal its intentions for its behavior after the price cap regime begins. The nondominant firm finds it advantageous to announce a strategic price initiative designed to induce a higher joint-profit equilibrium. The leader or dominant firm should infer that this other firm will adopt only such strategies. This model demonstrates that, at the onset of price caps, the regulated firm will set out its price strategy so as to increase price levels, and the unregulated firm will set that or a higher price level.

In summary, it appears that technology and regulatory conditions in markets for long-distance telecommunications have changed in directions that favored adoption of the first set of strategies. The three large carriers' marginal costs of providing service have become virtually the same, given that access charges for local exchange were the same after 1990 and that other operating costs have been minimal. The growth of individual carrier capacity has been so extensive that each firm could have provided the entire interexchange volume of services, making credible the threat of any one of the three to take rates to marginal costs. Those emerging conditions provided each carrier with more incentive to choose price levels that limit incursions in the revenue shares of each of the carriers in each of the key markets.

The tariff submission practices of the carriers at the Commission contributed to developing such stability. Each of the large service providers has offered an array of calling plans under tariffs submitted periodically to the Commission. The procedure has been that AT&T submits first and then has been followed by MCI

and Sprint. From 1990 to 1993, AT&T in each new tariff initiated a change that MCI and Sprint followed; their changes became more and more identical. By December 1993, AT&T, MCI and Sprint arrived at virtually the same index price level for message toll services across the country.

That sequence of submissions with price convergence was also present in outbound WATS and after 1991 in inbound WATS. Remarkably, even in virtual network services for which subscriber self-provision of service provides a competitive alternative, the AT&T tariffs generated price changes from 1990 to 1993 that were followed by MCI with only a single exception.

THE CONDUCT FRAMEWORK FOR ANALYZING PRICING BEHAVIOR

Given these conditions, it is possible to posit certain hypothetical relationships between changes in concentration and in price-cost margins across markets for long-distance services. Depending on the extent of interactivity among individual price setters, margins should decline more or less rapidly than share concentration declines. The general framework for setting out such expectations on changes in margins based on declining concentration is $((p - mc)/p = -ms(1+v)/e)$, where ms is firm market share, e is market elasticity of demand, and v is conjectural variation among firms.⁴⁶ For identical price-cost margins across firms, that condition is $((p - mc)/p = -HHI(1+v)/e)$, and the conjectural variation term ranges from $(1-HHI)/HHI$ for perfect collective interaction among firms to -1 for the fully competitive interaction. As adjustments in price-cost margins are made as a result of declines in HHI, a further hypothesis is that the conjectural variation would also decline. Whether price-cost margins fall to zero, or only proportional to the fall in HHI ($v=0$), the conclusion would be that markets become more competitive. Postdivestiture market behavior characterized in that way would show that price-cost margins decline not only as

46. For reference to the use of v as the conjectural variation term, see J. A. Brander & A. Zhang, *Market Conduct in the Airline Industry: An Empirical Investigation*, 21 RAND J. ECON. 569 (1990).

concentration declines, but at a more rapid rate.⁴⁷

47. That is, $\partial[(p - mc)/p]/\partial HHI = -(1 + v)/e - (HHI/e)\partial v/\partial HHI > 0$.

5

Testing for Competitiveness in Changes in Price-Cost Margins

THE "COMPETITIVENESS" of service providers in long-distance markets can be assessed in terms of changes in price-cost margins for the key services over the last decade. Their prices have been specified in standard tariffs submitted to the Federal Communications Commission or in various discount plan tariffs that quote percentage discounts in standard plans. In addition, prices for business services on dedicated facilities have been specified as percentage reductions of tariff prices for standard business services. Price indices for representative calls for six classes of services offered by AT&T, MCI, and Sprint have been constructed from tariffs of each of those carriers. The direct measure of the price-cost margin, specified as $[(p - mc)/p]$ in the last chapter, requires estimates of marginal costs as well. These costs have been estimated as the sum of access charges levied by the local carrier for passing on messages to the long-distance carrier and operating expenses incurred from use of a carrier network to switch and transport that message. Approximations for the two parts of this cost element have been used to estimate price-cost margins first for standard services and then separately for discount plans, for services nationwide, for services in California, and finally for international services outbound from the United States.

Each of these estimations can be taken in turn. The first step in constructing price indices is to specify calling patterns for a representative consumer and then price those patterns from the

relevant tariffs. Representative calling patterns are shown in table 5-1. The prices for those calls on each of six classes of standard service have been estimated from tariffs as specified in that table.¹ The calling pattern assumptions fit customers located on the East Coast. For estimating prices in California, however, the assumed calling pattern has been adjusted. The important differences are: (1) the distance calls travel is greater for California-based than for East Coast customers and (2) the time-of-day distribution of calls is earlier in the day for customers located in California. It is also assumed that the customer is located in the 415 area code (San Francisco), and makes calls to each area code outside California with equal probability.

1. The price indices were calculated based on data provided by HTL Telemanagement, Ltd. by taking the assumed calling patterns and applying them to tariffs that AT&T, MCI, and Sprint maintain on file at the Federal Communications Commission.

TABLE 5-1 USAGE ASSUMPTIONS IN CALCULATING AN INDEX PRICE			
Distribution of Calls by Mileage			
Miles	Distribution		
0-55	6%		
56-292	8%		
293-430	6%		
431-925	30%		
926-1910	33%		
1911-3000	17%		
Time-of-Day Distribution			
Day	85%		
Evening	10%		
Night/Weekend	5%		
Virtual Networks			
	On-Net	Off-Net	
Originating	80%	20%	
Terminating	25%	75%	
Tariff Sources:			
Service Type	AT&T	MCI	Sprint
MTS	MTS	Execunet	Dial "1"
WATS Outbound-Switched	PRO WATS	Prism Plus	Dial "1" WATS
WATS Outbound-Dedicated	MEGACOM	Prism I	Advantage
WATS Inbound-Switched	800 Ready Line	Business Line	Ultra WATS
WATS Inbound-Dedicated	800	800 Direct	FONLINE
Virtual Network	MEGACOM	Vnet	Ultra 800
	SDN		VPN

Estimated prices per minute for the representative call on various carriers and services appear in table 5-2. They show that there were index price reductions in the late 1980s and index price increases in the early 1990s. The increases in the 1990s took place, moreover, when costs at the margin were declining.

Date	AT&T	MCI	Sprint
1/1/87	0.298		
3/1/87		0.289	0.289
1/1/88	0.265		
3/1/88		0.256	0.259
1/1/89	0.254	0.244	0.250
5/1/89		0.227	0.234
8/1/89		0.228	0.229
12/1/89		0.228	
12/15/89			0.230
1/1/90	0.233		
2/1/90		0.223	0.228
8/1/90		0.222	0.224
1/1/91	0.228		
2/1/91		0.222	
3/1/91		0.222	
6/3/91			0.228
7/1/91	0.227		
8/1/91			0.227
12/1/91		0.223	

TABLE 5-2 PRICE PER MINUTE BY CARRIER AND SERVICE—MTS			
Date	AT&T	MCI	Sprint
1/2/92	0.228		
1/16/92		0.224	
3/1/92			0.228
6/1/92	0.227		
6/18/92		0.225	
9/1/92		0.223	
11/1/92			0.227
2/19/93	0.228		
3/4/93		0.225	
4/1/93			0.228
6/26/93		0.227	
8/1/93	0.229		
9/29/93	0.235	0.234	
10/1/93			0.235
1/19/94		0.234	
1/14/94	0.256		
1/19/94		0.255	0.256

TABLE 5-2 (CTD.) PRICE PER MINUTE BY CARRIER AND SERVICE WATS SWITCHED INBOUND (200 HOURS PER MONTH)			
Date	AT&T	MCI	Sprint
7/1/87	0.252		
1/1/88	0.219	0.221	
3/1/88		0.221	
12/1/88	0.215		
2/1/89			0.189
4/5/89	0.214		
5/1/89		0.194	
6/1/89			0.187
7/1/89	0.210		
2/1/91	0.211	0.197	
3/1/91			0.193
9/5/91	0.213		
10/1/91		0.199	
11/1/91	0.217	0.202	
1/1/92			0.197
6/1/92	0.220		
6/4/92		0.206	
7/1/92			0.203
11/1/92	0.224	0.214	0.212
8/1/93	0.232		
8/6/93		0.221	0.221
12/1/93	0.230		
1/1/94		0.219	0.222
2/1/94	0.239	0.227	0.231

TABLE 5-2 (CTD.) PRICE PER MINUTE BY CARRIER AND SERVICE WATS SWITCHED OUTBOUND (200 HOURS PER MONTH)			
Date	AT&T	MCI	Sprint
1/1/87	0.258		
7/1/87	0.249		
11/1/87			0.211
1/1/88	0.237		
3/1/88			0.199
8/1/88			0.199
11/1/88		0.211	
12/1/88	0.228		
1/5/89			0.202
2/1/89		0.209	
3/1/89	0.230		
4/1/89	0.219		
5/1/89		0.204	
6/1/89			0.191
9/6/89	0.214		
10/1/89		0.199	
11/20/89	0.213		
1/5/90			0.197
2/1/90		0.198	
4/5/90			0.196
7/27/90	0.217		

TABLE 5-2 (CTD.) PRICE PER MINUTE BY CARRIER AND SERVICE WATS SWITCHED OUTBOUND (200 HOURS PER MONTH)			
Date	AT&T	MCI	Sprint
8/1/90		0.201	
8/5/90			0.199
1/3/91		0.204	
2/1/91	0.221	0.209	
5/3/91			0.200
6/30/91	0.223		
1/3/92	0.225		
2/1/92		0.211	
2/3/92			0.203
6/1/92	0.227		
6/3/92			0.217
6/4/92		0.216	
7/3/92			0.215
11/1/92		0.215	
5/1/93		0.226	
5/3/93			0.219
8/1/93	0.235	0.237	
8/6/93			0.232
1/4/94	0.236		
2/1/94	0.244	0.249	0.241

TABLE 5-2 (CTD.) PRICE PER MINUTE BY CARRIER AND SERVICE VIRTUAL NETWORK (10,000 HOURS PER MONTH)			
Date	AT&T	MCI	Sprint
1/1/87	0.167		
1/1/88	0.141		0.139
11/1/88		0.131	
12/1/88	0.132		
1/5/89			0.129
2/1/89		0.116	
4/1/89	0.127		
4/19/89		0.113	
6/1/89			0.121
6/29/89	0.123		
7/1/89		0.108	
8/1/89			0.113
11/3/89			0.113
12/1/89		0.116	
3/11/90	0.123		
6/1/90			0.121
7/27/90	0.125		
8/1/90		0.118	

TABLE 5-2 (CTD.) PRICE PER MINUTE BY CARRIER AND SERVICE VIRTUAL NETWORK (10,000 HOURS PER MONTH)			
Date	AT&T	MCI	Sprint
9/1/90	0.167		0.122
11/1/90			0.122
4/1/91		0.116	
4/22/91	0.124		
12/16/91	0.126		
1/1/92		0.118	0.125
4/1/92		0.118	
6/1/92	0.132		
6/4/92		0.124	
7/1/92			0.130
3/1/93		0.126	
4/1/93	0.134		0.134
6/1/93		0.128	
8/1/93	0.139		
8/3/93		0.128	
8/6/93			0.139
2/1/94	0.144	0.137	0.138

Source: As described in the text and in *supra* note 1.

Marginal costs have been estimated as the change in total costs resulting from an incremental change in existing service levels. For all long-distance services, those costs comprise access charges for calls based on tariffed rates for access switched services per conversation minute as obtained from the FCC. Pacific Telesis provided the access charges for dedicated services that were used to calculate all classes of interstate dedicated access costs for outbound and inbound services that are not switched. Access charges for intrastate, interLATA calls tariffed rates per minute were obtained from Pacific Telesis for both switched and dedicated (outbound and inbound) access.²

Estimates of the network operating costs per minute for a long-distance call have been reported by AT&T for WATS outbound and WATS inbound (800) services as shown in table 5-3.³ The Wharton Economic Forecast Associates (WEFA) reports that the network cost of service equals \$0.01 per minute, which supports those AT&T cost estimates.⁴ The marginal cost estimates here are based on AT&T's estimates of operating costs for switched and dedicated WATS outbound and inbound services and WEFA's estimate of operating costs for MTS standard and discount services.

2. The sources of access charge estimates over time are listed below following the type of service. Interstate MTS: FCC, Monitoring Report, 1994, Table 5.11. Intrastate MTS: Pacific Telesis Tariffs. Interstate WATS Outbound Switched: FCC, Monitoring Report, 1994, Table 5.11. Interstate WATS Outbound Dedicated, Open End of Call: FCC, Monitoring Report, 1994, Table 5.11. Closed End of Call: Pacific Telesis Tariffs. Intrastate WATS Outbound Switched: Pacific Telesis Tariffs. Intrastate WATS Outbound Dedicated: Pacific Telesis Tariffs. Interstate WATS Inbound Switched: FCC, Monitoring Report, 1994, Table 5.11. Interstate WATS Inbound Dedicated, Open End of Call: FCC, Monitoring Report, 1994, Table 5.11. Closed End of Call: Pacific Telesis Tariffs. Intrastate WATS Inbound Switched: Pacific Telesis Tariffs. Intrastate WATS Inbound Dedicated: Pacific Telesis Tariffs.

3. See Direct Testimony of John Sumpter on Behalf of AT&T Communications of California, Inc., Application of AT&T Communications of California, Inc. (U 5002 C) for Authority to Provide Intrastate AT&T 800 READYLINE Service, June 18, 1990.

4. WHARTON ECONOMIC FORECAST ASSOCIATION. ECONOMIC IMPACT OF ELIMINATING THE LINE-OF-BUSINESS RESTRICTIONS ON THE BELL COMPANIES (July 1993) at 20-21 (citing Bellcore data).

TABLE 5-3 AT&T ESTIMATES OF LONG-RUN NETWORK COSTS FOR LONG-DISTANCE CALLS (Dollars Per Minute)			
WATS Out- bound Switched	WATS Out- bound Dedi- cated	WATS Inbound Switched	WATS In- bound Dedi- cated
Pro WATS	Megacom WATS	READYLINE8 00	Megacom 800
\$0.0101	\$0.0130	\$0.0108	\$0.0129
Source: Testimony of John Sumpter on Behalf of AT&T Comm. of California, Inc., Application of AT&T Comm. of California, Inc. (U 5002 C) for Authority to Provide Intrastate AT&T 800 READYLINE Service. June 18, 1990.			

Access charges and network operating costs together comprise marginal costs that vary according to the types of services provided. Table 5-4 indicates the extent of variation between switched and dedicated services. The costs of switched interstate are greater because operating expenditures and access charges are higher. This table also indicates the significant decline in marginal costs over the ten year period—by more than fifty percent for each type of service. Marginal costs declined over that period because state and federal regulatory decisions reduced access charges by more than ten cents per minute for switched and five cents per minute for dedicated services.

TABLE 5-4 ESTIMATED MARGINAL COSTS OF A REPRESENTATIVE INTERSTATE LONG-DISTANCE MESSAGE			
	Switched Service	Dedicated Outbound Service	Dedicated Inbound Service
Date	(\$ per message minute)		
5/26/84	0.183	0.105	0.099
1/15/85	0.187	0.107	0.101
6/1/85	0.172	0.099	0.094
10/1/85	0.164	0.096	0.091
6/1/86	0.150	0.096	0.091
1/1/87	0.134	0.096	0.090
7/1/87	0.125	0.096	0.090
1/1/88	0.116	0.093	0.088
12/1/88	0.106	0.084	0.079
2/15/89	0.105	0.082	0.078
4/1/89	0.101	0.066	0.063
1/1/90	0.088	0.058	0.055
7/1/90	0.085	0.054	0.051
1/1/91	0.082	0.052	0.099
7/1/91	0.080	0.051	0.048
7/1/92	0.078	0.049	0.047
7/1/93	0.077	0.050	0.047

Source: *supra* note 2.

The estimated price and marginal cost indices provide the data required to calculate price-cost margins for each service for each year. Price-cost margins are estimated here as the difference between the price and cost indices as a percent of the price index. Margins are analyzed first for standard services and then for discount plans. Next, margins are examined for long-distance services

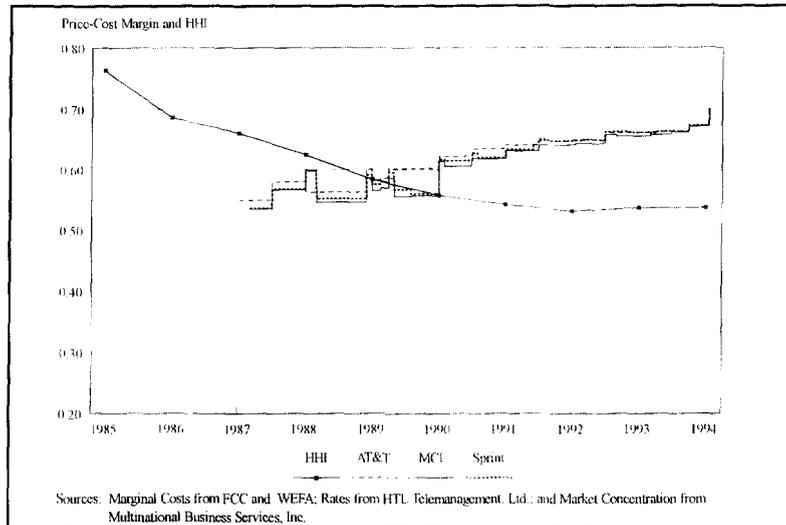
within California. Finally, margins are analyzed for a sample of important outbound U.S. international markets.

THE DYNAMICS OF PRICE-COST
MARGINS AND MARKET SHARES

The price-cost margins and HHI estimates for the four major classifications of service markets appear below.⁵ For message toll service (in figure 5-1) price-cost margins were constant over time and slightly variant across the three firms in the 1980s. Margins both increased and converged for the three firms in the 1990s, reflecting the underlying increased similarity not only in access charges but also in their standard tariff prices. Market concentration, as measured by HHI, decreased from a level of 0.76 in 1985 to 0.54 in 1993. Those changes over time produced an inverse relation between profit margins and the HHI. Price-cost margins increased as concentration declined.

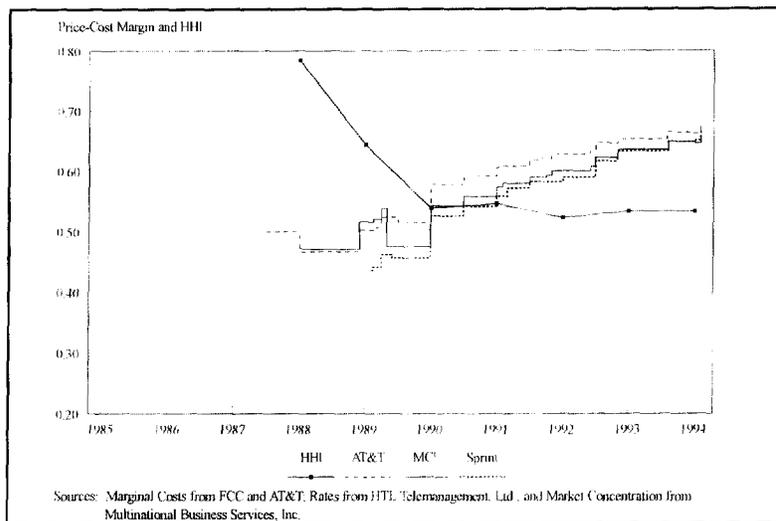
5. While it is customary to measure the HHI in units (thousands), based on shares in whole numbers, it is assumed here that shares are percentages (thousandths) for convenience in placing the HHI and margins on the same diagram.

FIGURE 5-1
PRICE-COST MARGINS AND MARKET CONCENTRATION MTS



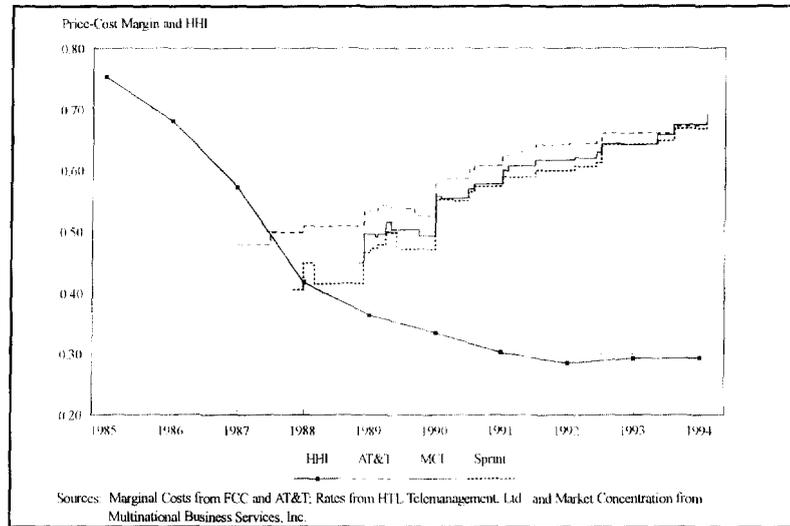
For WATS switched inbound access, as in figure 5-2, margins differed among the three firms from 1982 to 1989. AT&T's price-cost margins were consistently higher than those of MCI and Sprint. But as the two smaller carriers established inbound service comparable to that of AT&T, and as they began to pay the same access charges, their margin levels became more similar until in 1993 they had become virtually identical. As margins converged, they increased to 70 percent of prices. Because of AT&T's monopoly in that service at the time of divestiture, the HHI for inbound WATS was 1.0 in 1986 but decreased rapidly to 0.55 in 1990, after which it stabilized at 0.53 by 1993. Thus, inbound WATS pricing margins increased to high levels as concentration declined significantly.

FIGURE 5-2
 PRICE-COST MARGINS AND MARKET CONCENTRATION
 WATS SWITCHED INBOUND (200 HOURS PER MONTH)



For outbound WATS with switched access, as illustrated in figure 5-3, the price-cost margins of AT&T, MCI, and Sprint followed a path of steady increases during the late 1980s and early 1990s—from 55 to 60 percent initially and to 75 percent in 1994. Margins of the three suppliers converged following the establishment of uniformity in prices. Concentration in shares as indicated by the HHI declined rapidly from 1985 to 1988 from a level of 0.75 to 0.42 and thereafter stabilized at 0.30, the equivalent of three-and-one-third equal-sized firms. Again, as for inbound WATS, margins rose to high levels as the three large service providers moved toward much more equal shares of revenues.

FIGURE 5-3
 PRICE-COST MARGINS AND MARKET CONCENTRATION
 WATS SWITCHED OUTBOUND (200 HOURS PER MONTH)



Virtual network services offered to large volume business users were available at prices that discounted WATS outbound tariffs in the late 1980s. Because of extensive differences in those discounts across the three large providers, price-cost margins for virtual services varied extensively in 1989 and 1990 (as shown in figure 5-4). Price-cost margins were also ten to fifteen percentage points lower than for WATS services. That would be a difference in margins in keeping with the most profitable price structure of a discriminating monopolist, given that the price elasticity of demand for virtual services is higher (due to the ability of those buyers to self-provide much of that service with their own networks). After 1990, margins for AT&T and Sprint were almost identical while those for MCI were lower. Over the first three years of the 1990s, price-cost margins for all three providers increased to levels twice what they were previously; margins for MCI were still lower than for the other two, but that company maintained a roughly constant price differential relative to the others. The HHI decreased from 0.65 to a level of 0.50 by 1989 and stabilized at 0.47 by 1992.