

$$dp = dw - dTFP$$

Thus, the growth in input prices less the growth in output prices is equal to the change in TFP. This result requires only that excess profits are zero in every period. It does not require cost minimization, profit maximization, marginal cost pricing, or constant returns to scale.

We have showed that the change in the average industry output price is equal to the change in its average input prices less the change in its total factor productivity. Applying this to the telecommunications industry, we write:

$$(1) \quad p^T = w^T - TFP^T$$

where p^T represents the annual percentage change in the telecommunications industry output prices, w^T represents the annual percentage change in its input prices and TFP^T represents the annual percentage change in its total factor productivity (the ratio of an index of physical quantities of outputs to an index of physical quantities of inputs).

In the long run, since there are no excess profits in the economy as a whole, the relationship among input prices, output prices, productivity, and exogenous cost changes can be derived for the nation as a whole in the same manner as (1) above:

$$(2) \quad p^N = w^N - TFP^N$$

where p^N is the annual change in a national index of output prices, w^N is the annual change in a national index of input prices and TFP^N is the annual change in the economy-wide total factor productivity.

Subtracting equation (2) from equation (1), we see that:

$$(3) \quad p^T = p^N - [TFP^T - TFP^N] + [w^T - w^N]$$

so that X is given by $[TFP^T - TFP^N] - [w^T - w^N]$ which simplifies to AT&T's equation number (1) in Appendix A.

ATTACHMENT 2

**USTA COMMENTS
CC DOCKET NO. 94-1, 96-262
JANUARY 24, 2000**

"Du Pont" Financial Analysis of Interstate Operating Income

For this demonstration, USTA uses the "Du Pont Analysis" from finance.

"The Du Pont Company was a forerunner in stressing that satisfactory return on assets may be achieved through high profit margins or rapid turnover of assets, or a combination of both. The Du Pont system causes the analyst to examine the sources of a company's profitability. Since the profit margin is an income statement ratio, a high profit margin indicates good cost control, whereas a high asset turnover ratio demonstrates efficient use of the assets on the balance sheet. Different industries have different operating and financial structures. For example, in the heavy capital goods industry (machinery and equipment), the emphasis is on a high profit margin with a low asset turnover, while in food processing, the profit margin is low, and the key to satisfactory returns on total assets is a rapid turnover of assets."¹

The profit margin ratio is BOC interstate operating income divided by BOC interstate revenue. The asset turnover ratio is BOC interstate revenue divided by BOC interstate average net investment (ANI). Thus, the Du Pont display is a decomposition of return into the corresponding profit margin and asset turnover ratios.

The first column in Table 1 is the interstate rate of return, which is actual BOC interstate operating income divided by annual average net investment.² The second column shows that the BOC profit margin per dollar of revenue has been very stable under Price Caps.³ Therefore even the separated accounting data shows that LECs have achieved efficiency gains sufficient to absorb the \$6 billion of interstate Price Cap X reductions from 1991-1998. LEC industry efficiency gains are further highlighted by the increasing LEC asset turnover efficiency in the third column.⁴ This shows increasingly higher levels of revenue per dollar of LECs' average net investment.⁵ Of course, all of these effects are more correctly included in the "economically meaningful" total company TFP approach to measuring the X-factor.

¹ Fundamentals of Investment Management, G.A.Hirt and S.B. Block, Irwin, 5th edition, 1996, page 222-223. See also page 86, Fundamentals of Financial Management, 7th edition, Eugene F.Brigham, The Dryden Press, 1995 which defines the Du Pont equation as "A formula that gives the rate of return on assets by multiplying the profit margin by the total assets turnover."

² BOC interstate revenue, actual operating income and ANI was collected from interstate reports but can also be found in Tables 5 and 6, Appendix C, Statistical Data, in Price Cap First Report and Order, released April 7, 1995. More current data since 1992 was collected for the BOC industry from the FCC's "Annual Constant Return" excel spreadsheets from the Imputed X study, available from the CCB web site.

³ Principles of Financial Management, D.R. Emery, J.D. Finnerty, J.D. Stowe, 1998, Prentice Hall. Page 98-99 "Restaurants, for example, operate on lower profit margins than electric companies, jewelers, or banks." Table 4.7 shows a typical electric company net profit margin at 20%, in the range for the BOC interstate results.

⁴ Ibid. "The total asset turnover is largely determined by the production and marketing processes in each particular industry. For example, its not possible to generate electricity without a large investment in plant and equipment." Table 4.7 also shows the typical total asset turnover ratio in the electric industry at 0.5 .

TABLE 1

Interstate return = Operating Income / ANI =

(Operating Income / Revenue) X (Revenue / ANI)

	BOC Interstate Industry Average	=	Income divided by Revenue	X	Revenue divided by Average Net Investment
	Rate of Return	=	Earnings MARGIN	X	Asset Turnover
1987-88	0.1239	=	0.2072	X	0.5980
1989-90	0.1191	=	0.1946	X	0.6120
1991	0.1179	=	0.1914	X	0.6159
1992	0.1252	=	0.1934	X	0.6471
1993	0.1352	=	0.2005	X	0.6744
1994	0.1368	=	0.1958	X	0.6987
1995	0.1413	=	0.1995	X	0.7086
1996	0.1458	=	0.2042	X	0.7140
1997	0.1478	=	0.2004	X	0.7378
1998	0.1567	=	0.1998	X	0.7843

INPUTS TO

SECTION ABOVE:

\$ millions	BOC Average		
	Interstate Net Investment	BOC Net Oper. Income	BOC Interstate Revenues
1987-88	\$ 26,057	\$ 3,228	\$ 15,583
1989-90	\$ 25,512	\$ 3,038	\$ 15,615
1991	\$ 25,103	\$ 2,959	\$ 15,461
1992	\$ 24,795	\$ 3,103	\$ 16,044
1993	\$ 24,637	\$ 3,331	\$ 16,614
1994	\$ 25,011	\$ 3,422	\$ 17,476
1995	\$ 25,523	\$ 3,608	\$ 18,085
1996	\$ 26,164	\$ 3,815	\$ 18,681
1997	\$ 25,578	\$ 3,781	\$ 18,872
1998	\$ 25,321	\$ 3,969	\$ 19,858

⁵ Essentials of Investments, Z. Bodie, A. Kane, A.J. Marcus, 2d edition, Irwin, 1995, page 361. "...the ratio of sales to assets, is known as the **asset turnover** (ATO). It indicates the efficiency of the firm's use of assets in the sense that it measures the annual sales generated by each dollar of assets."

Access Ratepayers have gained the majority share of Price Cap benefits.

Table 2 shows that the improvement in LECs' interstate earnings represents approximately 27% of the total Price Cap efficiency benefits. The majority balance of 73% represents interstate access reductions for ratepayers of over \$2.8 billion just from 1991 through 1995. This 27% benefit share to LECs reflects interstate earnings gains of approximately \$1 billion, compared to total efficiency benefits of almost \$3.9 billion over 1991 to 1995. This period included the highest LEC efficiency initiatives in the form of major force reductions.

The analysis in Table 2 uses verifiable LEC interstate rate change and earnings data. Data sources are indicated in the third column of Table 2. However, USTA continues to caution that interstate accounting is the lesser alternative to the more "economically meaningful" total company TFP approach.

TABLE 2

1991-1994 CUMULATIVE LEC INTERSTATE RATE REDUCTIONS (\$millions)	\$2,121	Table 6, Appendix C, FCC First Report and Order, April 7, 1995
1995 INTERSTATE REDUCTIONS	\$723	LEC Tariff filings, 1995 calendar impact
TOTAL REDUCTIONS 1991-1995	\$2,844	Reductions to interstate ratepayers, includes sharing, pricing below cap
TOTAL 1991 Interstate Earnings At 11.25% on 1991 ANI rate base	\$3,445	Table 5, pg. 2, Appendix C, 1 st R&O = .1125 x \$30,624 LEC ANI
TOTAL 1995 Interstate Earnings	\$4,486	Col. H, pg. 1 FCC "Constant Return" Spreadsheet from FNPRM Imputed X
Interstate Earnings Gain 1991-1995	\$1,041	1995 earnings vs. 1991 at 11.25%
Total of 1991-1995 Rate Reductions and LEC interstate earnings gain	\$3,885	SUM: \$2,844 + \$1,041
LEC interstate earnings gain 1991-1995 as share of total interstate efficiency benefits	26.8%	\$1,041 earnings gain relative to total efficiency gains of \$3,885, 1991-1995

Price Cap LEC Investment Impact

The IXCs' Comments support the FNPRM proposition that billions of past interstate industry earnings and employee severance payments have been "excessive". This self-serving assessment is used to rationalize making billions of reductions to LEC industry earnings year by year. The FNPRM analysis reduces earnings and revenues based on a path defined by Baa bond movements down to an 8.68% cost of capital, as shown in Table C-3 of the FNPRM Imputed X study. AT&T, on the other hand, adjusts past LEC earnings and revenues down from 11.25% in 1991 on a straight line to 8.63% in 1998 (for example, AT&T Comments Appendix A, at Table A-2)

Annual new BOC industry plant investment has totaled \$196 billion over 1986 to 1998 and totaled \$129 billion during the 1991-1998 Price Cap period.¹ However, the adjustments for "excess" earnings in the FCC FNPRM, plus the FCC disallowances for "excess" severance, would have removed a total of over \$36 billion in actual BOC income for the 1991-1998 period.

Compared to actual BOC industry income for the 1991-1998 period, such an adjustment would be equivalent to a loss of BOC investment funding support of approximately 28% against the actual BOC new plant investment of \$128.9 billion.

¹ Annual BOC new plant investment can be found in the X-factor TFP studies, for example, in the column "Adjusted Capital Additions", Table B-7, page 59 of the FNPRM in this proceeding. The second column can be found at the last column of FNPRM Table B-7, except that 1998 is adjusted to remove SNET, which was not included in the prior years' history. The FCC Adjusted property income can be found at the second column FNPRM Table B-10, but is also reduced for the "excess" severance payment adjustments from the sixth column of FNPRM Table B-5. The last column in Table 3 is the difference between actual BOC property income and the "FCC Adjusted" series.

TABLE 3

\$ millions	Annual BOC Gross Plant Investment	ACTUAL BOC Property Income incl. Deprec.	FCC Adjusted Property Income - "excess" labor	FCC Investment Fund Reductions \$ millions
1986	\$ 13,180	\$ 26,793	\$ 21,249	\$ (5,544)
1987	\$ 12,555	\$ 27,702	\$ 22,444	\$ (5,258)
1988	\$ 14,285	\$ 26,866	\$ 23,494	\$ (3,372)
1989	\$ 13,284	\$ 25,846	\$ 23,723	\$ (2,123)
1990	\$ 14,476	\$ 25,585	\$ 24,600	\$ (985)
1991	\$ 14,527	\$ 24,641	\$ 24,019	\$ (622)
1992	\$ 14,612	\$ 26,477	\$ 23,274	\$ (3,203)
1993	\$ 14,860	\$ 26,915	\$ 21,728	\$ (5,187)
1994	\$ 14,718	\$ 26,366	\$ 22,683	\$ (3,683)
1995	\$ 15,375	\$ 27,166	\$ 23,270	\$ (3,896)
1996	\$ 18,026	\$ 30,415	\$ 24,090	\$ (6,325)
1997	\$ 18,253	\$ 30,680	\$ 25,311	\$ (5,369)
1998	\$ 18,554	\$ 33,341	\$ 25,267	\$ (8,074)

\$ millions	BOC ACTUAL Plant Investment	ACTUAL BOC Property Income	FCC Adjusted Property Income
SUM 1991 - 1998	\$ 128,925	\$ 226,001	\$ 189,642

**FCC FNPRM Investment
Funding Reduction
1991-1998 Total**

\$ - 36,359 million

= - 28.2% funding reduction

ATTACHMENT 3

**USTA COMMENTS
CC DOCKET NO. 94-1, 96-262
JANUARY 24, 2000**

Joel Popkin and Company

ECONOMIC CONSULTANTS

Review of TFPRP Model for USTA

Statement by Stephen B. Pociask

**Executive Vice President and Chief Economist
Joel Popkin and Company
Washington, DC**

January 21, 2000

At the request of the United States Telecom Association (USTA), I have reviewed its TFPRP model and results. My review included an assessment of the model – both in terms of productivity theory and spreadsheet logic – in order to determine whether the TFPRP model has been appropriately updated through 1998. My conclusion is that USTA's TFPRP model is internally consistent and defines productivity growth in a theoretically sound manner.

The update of 1998 required both company-specific data for the local exchange companies and macroeconomic data. I performed a company-by-company check of the reasonableness of the data. While I found the year-to-year changes to be reasonable and consistent given historical financial trends and regulatory events (e.g., access reform), I have not audited the primary LEC data back to its company sources and therefore have no opinion on their precision. In regard to the macroeconomic data inputs, which include national input prices, data from the National Income and Product Accounts, and multi-factor productivity estimates for the U.S. economy, I updated the data for 1997 and 1998 and linked these data to the earlier series in the model.

The model incorporates accepted TFP methods in its formulae and spreadsheet design. Price and quantity growth rates consistently utilize logarithms in the calculation of TFP and the X-Factor. Consistent with standard Tornquist indexing, biannual arithmetic averages of cost shares and biannual arithmetic averages of revenue shares are applied to calculate aggregate annual growth rates. The Tornquist technique is appropriately applied to the measurement of outputs, inputs and TFP. All spreadsheet formulae and updated data used in 1998 are consistent with formulae and data used in the prior years.

In sum, my overall assessment is that the updated USTA TFPRP model is designed consistent with standard TFP methodology and its results appear to produce reasonable estimates of the X-Factor.

USTA X-FACTOR SUMMARY REPORT

1998 Total Factor Productivity Review Plan
Input Inflation Differential Development

Item	Source	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
ANNUAL TFP DIFFERENTIAL												
100	LEC TFP	TFP1, I,120	1.77%	3.85%	2.02%	3.78%	3.47%	2.33%	3.80%	6.23%	1.06%	3.50%
110	U.S. TFP	TFP1, I,131	-0.26%	-0.21%	-1.04%	1.49%	0.62%	0.60%	0.39%	0.99%	0.69%	0.68%
120	TFP DIFFERENTIAL	TFP1, I,140	2.03%	4.07%	3.06%	2.29%	2.85%	1.73%	3.41%	5.24%	0.37%	2.81%
130	5Year Average TFP Different	TFP1, I,170	N/A	N/A	N/A	N/A	2.86%	2.80%	2.66%	3.28%	2.98%	2.89%

LEC INPUT INFLATION DEVELOPMENT

Item	Source	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
AVG INPUT SHARES													
200	Capital	INPIDX1,1,200	N/A	0.5024	0.4937	0.4970	0.5092	0.5236	0.5222	0.5212	0.5231	0.5282	0.5360
210	Labor	INPIDX1,1,210	N/A	0.2717	0.2690	0.2638	0.2578	0.2548	0.2525	0.2425	0.2330	0.2204	0.2076
220	MR&S	INPIDX1,1,220	N/A	0.2259	0.2373	0.2392	0.2330	0.2216	0.2253	0.2363	0.2439	0.2514	0.2585
INPUT COST GROWTH Expense													
230	Capital	@LN(INPIDX1,1,100(t)/I,10	N/A	-5.13%	5.27%	3.92%	8.81%	5.85%	2.97%	2.98%	-0.11%	6.84%	4.43%
240	Labor	@LN(INPIDX1,1,110(t)/I,11	N/A	0.19%	1.33%	2.70%	0.61%	6.08%	1.43%	-3.21%	-2.61%	-3.84%	0.34%
250	MR&S	@LN(INPIDX1,1,120(t)/I,12	N/A	10.74%	2.98%	6.48%	-3.90%	2.99%	9.69%	6.17%	2.35%	8.49%	3.88%
INPUT COSTS Quantity													
260	Capital	INPIDX1,1,300	N/A	3.80%	2.40%	2.83%	2.44%	2.51%	2.24%	2.01%	2.03%	3.33%	3.43%
270	Labor	INPIDX1,1,310	N/A	-1.63%	-3.25%	-5.06%	-4.76%	-4.47%	-5.64%	-7.01%	-4.22%	-1.01%	0.15%
280	MR&S	INPIDX1,1,320	N/A	6.34%	-1.45%	2.53%	-7.03%	0.06%	7.00%	3.68%	0.10%	6.64%	2.71%
INPUT PRICE GROWTH Price													
290	Capital	I,230 - I,260	N/A	-8.93%	2.87%	1.09%	6.37%	3.34%	0.73%	0.98%	-2.14%	3.51%	1.00%
300	Labor	I,240 - I,270	N/A	1.82%	4.58%	7.76%	5.37%	10.55%	7.07%	3.81%	1.61%	-2.83%	0.19%
310	MR&S	I,250 - I,280	N/A	4.40%	4.43%	3.95%	3.13%	2.93%	2.69%	2.49%	2.25%	1.84%	1.17%

LEC INPUT INFLATION

320	Annual	I,290*I,200+I,300*I,210+I,3	N/A	-3.00%	3.70%	3.54%	5.36%	5.09%	2.78%	2.02%	-0.20%	1.70%	0.88%
330	5Year Moving Average	@avg(I,320(t),I,320(t-4))	N/A					2.94%	4.09%	3.76%	3.01%	2.28%	1.43%
400	U.S. TFP (Annual)	I,110	N/A	-0.26%	-0.21%	-1.04%	1.49%	0.62%	0.60%	0.39%	0.99%	0.69%	0.68%
410	5Year Moving Average(Curr)	TFP1, I,160	N/A	N/A	N/A	N/A	N/A	0.12%	0.29%	0.42%	0.64%	0.40%	0.49%
420	% Change In GDPPI (Annual)	MISC1P1, I,207	N/A	4.40%	4.43%	3.95%	3.13%	2.93%	2.69%	2.49%	2.25%	1.84%	1.17%
430	5Year Moving Average(Curr)	Avg % Chg: MISC1P1(I,120	N/A	N/A	N/A	N/A	N/A	3.77%	3.43%	2.78%	2.49%	2.19%	1.77%

U.S. INPUT INFLATION

440	Annual	I,400 + I,420	N/A	4.14%	4.22%	2.91%	4.61%	3.55%	3.29%	2.89%	3.24%	2.53%	1.86%
450	5Year Moving Average	I,410 + I,430	N/A	N/A	N/A	N/A	N/A	3.88%	3.72%	3.19%	3.13%	2.59%	2.26%

INPUT INFLATION DIFFERENTIAL

500	Annual	I,320 - I,440	N/A	-7.13%	-0.52%	0.63%	0.75%	1.54%	-0.52%	-0.87%	-3.44%	-0.84%	-0.98%
510	5Year Moving Average	I,330 - I,450	N/A	N/A	N/A	N/A	N/A	-0.95%	0.38%	0.56%	-0.12%	-0.31%	-0.82%

X FACTOR

600	Annual	TFP Differential - Input Inflation Differential	N/A	9.16%	4.59%	2.43%	1.55%	1.31%	2.25%	4.28%	8.68%	1.20%	3.79%
610	5Year Moving Average	I,120 - I,500	N/A	N/A	N/A	N/A	N/A	3.81%	2.43%	2.10%	3.40%	3.29%	3.71%

SUMMARY: 5 Year Moving Averages

700	5 YR AVG TFP DIFF	I,130	N/A	N/A	N/A	N/A	N/A	2.86%	2.80%	2.66%	3.28%	2.98%	2.89%
710	5 YR AVG INPUT INFL DIFF	I,510	N/A	N/A	N/A	N/A	N/A	-0.95%	0.38%	0.56%	-0.12%	-0.31%	-0.82%
720	5 YR AVG X-FACTOR	I,610	N/A	N/A	N/A	N/A	N/A	3.81%	2.43%	2.10%	3.40%	3.29%	3.71%

Item	Source	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
ACCESS LINES (4308) :												
100 Total Switched Access Lines	4308, Table II, r.910, c.cj	112,217,077	116,536,400	119,227,701	123,353,984	125,578,899	129,521,137	133,160,832	138,323,336	144,852,880	152,164,275	157,485,726
MINUTES OF USE (4301) :												
Common Line:												
110 Originating Premium	4301, Table II, r.2010	95,445,094,000	107,582,407,000	120,387,201,000	126,248,833,000	134,730,086,830	142,534,262,743	150,588,924,000	154,607,223,000	154,029,023,000	158,895,134,000	160,527,411,000
120 Terminating Premium	4301, Table II, r.2020	117,020,520,000	135,606,343,000	149,424,148,000	160,387,789,000	172,977,212,400	187,632,699,096	203,753,079,000	228,373,066,000	261,001,967,000	283,657,515,000	301,574,603,000
130 Originating NonPremium	4301, Table II, r.2030	1,807,948,000	1,428,082,000	1,086,300,000	707,543,000	401,281,000	241,678,000	152,080,000	138,438,000	79,058,000	47,503,000	76,686,000
140 Terminating NonPremium	4301, Table II, r.2040	5,870,275,000	4,579,900,000	2,907,521,000	1,987,867,000	1,330,352,000	855,301,000	655,211,000	457,296,000	340,689,000	204,884,000	379,386,000
150 Sw Traffic Sensitive (Prem&NonPrem)	4301, Table II, (r.2050+r.2060)	239,891,398,000	285,468,154,000	283,835,482,000	297,438,355,000	324,311,554,000	333,356,172,250	361,402,276,000	389,788,018,000	421,895,031,000	451,426,381,000	470,254,288,000

		Expense and Labor Inputs										
Item	Source	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
EXPENSE DATA (4302) :												
100 Total Operating Expenses	4302, Table I-1-4, r.720, c.ab	55,170,278,000	57,432,269,000	58,447,840,000	59,966,374,000	59,842,816,000	62,226,713,000	65,565,061,000	66,952,522,000	67,951,758,000	69,798,998,000	71,648,427,000
110 Depreciation & Amortization	4302, Table I-1-3, r.6560, c.ab	16,021,903,000	16,286,221,000	16,427,540,000	16,013,519,000	16,358,255,000	16,885,243,000	17,743,325,000	18,448,323,000	19,481,214,000	19,987,384,000	20,678,381,000
120 Wages & Salaries	4302, Table I-1-4, r.720, c.ac	17,702,530,000	17,666,806,000	17,878,658,000	17,738,490,000	17,663,812,000	17,802,446,000	17,596,539,000	17,640,465,000	17,815,572,000	17,833,843,000	18,015,245,000
130 Fringe Benefits	4302, Table I-1-4, r.720, c.ad	4,201,210,000	4,278,693,000	4,360,014,000	5,108,748,000	5,322,788,000	6,825,305,000	7,182,369,000	6,356,310,000	5,563,285,000	4,683,912,000	4,559,470,000
OPERATING TAXES (4302) :												
200 ITC-Net	4302, Table I-1-5, r.7210, c.bb	865,968,326	803,998,000	725,102,000	665,933,000	603,261,000	554,943,000	486,464,000	381,993,000	351,000,000	286,801,000	236,970,000
210 FIT	4302, Table I-1-5, r.7220, c.bb	4,487,235,000	3,869,122,000	4,378,359,000	4,727,925,000	4,973,794,000	5,607,106,000	5,570,826,000	5,397,607,000	6,288,239,000	5,940,671,000	6,761,194,000
220 State and Local	4302, Table I-1-5, r.7230, c.bb	764,070,000	632,729,000	680,301,000	764,550,000	699,681,000	798,731,000	871,443,000	738,142,000	821,497,000	799,042,000	1,008,734,000
230 Property	4302, Table I-4, r.940, c.c	2,300,681,427	2,431,872,802	2,507,425,520	2,496,785,724	2,408,018,000	2,422,627,000	2,419,839,000	2,360,675,000	2,458,930,000	2,386,513,000	2,407,279,000
240 Gross Receipts	4302, Table I-4, r.940, c.d	1,384,723,594	1,277,184,445	1,237,745,843	1,366,201,386	1,376,876,000	1,412,557,000	1,421,510,000	1,428,998,000	1,381,987,000	1,409,807,000	1,419,537,000
250 Capital Stock	4302, Table I-4, r.940, c.e	101,807,366	124,717,280	132,885,705	146,609,892	159,788,000	183,307,000	152,459,000	140,843,000	145,628,000	130,187,000	127,880,000
260 Other	4302, Table I-4, r.940, c.g	127,863,422	132,827,072	146,630,929	147,563,418	146,199,000	192,054,000	183,629,000	214,675,000	270,387,000	235,585,000	242,726,000
LABOR DATA (4302) :												
300 End of Year Employee Counts	4302, Table I-1-6, r.830, c.bb	574,312	568,926	537,774	514,318	488,880	470,509	436,229	409,083	401,322	400,909	402,558

Item	Source	Gross Additions Inputs											
		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
(a) General Support Facilities													
100	2112 Motor Vehicles	4302, Table B-1-2, r.2112, c.ac	266,537,000	287,619,000	276,415,000	269,825,000	205,703,000	193,336,000	184,027,000	200,387,000	196,178,000	250,915,000	334,880,000
110	2115 Garage Work Equip	4302, Table B-1-2, r.2115, c.ac	11,335,000	10,876,000	14,617,000	13,281,000	12,173,000	10,362,000	6,492,000	5,300,000	4,049,000	4,534,000	7,636,000
120	2116 Other Work Equip	4302, Table B-1-2, r.2116, c.ac	177,131,000	163,620,000	180,577,000	177,330,000	193,088,000	170,197,000	172,191,000	158,183,000	328,078,000	246,079,000	197,545,000
130	2121 Buildings	4302, Table B-1-2, r.2121, c.ac	676,405,000	716,551,000	860,433,000	836,564,000	931,155,000	799,353,000	799,314,000	1,012,376,000	809,051,000	815,511,000	889,697,000
140	2122 Furniture	4302, Table B-1-2, r.2122, c.ac	136,420,000	55,901,000	53,881,000	49,574,000	18,637,000	24,540,000	26,760,000	28,162,000	18,193,000	8,659,000	8,242,000
150	2123 Office Equipment	4302, Table B-1-2, r.2123, c.ac	436,068,000	312,821,000	367,350,000	244,867,000	236,882,999	212,611,000	220,300,000	195,820,000	171,845,000	152,602,000	125,209,000
160	2124 Genl Purpose Computers	4302, Table B-1-2, r.2124, c.ac	1,099,011,000	1,251,509,000	1,210,606,000	1,250,904,000	1,381,389,000	1,337,134,000	1,464,842,000	1,808,271,000	1,361,591,000	1,159,809,000	947,358,000
170	(b) Central Office	4302, Table B-1-2, r.2210, c.ac	4,751,002,000	4,090,523,000	4,324,235,000	4,115,385,000	4,428,370,000	4,289,215,000	4,369,533,000	3,745,805,000	5,040,234,000	5,323,221,000	5,755,352,000
180	(c) Operator Systems	4302, Table B-1-2, r.2220, c.ac	148,469,000	94,168,000	173,212,000	169,284,000	115,563,000	144,345,000	91,138,000	94,978,845	51,447,000	74,444,000	43,117,000
190	(d) Transmission	4302, Table B-1-2, r.2230, c.ac	3,687,577,000	3,292,019,000	3,490,692,000	3,764,516,000	3,905,582,000	4,242,600,000	4,550,136,000	4,960,040,000	6,027,785,000	6,323,442,000	6,853,413,000
200	(e) Information Orig/Term	4302, Table B-1-2, r.2310, c.ac	400,002,000	409,434,000	419,613,000	415,814,000	441,774,000	478,581,000	346,421,000	581,899,000	540,325,000	519,008,000	505,487,000
210	(f) Cable and Wire	4302, Table B-1-2, r.2410, c.ac	5,007,905,000	5,022,754,000	5,928,238,000	5,783,188,000	5,731,800,000	5,644,917,000	5,249,384,000	5,358,204,000	6,263,137,000	6,635,329,000	6,519,911,000

Item	Source	Revenue Inputs										
		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
BOOKED REVENUES (4302) :												
100 Basic Local Service	4302, Table I-1-1, r.520, c.b	32,971,012,000	33,758,126,000	34,837,223,000	36,353,114,000	37,848,452,000	39,443,835,000	40,730,878,000	43,261,285,000	46,373,510,000	48,711,603,000	51,451,792,000
110 LD Network Service	4302, Table I-1-1, r.525, c.b	13,109,806,000	13,291,607,000	13,215,606,000	12,670,381,000	12,229,930,000	12,283,856,000	11,951,957,000	10,036,028,000	9,741,771,000	8,604,982,000	7,676,510,000
120 Network Access	4302, Table I-1-1, r.5080, c.b	24,133,705,000	24,213,716,000	24,036,052,000	24,196,707,000	24,662,637,000	25,398,326,000	26,415,053,000	27,198,094,000	28,427,812,000	29,376,836,000	30,883,209,000
130 End User	4302, Table I-1-1, r.5081, c.b	4,118,822,000	5,050,401,000	5,370,514,000	5,552,710,000	5,708,859,000	6,037,423,000	6,400,049,000	6,617,216,000	6,822,277,000	7,202,744,000	8,880,541,000
140 Switched Access	4302, Table I-1-1, r.5082, c.b	11,617,855,000	10,995,805,000	10,425,760,000	10,358,591,000	10,512,991,000	10,781,621,000	11,182,374,000	11,255,672,000	11,454,380,000	10,795,569,000	9,231,017,000
150 Special Access	4302, Table I-1-1, r.5083, c.b	2,778,884,000	2,486,187,000	2,446,865,000	2,352,593,000	2,394,838,000	2,332,938,000	2,454,091,000	2,792,714,000	3,409,082,000	4,316,434,000	5,437,271,000
160 State Access	4302, Table I-1-1, r.5084, c.b	5,618,140,000	5,681,341,000	5,792,915,000	5,932,810,000	6,048,149,000	6,266,343,000	6,378,539,000	6,532,493,000	6,743,075,000	7,062,129,000	7,334,382,000
170 Miscellaneous	4302, Table I-1-1, r.5200, c.b + (starting with 1998) r.5280, c.b	7,453,494,000	7,913,338,000	8,059,253,000	8,450,900,000	7,948,212,000	8,341,236,000	8,520,280,000	9,041,751,000	9,926,353,000	10,124,793,000	11,319,783,000
BOOKED REVENUES (4301) :												
200 Common Line	4301, Table I, r.1020, c.m	8,500,408,000	8,357,618,000	8,210,281,000	8,077,652,000	8,114,919,000	8,836,506,000	9,623,506,000	9,874,382,000	10,028,764,000	10,220,976,000	12,267,704,000
210 Switched Traffic Sensitive	4301, Table I, r.1020, c.r	7,239,420,000	7,868,493,000	7,407,810,000	7,485,438,000	7,794,244,000	7,770,380,000	7,721,726,000	7,942,338,000	8,155,421,000	7,694,205,000	5,741,215,000

Other Inputs

Item	Source	1/1/1988										
STARTING TOTAL PLANT IN SERVICE												
100 Motor Vehicles (acct. 2112)	ARMIS 4302, Table B-1-2, col. (ab)	2,104,034,000										
110 Garage Work Eqpt. (2115)	ARMIS 4302, Table B-1-2, col. (ab)	85,885,000										
120 Other Work Eqpt. (2116)	ARMIS 4302, Table B-1-2, col. (ab)	1,223,334,000										
130 Buildings (2121)	ARMIS 4302, Table B-1-2, col. (ab)	15,108,895,000										
140 Furniture (2122)	ARMIS 4302, Table B-1-2, col. (ab)	1,171,779,000										
150 Office Eqpt. (2123)	ARMIS 4302, Table B-1-2, col. (ab)	2,801,610,000										
160 Genl Purpose Computers (2124)	ARMIS 4302, Table B-1-2, col. (ab)	5,682,910,000										
170 Central Office Switches (2210)	ARMIS 4302, Table B-1-2, col. (ab)	40,348,576,000										
180 Operator Systems (2220)	ARMIS 4302, Table B-1-2, col. (ab)	656,408,000										
190 Transmission Eqpt. (2230)	ARMIS 4302, Table B-1-2, col. (ab)	31,035,528,000										
200 IOT Eqpt. (2310)	ARMIS 4302, Table B-1-2, col. (ab)	17,928,984,000										
210 Cable & Wire (2410)	ARMIS 4302, Table B-1-2, col. (ab)	78,977,533,000										
220 END OF YEAR EMPLOYEES	Form M Totals	587,765										
RATE CHANGE DATA												
Local												
300 Credit	Form M Totals	(53,372,000)	(103,148,360)	(97,449,700)	(56,996,874)	(64,425,378)	(49,054,610)	(100,000)	15,781,000	0	0	(3,541,842)
310 Annualized Revenue Change	Form M Totals	(612,136,294)	(861,827,645)	(847,844,631)	229,998,538	(159,513,750)	101,564,752	(543,089,340)	129,835,000	101,414,000	166,456,120	134,878,496
320 Effective Rate Change	Form M Totals	(323,377,709)	(765,200,817)	(816,294,677)	246,954,789	(70,921,207)	56,856,331	(405,572,409)	111,022,871	15,953,882	117,820,490	56,123,197
Intrastate												
330 Credit	Form M Totals	0	0	(14,860,000)	(1,950,000)	(3,053,622)	(1,430,000)	(4,200,000)	0	0	0	0
340 Annualized Revenue Change	Form M Totals	(149,895,234)	(39,264,370)	(293,959,445)	(56,726,640)	(138,473,818)	(294,367,655)	(306,284,704)	(211,244,000)	(194,754,100)	(207,619,700)	(309,584,128)
350 Effective Rate Change	Form M Totals	(128,635,581)	1,294,641	(66,548,763)	(27,158,807)	(72,323,751)	(117,595,024)	(134,766,289)	(141,256,636)	(120,225,316)	(138,547,966)	(177,685,703)
Toll												
360 Credit	Form M Totals	(587,472)	0	19,797,000	0	0	(1,500,000)	1,000,000	(3,073,000)	0	(3,562,000)	0
370 Annualized Revenue Change	Form M Totals	(141,987,579)	(173,889,929)	(521,665,945)	(61,416,848)	(210,937,296)	(171,239,732)	(32,546,069)	(644,755,000)	25,985,400	(132,152,800)	27,425,288
380 Effective Rate Change	Form M Totals	(78,008,775)	(109,325,726)	(158,452,889)	(35,349,394)	(146,935,103)	(82,577,798)	(58,801,641)	(570,285,203)	6,125,277	(84,898,611)	5,222,039

1998 Total Factor Productivity Review Plan
Miscellaneous Inputs

Item	Source	1995	1996	1997	1998	1999	1990	1991	1992	1993	1994	1995	1996	1997	1998
BEA PRICE INDEXES (see note 8 below)															
Motor Vehicles SCB Table 7.8 Line 5; 96=100															
102	Current View of Curr. Year	N/A	98.40	100.00	103.40	107.00	108.20	111.70	116.70	121.90	125.80	111.872	112.410	111.720	98.480
104	Current View of Prior Year	N/A	93.80	98.40	100.00	103.40	107.00	108.20	111.70	116.70	121.90	108.738	111.710	112.420	96.500
106	% Change: Motor Veh. Index @ln(1.02/1.04)	N/A	4.79%	1.61%	3.34%	3.42%	1.12%	3.18%	4.38%	4.36%	3.15%	2.84%	0.62%	-0.62%	-1.02%
Garage & Other Work Eqpt SCB Table 7.9 Line 35															
112	Current View of Curr. Year	N/A	99.00	100.00	101.90	103.90	106.20	108.30	109.70	110.70	112.50	100.827	96.620	93.880	94.010
114	Current View of Prior Year	N/A	97.50	98.00	100.00	101.90	103.90	106.20	108.30	109.70	110.70	100.605	98.890	96.800	97.370
116	% Change: Gar&OthWorkEqpt @ln(1.12/1.14)	N/A	1.53%	1.01%	1.88%	1.94%	2.19%	1.96%	1.28%	0.91%	1.61%	0.22%	-2.32%	-3.06%	-3.51%
Furniture and Office Equipment SCB Table 7.8 Line 57															
122	Current View of Curr. Year	N/A	97.00	100.00	105.60	109.40	113.30	115.40	116.20	118.20	123.00	107.592	110.120	111.930	102.210
124	Current View of Prior Year	N/A	93.70	97.00	100.00	105.60	109.40	113.30	115.40	116.20	118.20	104.626	107.620	110.170	101.700
126	% Change: Furn&OfcEqpt @ln(1.22/1.24)	N/A	3.46%	3.05%	5.45%	3.54%	3.50%	1.84%	0.69%	1.71%	3.88%	2.80%	2.30%	1.58%	0.50%
Gen Purpose Computers SCB Table 7.8 Line 37															
132	Current View of Curr. Year	N/A	113.70	100.00	95.30	90.00	82.40	73.70	66.40	59.30	55.20	73.525	53.620	42.440	57.380
134	Current View of Prior Year	N/A	131.90	113.70	100.00	95.30	90.00	82.40	73.70	66.40	59.30	81.649	67.980	53.770	77.510
136	% Change: GenPurp Computers @ln(1.32/1.34)	N/A	-14.85%	-12.84%	-4.81%	-5.72%	-8.82%	-11.16%	-10.43%	-11.31%	-7.16%	-10.48%	-23.73%	-23.85%	-30.07%
Communications Equipment SCB Table 7.8 Line 38															
142	Current View of Curr. Year	N/A	97.50	100.00	99.60	100.90	102.10	103.70	105.10	106.80	108.00	104.243	94.310	92.980	97.330
144	Current View of Prior Year	N/A	95.50	97.50	100.00	99.60	100.90	102.10	103.70	105.10	106.80	102.961	85.740	93.590	98.930
146	% Change: CommEqpt @ln(1.42/1.44)	N/A	2.07%	2.53%	-0.40%	1.30%	1.18%	1.55%	1.34%	1.60%	1.12%	1.24%	-1.50%	-0.64%	-1.63%
Telecommunications Structures SCB Table 7.7 Line 45															
152	Current View of Curr. Year	N/A	100.00	100.00	101.00	110.00	113.00	114.00	114.00	115.00	118.60	103.429	118.820	110.450	101.740
154	Current View of Prior Year	N/A	101.00	100.00	101.00	110.00	113.00	114.00	114.00	115.00	115.00	102.632	113.330	113.910	101.740
156	% Change: Telecom Structures @ln(1.15/1.14)	N/A	-1.00%	0.00%	1.00%	8.54%	2.69%	0.88%	0.00%	0.87%	3.08%	0.77%	3.03%	-3.08%	0.00%
OTHER INDEXES AND DATA BY YEAR (see note 6)															
GDPP1 BEA, Natl Inc&Prod Accts															
201	Current View of Curr. Year	N/A	N/A	100.03	103.95	108.83	113.55	118.13	121.88	125.50	128.93	107.575	110.213	111.570	102.860
202	Current View of Year (t-1)	N/A	N/A	N/A	100.03	103.95	108.83	113.55	118.13	121.88	125.50	104.825	107.762	109.533	101.860
203	Current View of Year (t-2)	N/A	N/A	N/A	N/A	100.03	103.95	108.83	113.55	118.13	121.88	102.600	105.087	107.511	100.000
204	Current View of Year (t-3)	N/A	N/A	N/A	N/A	N/A	100.03	103.95	108.83	113.55	118.13	100.000	102.637	105.087	98.190
205	Current View of Year (t-4)	N/A	N/A	N/A	N/A	N/A	N/A	100.03	103.95	108.83	113.55	97.325	100.000	102.637	96.140
206	Current View of Year (t-5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100.03	103.95	108.83	93.625	97.325	100.000	94.170
207	% Change: GDPP1 (t) over (t-1) @ln(201/202)	N/A	N/A	N/A	N/A	4.40%	4.43%	3.95%	3.13%	2.93%	2.69%	2.49%	2.25%	1.84%	1.17%
210	Special Access Growth Rate	Industry analysis (see note 1 below)	N/A	N/A	N/A	N/A	-7.94%	-1.08%	2.57%	N/A	N/A	N/A	N/A	N/A	N/A
220	Special Access API as of 1/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	98.3753	98.9917	97.1108	98.0858	85.6576	81.3776	79.8547	61.8407
230	as of 4/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	98.1593	98.8726	96.8618	87.9792	85.8509	80.7856	79.6211	61.8980
240	as of 7/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	98.3881	98.0450	89.4779	85.7953	81.1648	80.2325	86.3488	58.1781
250	as of 10/1	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	98.3837	97.4509	88.2885	85.7071	81.0575	80.0012	86.7213	58.0549
255	as of 1/1(t+1)	LEC TRPs, weighted by revenue	N/A	N/A	N/A	N/A	N/A	98.9917	97.1108	88.0858	85.6576	81.0519	79.8547	62.5620	58.0064
U.S. TFP U.S. Dept. of Labor (see Notes 6 & 7 below)															
281	Current View of Curr. Year	N/A	N/A	N/A	3446.299	3437.270	3429.911	3394.427	3445.228	3466.494	3487.354	102.2	101.3	102.0	102.7
282	Current View of Year (t-1)	N/A	N/A	N/A	N/A	3446.299	3437.270	3429.911	3394.427	3445.228	3466.494	101.8	100.3	101.3	102.0
283	Current View of Year (t-2)	N/A	N/A	N/A	N/A	N/A	3446.299	3437.270	3429.911	3394.427	3445.228	101.0	100.6	100.3	101.3
284	Current View of Year (t-3)	N/A	N/A	N/A	N/A	N/A	N/A	3446.299	3437.270	3429.911	3394.427	100.5	100.2	100.6	100.3
285	Current View of Year (t-4)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3446.299	3437.270	3429.911	99.1	100.0	100.2	100.6
286	Current View of Year (t-5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3446.299	3437.270	100.1	98.1	100.0	100.2
289	% Change: U.S.TFP (t) over (t-1) @ln(261/262)	N/A	N/A	N/A	N/A	-0.26%	-0.21%	-1.04%	1.49%	0.62%	0.60%	0.39%	0.99%	0.69%	0.68%

1998 Total Factor Productivity Review Plan
 Miscellaneous Inputs

Item	Source	1995	1996	1997	1998	1999	1990	1991	1992	1993	1994	1995	1996	1997	1998	
GROSS ADDITIONS																
300 Motor Vehicles	used 1988 values as surrogate	280,587,000	280,587,000	280,587,000												
310 Garage & Other Work Eqpt	used 1988 values as surrogate	194,104,000	194,104,000	194,104,000												
320 Furniture & Office Eqpt	used 1988 values as surrogate	584,466,000	584,466,000	584,466,000												
330 General Purpose Computers	used 1988 values as surrogate	1,110,021,000	1,110,021,000	1,110,021,000												
340 Total	Sum of 300 thru 330	2,169,178,000	2,169,178,000	2,169,178,000												
COST OF CAPITAL																
Lines 402 thru 464 shown in Millions of \$ (see note 6)																
Gross Domestic Product																
402 Current View of Curr. Year	SCB Table 1.1 Line 1	N/A	4,268.6	4,539.9	4,900.4	5,250.8	5,546.1	5,724.8	6,020.2	6,343.3	6,738.4	7,247.7	7,636.0	8,110.9	8,759.9	
404 Current View of Prior Year		N/A	N/A	4,268.6	4,539.9	4,900.4	5,250.8	5,546.1	5,724.8	6,020.2	6,343.3	6,931.4	7,265.4	7,661.6	8,300.8	
Labor Compensation																
412 Current View of Curr. Year	SCB Table 6.2 Line 2	N/A	2,524.0	2,698.8	2,921.5	3,100.4	3,297.8	3,405.0	3,591.3	3,780.6	4,004.8	4,209.4	4,429.5	4,680.3	5,016.4	
414 Current View of Prior Year		N/A	N/A	2,524.0	2,698.8	2,921.5	3,100.4	3,297.8	3,405.0	3,591.3	3,780.6	4,008.3	4,218.0	4,411.8	4,680.7	
Depreciation																
422 Current View of Curr. Year	SCB Table 1.9 Line 6	N/A	478.6	502.2	534.0	580.4	602.7	626.5	658.5	669.1	715.3	825.8	830.1	871.8	880.8	
424 Current View of Prior Year		N/A	N/A	478.6	502.2	534.0	580.4	602.7	626.5	658.5	669.1	818.8	796.8	832.0	829.2	
Indirect Business Taxes																
432 Current View of Curr. Year	SCB Table 1.9 Line 13	N/A	345.5	365.0	385.3	414.7	444.2	478.3	504.4	525.3	554.0	595.9	604.8	627.2	677.0	
434 Current View of Prior Year		N/A	N/A	345.5	365.0	385.3	414.7	444.2	478.3	504.4	525.3	572.5	582.8	606.4	645.8	
Corporate FIT Liability																
442 Current View of Curr. Year	SCB Table 6.18 Line 2	N/A	106.5	127.1	137.0	141.3	139.7	131.1	139.7	173.2	202.5	228.3	229.0	246.1	240.2	
444 Current View of Prior Year		N/A	N/A	106.5	127.1	137.0	141.3	139.7	131.1	139.7	173.2	195.3	213.2	226.1	238.3	
Current Cost of Net Capital Stock																
452 Current View of Curr. Year	SCB&BEA (note 2 below)	7,751.80	8,224.3	8,728.1	9,108.3	9,650.3	10,116.5	10,384.8	10,751.2	11,280.9	11,917.2	12,415.4	16,496.7	17,316.3	18,166.3	
454 Current View of Prior Year		N/A	7,751.80	8,224.3	8,728.1	9,108.3	9,650.3	10,116.5	10,384.8	10,751.2	11,280.9	11,917.2	15,736.1	16,496.7	17,316.3	
Constant Cost of Net Capital Stock																
462 Current View of Curr. Year	SCB&BEA (note 3 below)	8,112.40	8,346.0	8,557.9	8,773.8	8,980.3	9,157.8	9,261.5	9,373.8	9,562.6	9,825.1	9,999.3	14,540.0	14,944.0	15,302.0	
464 Current View of Prior Year		N/A	8,112.40	8,346.0	8,557.9	8,773.8	8,980.3	9,157.8	9,261.5	9,373.8	9,562.6	9,825.0	14,162.0	14,540.0	14,944.0	
470 U.S. Capital Stock Price Index	1.4521.462	0.9555	0.9854	1.0200	1.0381	1.0746	1.1047	1.1213	1.1469	1.1807	1.2129	1.2416	1.1346	1.1587	1.1872	
480 %Chg in U.S.Cap.Stk.Price Index	(1.470(t)-1.470(t-1))/1.470(t-1)	N/A	3.13%	3.51%	1.78%	3.51%	2.80%	1.50%	2.29%	2.95%	2.73%	2.37%	2.08%	2.11%	2.43%	
490 Cost of Capital	(1.402-(1.412+1.422+1.432+1.442)+ (1.454*1.480))/1.454		13.63%	13.81%	12.35%	14.65%	13.81%	12.22%	13.13%	14.08%	13.90%	14.02%	11.89%	12.26%	13.66%	
													Capital Stock Price Index Link	1.1111	1.1346	1.1587

1988 Total Factor Productivity Review Plan
 Miscellaneous Inputs

Item	Source	
<u>ECONOMIC STOCK BOOK VALUE ADJUSTMENT FACTORS</u>		
500 Gen Support Equipment	USTA comments (see note 4 below)	0.585915
510 Communication Equipment	USTA comments (see note 4 below)	0.667352
520 Structures	USTA comments (see note 4 below)	1.210756

<u>DEPRECIATION RATES</u>		
600 NonCommunications(Other) Eqpt	USTA comments (see note 4 below)	0.1546
610 Communications Equipment	Dale M. Jorgenson [see note 5 below]	0.1100
620 Structures	Dale M. Jorgenson [see note 5 below]	0.0225

<u>OTHER MISCELLANEOUS INPUTS</u>		
700 GSE Declining Balance Rate	Internal Revenue Code, MACRS	2.0
710 GSE Asset Life	Internal Revenue Code, MACRS	7.0
720 CommEqpt DecliningBalanceRate	Internal Revenue Code, MACRS	2.0
730 Communications Eqpt. Asset Life	Internal Revenue Code, MACRS	7.0
740 Cable & Wire Asset Life	Internal Revenue Code, MACRS	31.5

<u>STARTING INDEXES</u>		as of 12/31/87
800 Local Price Index	Initialized to 1.0000 on 12/31/87	1.0000
810 Intrastate Access Price Index	Initialized to 1.0000 on 12/31/87	1.0000
820 Toll Price Index	Initialized to 1.0000 on 12/31/87	1.0000
830 End User Price Index	Initialized to 1.0000 on 12/31/87	1.0000
840 Switched Access Price Index	Initialized to 1.0000 on 12/31/87	1.0000
850 Special Access Price Index	Initialized to 1.0000 on 12/31/87	1.0000
860 Miscellaneous Price Index	Initialized to 1.0000 on 12/31/87	1.0000

- Note1: Special Access growth rate is based on a study of LEC special access revenues and quantities commissioned by USTA.
- Note2: Survey of Current Business (SCB), August 1994, p.55, Table 2, line 1, and BEA Wealth Diskettes released April 16, 1995 (described in January 1995 SCB). 1998 Current Cost and Book Cost data will be available in March 2000.
- Note3: SCB, August 1994, p.56, Table 4, line 1, and BEA Wealth Diskettes released April 16, 1995 (described in January 1995 SCB). 1998 Current Cost and Book Cost data will be available in March 2000.
- Note4: Comments of the United States Telephone Association, FCC Dkt 94-1, May 9, 1994; Attachment 6 - Productivity of the Local Telephone Operating Companies, Laurits R. Christensen, Philip E. Schoech and Mark E. Meitzen, pp.5-9
- Note5: Dale M. Jorgenson, "Productivity and Economic Growth" (Chapter 3) in "Fifty Years of Economic Measurement", ed. E.R. Brendt and J.E. Triplett, University of Chicago Press, 1990, Table 3-6, p.45.
- Note6: BLS often restates indices from one year to another. In order to not achieve different results for historical runs each time this occurs, this model now includes (for each year) the BLS indices available at the time the study was run. When new indices are used, they will be input for the current year without restating historical indices. Values thru 1994 reflect indices available in 4Q85.
- Note7: U.S. Department of Labor, Bureau of Labor Statistics, "Multifactor Productivity-Private Business Sector", dated January or February of the year subsequent to the data year. Note that the U.S. TFP "Current View of Current Year" value in each column starting with 1984 is an estimate. Series ID: MDP740003 92=100, 1998 will be available in March 2000. To simplify data-gathering effort starting with data in the 1995 column, the index values (rather than the underlying MFP levels) are used.

1998 Total Factor Productivity Review Plan
 Asset Price Development

Item	Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
BEA PRICE INDEXES															
100 Motor Vehicles	MISC1,1,100														
110 Garage & Other Work Eqpt	MISC1,1,110														
120 Furniture & Office Eqpt	MISC1,1,120														
130 General Purpose Computers	MISC1,1,130														
% CHANGE IN BEA PRICE INDEXES															
140 Motor Vehicles	MISC1,1,106	N/A	4.78%	1.61%	3.34%	3.42%	1.12%	3.18%	4.38%	4.36%	3.15%	2.84%	0.62%	-0.62%	-1.02%
150 Garage & Other Work Eqpt	MISC1,1,116	N/A	1.53%	1.01%	1.88%	1.94%	2.19%	1.96%	1.28%	0.91%	1.61%	0.22%	-2.32%	-3.08%	-3.51%
160 Furniture & Office Eqpt	MISC1,1,126	N/A	3.46%	3.05%	5.45%	3.54%	3.50%	1.84%	0.69%	1.71%	3.98%	2.80%	2.30%	1.58%	0.50%
170 General Purpose Computers	MISC1,1,136	N/A	-14.85%	-12.84%	-4.81%	-5.72%	-8.82%	-11.16%	-10.43%	-11.31%	-7.16%	-10.48%	-23.73%	-23.85%	-30.07%
GROSS ADDITIONS															
200 Motor Vehicles	INV1,1,100; 85-87 MISC1,1,300	280,587,000	280,587,000	280,587,000	268,537,000	287,619,000	276,415,000	269,825,000	205,703,000	193,336,000	184,027,000	200,387,000	198,178,000	250,915,000	334,880,000
210 Garage & Other Work Eqpt	INV1,1,110+1,120; 85-87 MISC1,1,31	194,104,000	194,104,000	194,104,000	188,466,000	174,486,000	195,194,000	190,811,000	205,262,000	180,558,000	178,683,000	163,483,000	332,127,000	250,613,000	205,181,000
220 Furniture & Office Eqpt	INV1,1,140+1,150; 85-87 MISC1,1,32	584,486,000	584,486,000	584,486,000	572,488,000	368,722,000	421,231,000	284,441,000	255,519,999	237,151,000	247,080,000	223,982,000	188,838,000	161,261,000	133,451,000
230 General Purpose Computers	INV1,1,160; 85-87 MISC1,1,330	1,110,021,000	1,110,021,000	1,110,021,000	1,099,011,000	1,251,508,000	1,210,606,000	1,250,904,000	1,381,389,000	1,337,134,000	1,484,842,000	1,608,271,000	1,381,581,000	1,159,809,000	947,358,000
240 Total	Sum of 200 thru 230	2,169,178,000	2,169,178,000	2,169,178,000	2,126,502,000	2,082,346,000	2,103,446,000	2,005,791,000	2,047,873,999	1,848,180,000	2,074,612,000	2,186,123,000	2,079,734,000	1,822,598,000	1,620,870,000
GROSS ADDITIONS: AVERAGE OF SHARES															
250 Motor Vehicles	(I,200(t-1)M,240(t-1)+I,200(t)M,240(t))/	N/A	12.94%	12.94%	12.73%	13.17%	13.48%	13.30%	11.75%	9.98%	9.40%	9.00%	9.28%	11.60%	17.21%
260 Garage & Other Work Eqpt	(I,210(t-1)M,240(t-1)+I,210(t)M,240(t))/	N/A	8.95%	8.95%	8.91%	8.62%	8.83%	9.36%	9.76%	9.65%	8.94%	8.03%	11.71%	14.86%	13.20%
270 Furniture & Office Eqpt	(I,220(t-1)M,240(t-1)+I,220(t)M,240(t))/	N/A	26.84%	26.94%	26.93%	22.31%	18.87%	17.35%	13.58%	12.33%	12.04%	11.05%	9.66%	8.99%	8.54%
280 General Purpose Computers	(I,230(t-1)M,240(t-1)+I,230(t)M,240(t))/	N/A	51.17%	51.17%	51.43%	55.89%	58.83%	59.98%	64.91%	68.04%	69.62%	71.82%	69.35%	64.55%	61.04%
300 % Change: GSE Price Index	140*250+150*260+160*270+170*2	N/A	-5.91%	-5.45%	-0.41%	-1.78%	-4.19%	-5.78%	-8.04%	-6.96%	-4.07%	-6.96%	-16.45%	-15.78%	-18.95%
310 General Support Index	1,310(t-1)*@exp(I,300(t))	1.1250	1.0604	1.0042	1.0000	0.9823	0.9420	0.8882	0.8371	0.7808	0.7497	0.6993	0.5933	0.5067	0.4182
Communications Equipment															
330 % Change: Comm. Eqpt. Index	MISC1,1,146	N/A	2.07%	2.53%	-0.40%	1.30%	1.18%	1.55%	1.34%	1.60%	1.12%	1.24%	-1.50%	-0.64%	-1.63%
340 Communication Equipment Index	I,340(t-1)*@exp(I,330(t))	0.9588	0.9789	1.0040	1.0000	1.0131	1.0251	1.0412	1.0552	1.0723	1.0843	1.0978	1.0814	1.0745	1.0571
Telecommunications Structures															
360 % Chg: Telecom Structures Index	MISC1,1,156	N/A	-1.00%	0.00%	1.00%	8.54%	2.69%	0.88%	0.00%	0.87%	3.08%	0.77%	3.03%	-3.08%	0.00%
370 Telecom Structures Index	I,370(t-1)*@exp(I,360(t))	1.0000	0.9901	0.9901	1.0000	1.0891	1.1188	1.1287	1.1287	1.1386	1.1743	1.1834	1.2188	1.1828	1.1828

1998 Total Factor Productivity Review Plan
 Capital Stock Beginning Value

Item	Source	1987
<u>GROSS BOOK VALUES</u>		
100 Gen Support Equipment	OTH1:1.100 to 1.120 + 1.140 to 1.180	13,069,552,000
110 Communication Equipment	OTH1:1.170 to 1.200	89,969,494,000
120 Structures	OTH1:1.130+1.210	84,086,428,000
<u>STARTING CAPITAL STOCK VALUES</u>		
200 Gen Support Equipment	1.100*MISC1,1.500	7,657,646,580
210 Communication Equipment	1.110*MISC1,1.510	60,041,321,760
220 Structures	1.120*MISC1,1.520	113,915,707,220
230 Total		181,614,675,540
<u>STARTING CAPITAL STOCK QUANTITIES</u>		
300 Gen Support Equipment	1.200/ASTPRICE1,1.310	7,825,948,578
310 Communication Equipment	1.210/ASTPRICE1,1.340	59,801,156,473
320 Structures	1.220/ASTPRICE1,1.370	115,054,864,292

1998 Total Factor Productivity Review Plan
 Development of Capital Index, Part 1: Capital Stock Calculations

Item	Source	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
GROSS ADDITIONS												
100 Gen Support Equipment	INV1, Sum of I.100 thru I.1	2,126,502,000	2,082,346,000	2,103,446,000	2,005,781,000	2,047,873,999	1,948,180,000	2,074,612,000	2,196,123,000	2,079,734,000	1,822,598,000	1,620,870,000
110 Communication Equipment	INV1, Sum of I.170 thru I.2	8,987,050,000	7,886,144,000	8,407,752,000	8,464,999,000	8,891,289,000	9,152,741,000	9,357,228,000	9,362,722,845	11,659,791,000	12,240,115,000	13,157,369,000
120 Structures	INV1, Sum of I.130 + I.210	5,684,310,000	5,739,305,000	6,788,671,000	6,619,752,000	6,662,955,000	6,444,270,000	6,048,698,000	6,370,580,000	7,072,188,000	7,450,840,000	7,409,608,000
130 Total	Sum of 100 thru 120	16,797,862,000	15,707,795,000	17,299,869,000	17,090,532,000	17,602,117,999	17,545,191,000	17,480,538,000	17,929,425,845	20,811,713,000	21,513,553,000	22,187,847,000
ASSET PRICE INDEXES												
200 Gen Support Equipment	ASTPRC1, I.310	1.0000	0.9823	0.9420	0.8892	0.8371	0.7808	0.7497	0.6993	0.5933	0.5067	0.4192
210 Communication Equipment	ASTPRC1, I.340	1.0000	1.0131	1.0251	1.0412	1.0552	1.0723	1.0843	1.0978	1.0814	1.0745	1.0571
220 Structures	ASTPRC1, I.370	1.0000	1.0891	1.1188	1.1287	1.1287	1.1386	1.1743	1.1834	1.2198	1.1828	1.1828
CONSTANT DOLLAR INVESTMENT												
300 Gen Support Equipment	I.100(I.200)	2,126,502,000	2,119,973,232	2,232,987,223	2,255,658,670	2,446,304,883	2,495,006,496	2,767,257,387	3,140,329,751	3,505,586,489	3,597,280,186	3,866,701,879
310 Communication Equipment	I.110(I.210)	8,987,050,000	7,784,538,577	8,201,881,481	8,130,317,265	8,425,997,949	8,535,702,281	8,629,443,600	8,528,322,229	10,781,715,744	11,391,373,952	12,448,319,871
320 Structures	I.120(I.220)	5,684,310,000	5,269,725,500	6,067,750,186	5,864,868,000	5,903,144,342	5,659,750,174	5,151,083,457	5,383,393,490	5,797,738,659	6,299,501,839	6,264,641,198
CAPITAL STOCK QUANTITY												
400 Gen Support Equipment	I.400(t-1)*(1-MISC1,I.600)	8,573,478,928	9,367,992,318	10,152,687,928	10,838,741,044	11,609,376,561	12,309,573,441	13,173,770,774	14,277,435,563	15,575,730,515	16,765,002,763	18,039,835,315
410 Communication Equipment	I.410(t-1)*(1-MISC1,I.610)	62,210,079,261	63,151,509,119	64,408,724,597	65,452,302,156	66,678,546,868	67,879,608,993	69,042,295,604	69,975,965,316	73,060,324,875	76,415,063,091	80,455,725,822
420 Structures	I.420(t-1)*(1-MISC1,I.620)	118,150,439,845	120,761,780,449	124,112,390,574	127,184,729,787	130,228,217,708	132,955,877,984	135,115,454,186	137,458,749,957	140,163,666,741	143,309,486,079	146,349,663,840
CAPITAL STOCK VALUE												
500 Gen Support Equipment	I.200(I.400)	8,573,478,928	9,201,720,585	9,563,704,886	9,638,045,482	9,718,551,671	9,611,704,348	9,876,371,841	9,984,621,715	9,240,501,247	8,494,156,398	7,562,058,835
510 Communication Equipment	I.210(I.410)	62,210,079,261	63,975,775,804	66,023,359,250	68,146,823,831	70,360,595,139	72,786,568,679	74,865,139,811	76,822,328,178	79,010,441,259	82,108,546,685	85,052,103,818
520 Structures	I.220(I.420)	118,150,439,845	131,522,731,182	138,858,417,177	143,555,041,541	146,988,008,107	151,385,405,625	158,660,325,411	162,665,420,050	170,974,212,591	169,501,665,130	173,097,485,665
530 Total	Sum of 500 thru 520	188,933,998,034	204,700,227,571	214,445,481,314	221,339,710,855	227,067,154,916	233,783,678,653	243,401,837,063	249,472,369,943	259,225,155,096	260,104,368,214	265,711,648,318
LAGGED CAPITAL STOCK VALUE												
600 Gen Support Equipment	I.200(t)*I.400(t-1)	7,825,948,578	8,421,308,949	8,824,531,448	9,027,992,054	9,073,429,941	9,064,968,474	9,228,483,370	9,212,797,155	8,470,271,170	7,891,599,714	7,027,665,999
610 Communication Equipment	I.210(t)*I.410(t-1)	59,801,156,473	63,022,058,207	64,736,637,360	67,058,005,429	69,086,636,111	71,498,682,786	73,604,395,294	75,797,309,363	75,674,887,931	78,503,855,826	80,780,600,919
620 Structures	I.220(t)*I.420(t-1)	115,054,864,292	128,678,696,861	135,109,714,759	140,087,252,728	143,555,041,541	148,277,376,599	156,124,427,019	159,892,419,488	167,674,705,464	165,780,895,274	169,501,665,130
630 Total	Sum of 600 thru 620	182,481,969,343	200,122,064,017	208,670,883,567	216,173,250,210	221,695,107,593	228,841,027,859	238,957,305,682	244,902,526,007	251,819,864,564	252,176,350,814	257,309,932,048

1998 Total Factor Productivity Review Plan
 Development of Capital Index, Part 3: Capital Input Index

Item	Source	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
PROPERTY/CAPITAL STOCK TAXES												
1200 Gen Support Equipment	L1110(t)*1.500(t-1)	101,299,138	118,013,377	118,687,734	117,888,488	111,812,882	110,678,857	105,756,604	101,502,611	104,242,111	89,711,855	82,789,886
1210 Communication Equipment	L1110(t)*1.510(t-1)	794,256,313	841,805,463	825,166,962	813,847,156	790,582,534	801,295,349	800,863,200	769,412,824	802,045,571	767,076,704	800,287,294
1220 Structures	L1110(t)*1.520(t-1)	1,506,933,342	1,598,771,242	1,696,436,529	1,711,659,771	1,665,410,583	1,673,959,794	1,665,678,196	1,630,602,565	1,698,270,318	1,659,911,441	1,652,081,719
IMPUTED TAX DEPRECIATION												
1300 Gen Support Equipment	L1160*(L1130*1.500(t-1)+L1170*(L1130*1.510(t-1)+L1180*(L1130*1.520(t-1)+L1320 Structures	1,751,416,903	1,861,457,188	1,943,477,726	2,123,606,652	2,231,609,802	2,308,768,123	2,288,184,320	2,337,998,574	2,458,564,338	2,582,777,870	2,636,196,579
1310 Communication Equipment	L1170*(L1130*1.510(t-1)+L1180*(L1130*1.520(t-1)+L1320 Structures	9,584,981,002	10,157,040,181	10,636,530,428	10,692,643,134	10,910,789,173	11,229,458,417	11,793,673,754	12,221,651,399	12,759,249,997	13,366,513,857	14,355,755,068
1320 Structures	L1180*(L1130*1.520(t-1)+L1320 Structures	4,152,296,369	3,453,073,918	3,698,368,453	3,828,356,132	4,831,035,202	5,156,917,634	5,061,887,538	5,208,939,034	5,074,182,557	5,115,349,088	6,197,990,094
1330 Total	Sum of 1300 thru 1320	15,468,694,274	15,471,571,288	16,189,376,607	16,644,605,918	17,973,434,177	18,695,145,174	19,143,745,612	19,768,589,007	20,291,996,892	22,063,640,815	23,189,941,741
1350 Effective Income Tax Rate	(L1100*(L1130*1.530(t-1)+L11000*(L1190-L1010-L1330))	0.2953	0.2870	0.2842	0.2858	0.2621	0.2671	0.2548	0.2289	0.2585	0.2280	0.2456
SERVICE FLOWS												
1400 Gen Support Equipment	((L11100-L1350*1.1160)/(L1130*1.500(t-1)+L700-L900)+L1200	2,748,227,609	2,948,115,125	3,108,117,293	3,395,467,460	3,487,843,548	3,631,920,954	3,649,333,508	3,737,417,079	3,923,482,162	4,001,532,170	4,106,356,682
1410 Communication Equipment	((L11100-L1350*1.1170)/(L1130*1.510(t-1)+L710-L910)+L1210	15,249,878,214	16,295,167,179	17,186,145,482	17,316,895,046	17,296,675,490	17,928,024,030	19,065,034,297	19,775,788,467	20,622,815,712	21,010,199,137	22,711,148,744
1420 Structures	((L11100-L1350*1.1180)/(L1130*1.520(t-1)+L720-L920)+L1220	23,579,798,673	20,255,247,188	21,340,950,100	22,589,042,825	26,505,560,286	28,580,855,730	28,940,465,337	29,705,943,975	28,615,023,396	31,915,068,022	32,690,211,024
CAPITAL INPUT QUANTITIES												
1500 Gen Support Equipment	L400(t-1)*CAPSTK1,300	1.0000	1.1243	1.2284	1.3313	1.4213	1.5224	1.6142	1.7275	1.8722	2.0425	2.1984
1510 Communication Equipment	L410(t-1)*CAPSTK1,310	1.0000	1.0403	1.0560	1.0770	1.0945	1.1150	1.1351	1.1545	1.1701	1.2217	1.2778
1520 Structures	L420(t-1)*CAPSTK1,320	1.0000	1.0269	1.0496	1.0787	1.1054	1.1319	1.1556	1.1744	1.1947	1.2182	1.2456
CAPITAL INPUT SHARES												
1600 Gen Support Equipment	L1400/L1190	0.0661	0.0746	0.0747	0.0784	0.0738	0.0724	0.0706	0.0702	0.0738	0.0703	0.0690
1610 Communication Equipment	L1410/L1190	0.3668	0.4126	0.4128	0.3999	0.3658	0.3576	0.3691	0.3716	0.3879	0.3691	0.3817
1620 Structures	L1420/L1190	0.5671	0.5128	0.5126	0.5217	0.5605	0.5700	0.5603	0.5582	0.5383	0.5606	0.5493
AVERAGE OF CAPITAL INPUT SHARES												
1700 Gen Support Equipment	(L1600(t-1)+L1600(t))/2	N/A	0.0704	0.0746	0.0785	0.0761	0.0731	0.0715	0.0704	0.0720	0.0720	0.0696
1710 Communication Equipment	(L1610(t-1)+L1610(t))/2	N/A	0.3897	0.4127	0.4083	0.3828	0.3617	0.3633	0.3703	0.3798	0.3785	0.3754
1720 Structures	(L1620(t-1)+L1620(t))/2	N/A	0.5400	0.5127	0.5171	0.5411	0.5653	0.5651	0.5592	0.5482	0.5495	0.5550
CAPITAL INPUT GROWTH RATES												
1800 Gen Support Equipment	@ln(L1500(t)/L1500(t-1))	N/A	11.71%	8.86%	8.04%	6.54%	6.87%	5.86%	6.8%	8.0%	8.7%	7.4%
1810 Communication Equipment	@ln(L1510(t)/L1510(t-1))	N/A	3.95%	1.50%	1.97%	1.61%	1.86%	1.79%	1.7%	1.3%	4.3%	4.5%
1820 Structures	@ln(L1520(t)/L1520(t-1))	N/A	2.65%	2.19%	2.74%	2.45%	2.36%	2.07%	1.6%	1.7%	1.9%	2.2%
1850 AGGREGATE CAPITAL INP GROWTH RATE	1700*1800+1710*1810+1	N/A	3.80%	2.40%	2.83%	2.44%	2.51%	2.24%	2.0%	2.0%	3.3%	3.4%

1998 Total Factor Productivity Review Plan
 Labor and MR&S Input Index Development

Item	Source	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
LABOR INPUT INDEX DEVELOPMENT													
100	Wages and Salaries	EXP1.I.120	17,702,530,000	17,666,806,000	17,878,658,000	17,738,490,000	17,663,812,000	17,802,446,000	17,596,539,000	17,640,465,000	17,815,572,000	17,833,843,000	18,015,245,000
110	Fringe Benefits	EXP1.I.130	4,201,210,000	4,278,693,000	4,360,014,000	5,108,748,000	5,322,768,000	6,625,305,000	7,182,369,000	6,356,310,000	5,563,285,000	4,663,912,000	4,559,470,000
120	Labor Input Cost	Sum of 100 + 110	21,903,740,000	21,945,499,000	22,238,672,000	22,847,238,000	22,986,580,000	24,427,751,000	24,778,908,000	23,996,775,000	23,378,857,000	22,497,755,000	22,574,715,000
200	End of Year Work Force	EXP1.I.300	574,312	568,926	537,774	514,318	488,880	470,509	436,229	409,083	401,322	400,909	402,558
210	Average Work Force	$[(200(t-1)+200(t))/2]$	581,039	571,619	553,350	526,046	501,599	479,695	453,369	422,656	405,203	401,116	401,734
220	% Change in Labor Input	$@\ln[(210(t)/M.210(t-1))]$	N/A	-1.63%	-3.25%	-5.06%	-4.76%	-4.47%	-5.64%	-7.01%	-4.22%	-1.01%	0.15%
MR&S INPUT INDEX DEVELOPMENT													
300	Total Operating Expenses	EXP1.I.100	55,170,278,000	57,432,289,000	58,447,640,000	59,986,374,000	59,642,816,000	62,226,713,000	65,565,061,000	66,952,522,000	67,951,758,000	69,798,998,000	71,648,427,000
310	Depreciation & Amortization	EXP1.I.110	16,021,903,000	16,286,221,000	16,427,540,000	16,013,519,000	16,358,255,000	16,885,243,000	17,743,325,000	18,446,323,000	19,481,214,000	19,987,384,000	20,678,381,000
320	Wages and Salaries	EXP1.I.120	17,702,530,000	17,666,806,000	17,878,658,000	17,738,490,000	17,663,812,000	17,802,446,000	17,596,539,000	17,640,465,000	17,815,572,000	17,833,843,000	18,015,245,000
330	Fringe Benefits	EXP1.I.130	4,201,210,000	4,278,693,000	4,360,014,000	5,108,748,000	5,322,768,000	6,625,305,000	7,182,369,000	6,356,310,000	5,563,285,000	4,663,912,000	4,559,470,000
340	MR&S Input Cost	$I.300-I.310-I.320-I.330$	17,244,635,000	19,200,549,000	19,781,428,000	21,105,617,000	20,297,981,000	20,913,719,000	23,042,828,000	24,509,424,000	25,091,687,000	27,313,859,000	28,395,331,000
350	% Change in MR&S Cost	$@\ln[(340(t)/M.340(t-1))]$	N/A	10.74%	2.98%	6.48%	-3.90%	2.99%	9.69%	6.17%	2.35%	8.49%	3.88%
GDPPPI													
380	% Change in GDPPPI (annual)	MISC1.I.207	N/A	4.40%	4.43%	3.95%	3.13%	2.93%	2.69%	2.49%	2.25%	1.84%	1.17%
390	% Change in MR&S Quantity	$I.350-I.380$	N/A	6.34%	-1.45%	2.53%	-7.03%	0.06%	7.00%	3.68%	0.10%	6.64%	2.71%