

**REAL INTERSTATE TOLL RATES (NET OF ACCESS CHARGES) FELL FASTER  
BEFORE DIVESTITURE THAN AFTER**

Absent changes in access charges, Exhibit 1 shows that interstate toll rates would have risen in nominal terms from 1984 to 1991. In real terms, then, interstate toll rates would have fallen at less than 3.70 percent per year (net of access charge changes), since the GNP-PI for all commodities grew at an annual rate of 3.70 percent from 1984 to 1991.

This rate of decline of real toll rates (net of access charges) is low compared with the 1970s. According to the Bureau of Labor Statistics producer price index, real interstate toll rates fell at about 2.6 percent annually from 1972 to 1983, which was a period in which interstate costs were increasing due to changes in separations generated by the Ozark formula. If we held the interstate NTS allocation fixed at its 1972 level, real interstate revenues would have grown 3.68 percentage points more slowly (per year) from 1972 to 1983.<sup>20</sup> Thus, adjusting for the change in the interstate NTS allocation, we find that real interstate toll rates would have fallen at an annual rate of 6.28 percent ( $6.28 = 2.6 + 3.68$ ) from 1972 to 1983. Since divestiture, real interstate toll rates (net of access charge changes) have declined at less than an annual rate of 3.70 percent -- about half the annual rate at which they declined in the decade prior to divestiture.

---

<sup>20</sup>Between 1972 and 1982, the subsidy from interstate toll for the Bell System (in the form of non-traffic sensitive cost allocations) increased from \$1.570 billion to \$7.690 billion. (C.L. Weinhaus and A.G. Oettinger, Behind the Telephone Debates, Norwood, New Jersey: Ablex Publishing Corporation, 1988, p. 81.) At the same time, Bell System interstate revenues increased from \$6.493 billion to \$21.8 billion. (FCC, Form M (Monthly Report No. 1), various years) If the interstate NTS allocation had been held constant between 1972 and 1982, interstate revenues would have increased from \$6.493 billion to \$15.68 billion (where  $15.68 = 21.8 - 7.690 + 1.570$ ). Annual growth in interstate revenues thus was 12.88 percent, and annual growth in interstate revenue net of NTS allocation changes was 9.22 percent. The difference in the annual growth rate of revenue accounted for the change in NTS cost allocation was thus 3.68 percentage points.

## GROWTH IN DEMAND DUE TO COMPETITION

We compare the decade before divestiture (1972-1982) with the period after divestiture (1984-1988).<sup>21</sup> In each period, we divide actual demand growth into two parts:

1. predicted growth: a part due to changes in prices, income, and population and
2. unexplained growth: a (residually-measured) part due to other changes--changes in taste, changes in the market place (such as competitive entry) etc.

If competition shifts the demand curve outward due to advertising, the availability of new products or services, or a heightened awareness of the possibility of telephone service, we would expect to see that shift as an increase in unexplained growth.

Using conventional measures of the responsiveness of demand to changes in price, income, and population, we calculate the rate of growth of unexplained demand. In the 1972-82 period, demand was predicted to grow at an annual rate of 4.04 percent. Actual demand growth averaged 8.92 percent, leaving a growth rate of unexplained demand of 4.88 percent. In the 1984-91 period, demand growth was predicted to average 8.83 percent and actual demand growth averaged 11.81 percent. Thus the growth rate of unexplained demand in the 1984-91 period averaged 2.97 percent. Growth in demand unexplained by changes in price, income, and population averaged 1.91 percentage points lower in the 1984-91 period compared with the 1972-82 period. See Table 2. Table 2A provides the same analysis, comparing the pre-ENFLA period with the post-ENFLA period (1972-78 with 1979-91) and obtains the same qualitative result.

One explanation of this reduction in the growth rate of unexplained demand after divestiture is the growth of bypass. Interstate toll demand is measured as interstate switched access demand after divestiture, and the growth of bypass demand--including MEGACOM and WATS-type services--would mask

---

<sup>21</sup> Again, we treat the post-divestiture period as the competitive period, although the same analysis as that described below yields the same qualitative results if applied to the 1972-78, 1979-1990 periods. To judge the effects of competition on demand growth, it is useful to note that MCI and Sprint advertising was less than \$5 million in 1980 compared with \$45 million for AT&T (measured in 1986 dollars). Between 1983 and 1984, total annual advertising for AT&T, MCI and Sprint increased from about \$100 million to about \$150 million (in 1986 dollars). See Michael Porter, op. cit., Figure 23.

growth in toll demand after divestiture. To adjust our results for the possibility of bypass, we estimate interstate bypass usage from 1984 through 1991 and add that usage to our measure of switched access demand. Calculation of the bypass adjustment is outlined below. The results are shown in Table 2, where it is evident that adjusting for bypass growth does not reverse our earlier finding: growth in interstate toll demand (adjusted for bypass) unexplained by economic factors averaged 0.81 percentage points lower in the 1984-91 period than in the 1972-82 period.

TABLE 2  
UNEXPLAINED EXOGENOUS GROWTH SLOW D AFTER DIVESTITURE

PERIOD	GROWTH IN PRICE	GROWTH IN INCOME/POP	GROWTH IN POP	PRICE EFFECT  ELAS= -0.72	INCOME EFFECT  ELAS= 0.80	POP EFFECT  ELAS= 1.00	TOTAL EFFECT IMPLICATED GROWTH	ACTUAL GROWTH	UNEXPLAINED GROWTH	(INCLUDING BYPASS)	
										ACTUAL GROWTH	UNEXPLAINED GROWTH
1972-82	-2.65%	1.28%	1.01%	1.85%	1.02%	1.01%	4.04%	0.92%	4.08%	0.92%	4.08%
1984-91	-0.16%	1.75%	0.95%	0.32%	1.48%	0.95%	0.83%	11.01%	2.07%	12.08%	4.07%
DIFFERENCE	-5.51%	0.47%	-0.07%	4.37%	0.38%	-0.07%	4.79%	2.00%	-1.01%	3.00%	-0.81%

PPI  
INTERSTATE (LCL)  
GNP PI MINIMAL REAL

1972	50.3	1000	1960
1982	1000	1570	1520
1984	1003	1488	1374
1991	1395	1056	75.7
GROWTH			
72-82	7.11%	4.20%	-7.65%
84-91	6.51%	-4.78%	-8.16%

SOURCE: BLS

LONG LINES MESSAGE VOLUMES AND DURATION TIMES  
PER MONTH

	MESSAGES	TIME	MINUTES
1962	1,171,079	6.08	6,976,764
1970	2,714,007	7.04	21,277,015
1972	3,716,010	7.01	25,181,350
1980	6,406,607	8.65	55,311,207
1982	6,877,695	8.67	59,196,116
GROWTH			
1962-82	9.71%		10.40%
1972-82	7.07%		8.97%
1970-80	9.01%		10.10%

SOURCE: LONG LINES STATISTICS 1980-1982

PER-CAPITA  
POP REAL INCOME

1972	209,896	\$8,562
1982	232,171	\$9,725
1984	236,343	\$10,419
1991	252,474	\$11,760
GROWTH		
72-82	10.1%	1.28%
84-91	0.95%	1.75%

SOURCE: 1990 STATISTICAL ABSTRACT TABLES 2,695  
1991 STATISTICAL ABSTRACT TABLES 2,703  
1990 INCOME 700, 1992 SURVEY OF CURRENT BUSINESS  
1991 - EXTRAPOLATION

INTERSTATE SWITCHED ACCESS MINUTES

	USAGE	EST	
		BYPASS	TOTAL
00(3)	373	79	454
00(2)	621	103	724
00(1)	697	109	806
00(0)	778	222	1000
91(3)	819	204	1023
GROWTH			
1984-88	11.00%	23.65%	15.49%
1984-91	11.01%	17.30%	12.90%

SOURCE: FCC "TRENDS IN TELEPHONE SERVICE"  
FEBRUARY, 1992, TABLE 24

FCC "MONITORING REPORT," JULY 1991, TABLE 61A3

TABLE 2A  
UNEXPLAINED EXOGENOUS GROWTH SLOWED AFTER COMPETITIVE ENTRY

PERIOD	GROWTH IN PRICE	GROWTH IN INCOME/POP	GROWTH IN POP	PRICE EFFECT	INCOME EFFECT	POP EFFECT	TOTAL EFFECT PREDICTED GROWTH	ACTUAL GROWTH	UNEXPLAINED GROWTH	(INCLUDING BYPASS)	
				ELAS= -0.72	ELAS= 0.80	ELAS= 1.00				ACTUAL GROWTH	UNEXPLAINED GROWTH
1972-78	-2.80%	2.16%	0.98%	2.06%	1.73%	0.98%	4.85%	0.85%	5.10%	0.80%	5.10%
1978-81	-5.71%	1.51%	0.86%	4.32%	1.21%	0.86%	6.00%	0.80%	3.20%	10.00%	4.85%
DIFFERENCE	-2.91%	-0.65%	-0.02%	2.26%	-0.52%	-0.02%	1.75%	-0.06%	-1.82%	0.70%	-1.05%

	PPI		
	GNP - P1	INTERSTATE TEL NOMINAL	REAL
1972	50.1	100.0	100.0
1978	72.7	121.9	167.7
1979	70.8	120.0	151.1
1980	129.5	100.1	81.6
1991	139.5	105.6	75.7
GROWTH			
72-78	6.31%	1.16%	-7.00%
79-91	4.87%	-1.11%	-5.71%

SOURCES: BLS

	PER-CAPITA	
	POP	REAL INCOME
1972	200,096	\$8,562
1978	222,585	\$9,795
1979	225,055	\$9,829
1980	247,350	\$11,591
1991	252,676	\$11,768
GROWTH		
72-78	0.98%	2.16%
79-91	0.96%	1.51%

SOURCES: 1990 STATISTICAL ABSTRACT TABLES 2.095  
1991 STATISTICAL ABSTRACT TABLES 2.703  
1990 INCOME 790, 1992 SURVEY OF CURRENT BUSINESS  
1991 - EXTRAPOLATION

	LONG-LINES MESSAGE VOLUME AND HOLDING TIMES		
	MESSAGES	HOLDING TIME	MINUTES
1977	3,216,010	7.83	25,181,350
1978	5,378,014	8.15	44,009,080
1979	5,951,060	8.49	50,349,170
1982	6,877,695	8.67	59,196,116
GROWTH			
1972-78	8.76%		9.95%
1979-1982	6.67%		5.96%

SOURCE: LONG-LINES STATISTICS 1980-1982

	INTERSTATE SWITCHED ACCESS MINUTES		
	USAGE	EST BYPASS	TOTAL
1981 (Q1)	37.5	7.0	45.4
88(Q1)	62.1	18.5	80.6
89(Q1)	69.7	19.9	89.6
90(Q1)	77.8	22.2	100.0
91(Q1)	81.9	20.0	106.5
GROWTH			
1981-91	11.81%	17.30%	12.00%
1979-1991	9.89%		10.65%

SOURCE: FCC "TRENDS IN TELEPHONE SERVICE"  
FEBRUARY 1991, TABLE 24

FCC "MONITORING REPORT," JULY 1991, TABLES 6.1.6.3

**Bypass Volumes: 1984-91**

Total (intrastate plus interstate) bypass minutes were estimated by the RBOCs and GTE in five surveys conducted by the FCC. The results are reported in the FCC Monitoring Report, (July, 1991), Tables 6.1 and 6.3. We multiply those minutes of use by the fraction of minutes which are interstate ( $1/(1-0.368) = 0.73$ ) from the Huber Report) to obtain interstate switched access minutes of use which are bypassed for the years 1988, 1989, and 1990. An estimate for 1984 is calculated by observing the growth rate in special access lines (from the FCC Statistics of Communication Common Carriers, 1984-1991) and assuming the growth rates of special access lines and bypass minutes between 1984 and 1990 are the same. An estimate for 1991 is obtained by extrapolating from the 1990 estimate using the 1988-90 growth rate. See Table 3.<sup>22</sup>

**Table 3  
Growth in Special Access Lines**

	Special Access Lines
1984	1,128,924
1985	1,320,228
1986	1,760,741
1987	1,995,739
1988	3,192,682
1989	3,037,268
1990	4,035,297
Growth	23.7%

We then add to the bypass minutes the interstate switched access minutes as reported in the FCC Trends in Telephone Service (February 1992), Table 24, to obtain total switched access minutes of use (including bypass minutes). See Tables 2 and 2A.

<sup>22</sup>Source: FCC, Statistics of Communications Common Carriers.

**DEMAND STIMULATION FROM SUBSCRIBER LINE CHARGES  
AND EXOGENOUS COST CHANGES**

LEC interstate revenue requirements recovered from IXCs fell sharply after divestiture due to the increase in subscriber line charges and to the implementation of several exogenous cost changes. Table 4 shows LEC interstate revenue with and without these exogenous changes.<sup>23</sup>

**Table 4  
Carrier Switched Access Revenue Changes  
(\$000)**

Period	CCL + TS Revenue (R <sub>0</sub> )	Cumulative Exog Cost Changes	Change in Authorized Rate of Return	Change in CPE and IW Rev Req	SLC Revenue	CCL + TS Revenue R <sub>1</sub>
1984-85	\$14,464,181	\$0	\$0	\$0	(\$1,296,104)	\$15,760,285
1985-86	\$14,955,910	(\$206,574)	\$0	(\$627,112)	(\$4,484,658)	\$20,274,255
1986-87	\$13,669,242	(\$509,107)	(\$191,916)	(\$1,836,941)	(\$3,646,949)	\$19,854,155
1988	\$13,680,660	(\$1,090,281)	(\$343,170)	(\$1,821,257)	(\$4,563,679)	\$21,499,046
1989 (4-12)	\$12,713,833	(\$1,345,326)	(\$352,751)	(\$1,973,689)	(\$5,676,620)	\$22,062,219
1990-91	\$12,148,199	(\$1,744,907)	(\$339,278)	(\$2,409,425)	(\$6,069,004)	\$22,710,813

These reductions in revenue requirements caused interstate carrier access prices to fall and, in turn, caused interstate toll prices to fall. The demand stimulation resulting from the reduction in interstate toll prices can be calculated if the price elasticity of demand for interstate toll service and the

<sup>23</sup>Source: United States Telephone Association. Ex Parte in CC Docket 87-313, filed 8/6/09, Tables 2 and 5

fraction of DXC cost represented by access charges are known. For simplicity, we assume the demand function for LEC interstate switched access usage has a constant elasticity given by  $\beta$ , so that

$$q_i = Ap_i^\beta \quad (i = 1, 0)$$

and

$$R_i = p_i q_i = p_i \times Ap_i^\beta = Ap_i^{\beta+1}$$

It then follows that:

$$\frac{R_1}{R_0} = \left( \frac{p_1}{p_0} \right)^{\beta+1}$$

so that

$$\frac{p_1}{p_0} = \left( \frac{R_1}{R_0} \right)^{\frac{1}{\beta+1}}$$

Thus the price change required to obtain a 10 percent revenue change differs from 10 percent. Rather than using a percentage price change calculated in this manner to calculate demand response, we can directly solve for the quantity  $q_1$  which would result from imposing a price increase of the magnitude necessary to increase revenues from  $R_0$  to  $R_1$ :

$$\frac{q_1}{q_0} = \left( \frac{p_1}{p_0} \right)^\beta = \left( \frac{R_1}{R_0} \right)^{\frac{\beta}{\beta+1}}$$

so that

$$q_1 = \left( \frac{R_1}{R_0} \right)^{\frac{\beta}{\beta+1}} \times q_0$$

The decrease in carrier access revenue due to the reduction in switched access prices caused by the recovery of SLC revenue from end users and the implementation of exogenous cost changes thus causes

an interstate usage increase from  $q_0$  to  $q_1$ . We will take the difference  $q_0 - q_1$  as our measure of interstate switched access demand stimulation caused by the implementation of SLCs and exogenous cost changes. Using data from the recent price cap filings, we see that demand stimulation from SLCs and exogenous cost changes accounts for about 4.8 percentage points of annual growth since 1984. See Table 5.<sup>24</sup> Annual interstate toll growth averaged about 10.5 percent before divestiture (1962-82) and 11.8

Table 5  
Demand Stimulation From SLCs and Exogenous Cost Changes

	BASELINE CL DEMAND (1)	ESTIMATED CL STEM (2)	PERCENT CL STEM (3)	ESTIMATED CL UNSTEM (4)	ANNUAL GROWTH DIFF DUE TO STEM (5)
1984	160,139,810	6,493,672	4.06%	153,646,138	
1988	244,467,327	47,892,584	19.59%	196,574,743	
1989	281,422,756	65,700,270	23.35%	215,722,486	
1990-91	319,437,082	83,216,292	26.05%	236,220,790	
GROWTH:1984-					
1988	11.16%			6.35%	+ 4.80%
1989	11.94%			7.02%	+ 4.91%
1990	12.20%			7.43%	+ 4.77%

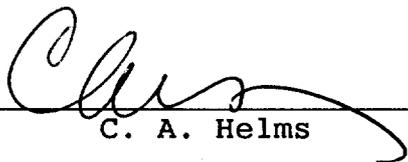
percent after divestiture (1984-91).<sup>25</sup> Approximately 8 percentage points of the post-divestiture demand growth were due to carrier access charge reductions (stemming from SLCs and exogenous cost changes). Hence regulatory actions by the FCC explain more than the difference in demand growth before and after divestiture.

<sup>24</sup>Sources: (1) 7/27/90 USTA Ex Parte, CC Docket 87-313, Table 1; (2) 8/6/90 Ex Parte, Table 8; (3) (2)/(1); (4) (1)-(3); and (5) (1)-(4).

<sup>25</sup>AT&T, "Long Lines Statistics, 1960-1982," and FCC, "Trends in Telephone Service," February 1992.

CERTIFICATE OF SERVICE

I, C. A. Helms, do hereby certify that a copy of the foregoing "REPLY COMMENTS OF PACIFIC BELL" in CC Dkt. 92-134, was served on the following parties of the attached Service List on October 5, 1992 by hand or by first class United States mail, postage prepaid.

  
C. A. Helms

Pacific Bell  
140 New Montgomery Street  
San Francisco, CA 94105

92-134  
0530B

CC Dkt. 92-134  
Service List

Cheryl Tritt \*  
Chief, Common Carrier Bureau  
FCC  
1919 M St., N.W., Rm. 500  
Washington, D.C. 20554

Gregory J. Vogt \*  
Chief, Tariff Division  
FCC  
1919 M St., N.W., Rm. 518  
Washington, D.C. 20554

Colleen Boothby \*  
Deputy Chief, Tariff Division  
FCC  
1919 M St., N.W., Rm. 518  
Washington, D.C. 20554

Judith Nitsche \*  
Chief, Tariff Review Branch  
FCC  
1919 M St., N.W., Rm. 518  
Washington, D.C. 20554

Downtown Copy Center \*  
1990 M St., N.W., Suite 640  
Washington, D.C. 20036

Spencer L. Perry, Jr.  
Senior Director - IRA/TMA  
P.O. Box 5090  
Hoboken, NJ 07030

William C. Sullivan  
Attorney for SWBT  
1010 Pine St., Rm. 2305  
St. Louis, MO 63101

Lawrence E. Sarjeant  
Attorney for USWC  
1020 19th St., N.W., Ste. 700  
Washington, D.C. 20036

\* Service by Hand

John Morgan, Adm. Asst.  
to Secy-Treas for CWA  
501 3rd St., N.W.  
Washington, DC 20001

Michael F. Hydock  
Sr. Staff Member for MCI  
1801 Pennsylvania Ave., N.W.  
Washington, D.C. 20006

Francine J. Berry  
Attorney for AT&T  
295 North Maple Ave.  
Rm. 3244J1  
Basking Ridge, NJ 07920

Leon M. Kestenbaum  
Attorney for US Sprint  
1850 M St., N.W., Ste. 1110  
Washington, D.C. 20036

John L. Bartlett  
Attorney for ARINC  
1776 K St., N.W.  
Washington, D.C. 20006