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USTA COMMENTS
CC DOCKET NOS. 96-262, 94-1
CCB/CPD File No. 98-63
OCTOBER 29, 1999

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION

IN THE MATTER OF	)	
	)	
ACCESS CHARGE REFORM	)	**CC DOCKET No. 96-262**
	)	
PRICE CAP PERFORMANCE REVIEW FOR LOCAL EXCHANGE CARRIERS	)	**CC DOCKET No. 94-1**
	)	
INTEREXCHANGE CARRIER PURCHASES OF SWITCHED ACCESS SERVICES OFFERED BY COMPETITIVE LOCAL EXCHANGE CARRIERS	)	**CCB/CPD FILE No. 98-63**
	)	
PETITION OF US WEST COMMUNICATIONS, INC FOR FORBEARANCE FROM REGULATION AS A DOMINANT CARRIER IN THE PHOENIX, ARIZONA MSA	)	**CC DOCKET No. 98-157**

COMMENTS OF

WILLIAM E. TAYLOR, Ph.D.

ON BEHALF OF

UNITED STATES TELEPHONE ASSOCIATION

OCTOBER 29, 1999

n/e/r/a
Consulting Economists

COMMENTS OF
WILLIAM E. TAYLOR, Ph.D.

CC DOCKET NO. 96-262

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COMMENTS OF WILLIAM E. TAYLOR, PH.D.
OCTOBER 29, 1999

I. INTRODUCTION

1. I am Senior Vice President of National Economic Research Associates, Inc. (NERA), head of its telecommunications economics practice and head of its Cambridge office. I received a B.A. degree in economics, *magna cum laude*, from Harvard College in 1968, a master's degree in statistics from the University of California at Berkeley in 1970, and a Ph.D. in Economics from Berkeley in 1974, specializing in industrial organization and econometrics. I have taught and published research in the areas of microeconomics, theoretical and applied econometrics, and telecommunications policy at academic institutions (including the economics departments of Cornell University, the Catholic University of Louvain in Belgium, and the Massachusetts Institute of Technology) and at research organizations in the telecommunications industry (including Bell Laboratories and Bell Communications Research, Inc.). I have participated in telecommunications regulatory, legislative and judicial proceedings before state public service commissions, the Federal Communications Commission ("FCC"), the Canadian Radio-Television and Telecommunications Commission, federal and state congressional committees and state and federal courts concerning access charges, competition, incentive regulation, productivity growth, telecommunications mergers and pricing for economic efficiency. I have appeared as a telecommunications commentator on The News Hour with Jim Lehrer. My research has appeared in numerous telecommunications industry publications as well as *Econometrica*, the *American Economic Review*, the *International Economic Review*, the *Journal of Econometrics*, *Econometric Reviews*, the *Antitrust Law Journal*, *The Journal of Regulatory Economics*, *The Review of Industrial Organization*, and *The Encyclopedia of Statistical Sciences*. I have served as a referee for these journals (and others) and the National Science Foundation and as an Associate Editor of the *Journal of Econometrics*.

2. I have been asked by the United States Telephone Association ("USTA") to comment on economic issues raised in the Federal Communication Commission's ("Commission") *Further Notice of Proposed Rulemaking* ("*FNPRM*"), released on August 27, 1999. The *FNPRM* seeks input on, *inter alia,* the Commission's proposal to re-examine the rate structures for the local switching service category of the traffic-sensitive basket and the common line basket. I provide an economic and policy analysis of four specific proposals on which the Commission is requesting comment:

   - Revising Section 69.106(f)(2) of the Commission's Rules to require price cap LECs to develop capacity-based local switching charges rather than per-minute charges;

   - Inclusion of a "q" factor in the traffic-sensitive PCI formula, similar to the "g" factor in the common line PCI formula, to account for the effects of usage-based recovery of costs invariant to usage;

   - Requiring a one-time downward adjustment of the LEC's traffic-sensitive PCI to the levels that would have resulted had the Commission incorporated a q factor in the traffic sensitive PCI formula that took effect in 1991; and

   - Increasing the g factor in the common line PCI from half the change in usage per line to the full rate of change in usage per line.

3. Price cap regulation has been successful in providing real economic benefits to consumers. Simply put, since the system is not broken it does not require fixing. As an empirical matter, earnings of price cap LECs have not performed as well as the average industrial firm while—at the same time—the LECs' customers have done considerably better than average customers as a result of price cap regulation. The Commission's focus on price-cap LEC accounting earnings as the basis for attempting to fix the price cap rules is both misguided, because interstate accounting earnings are highly misleading, and counter to the fundamental economic reason behind the move to price-cap regulation—the desire to jettison an earnings-based approach to regulating the LECs. Supplanting an earnings-based regulation scheme with price regulation: (1) removed the link between prices and costs, and (2) provided the regulated firm with the proper incentives to achieve technical and dynamic efficiency. As the Commission has already stated:

> [W]e find that reducing our regulatory reliance on earnings calculations based on accounting data is essential to the transition to a competitive marketplace, where forward-looking costs are central to decisionmaking.[1]

4. Apart from the erroneous economic conclusions that result from examining accounting data,[2] implementing the proposed changes in order to correct for alleged windfall earnings is the antithesis of price-cap regulation. The proposed adjustments to the LEC price-cap plan are merely the latest in a series of adjustments in the last several years, inspired by intervenors' concerns with ILEC accounting earnings.[3] These continual adjustments frustrate, rather than promote, economic efficiency because they are nothing more than a form of re-contracting that undermines the efficiency-enhancing incentives that were the primary reason for adopting price-cap regulation in the first place. Increased accounting earnings are good, not bad: it was explicitly expected at the implementation of price caps that if the new incentives worked to improve LEC efficiency, earnings of price-cap regulated firms would necessarily increase. Because such an increase would not have occurred under traditional forms of regulation, both the regulated firm and its customers would be made better off under the new system. And finally, as a matter of fact, LEC income gains have been moderate compared to other industries.

5. The proposed mandatory capacity-based rate structure for local switching is not materially different from the current rate design in which traffic-sensitive switch costs are recovered on a minutes of use basis. Because local switching facilities are shared among customers, their costs are traffic sensitive. Whether service is purchased in lumps (by capacity) or a minute at a time (by usage) results in only second-order theoretical differences in

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[1] In the Matter of Price Cap Performance Review for Local Exchange Carriers, CC Docket No. 94-1, 96-262, ¶150 (*Fourth LEC Price Cap Performance Review*).

[2] Not to mention the arbitrary and imprecise nature of the jurisdictional separations process which further complicates the analysis.

[3] In the *LEC Price Cap Performance Review*, the Commission removed the 1984/85 data point in the indirect calculation of TFP, thus leading to a higher X-factor. While this and other actions taken by the Commission to correct for alleged over-earnings is incompatible with price cap regulation, the end result was a correction to the PCI for any alleged over-earnings that may have occurred. As a result, any alleged windfall stemming from improper recovery of non-traffic sensitive switching costs that occurred before the implementation of the FCC's 1995 revisions has already been corrected. See, Price Cap Performance Review for Local Exchange Carriers, CC Docket No. 94-1, Second Further Notice of Proposed Rulemaking, 11 FCC Rcd 858, 863 (1995) (*LEC Price Cap Performance Review*).

efficiency. In applied situations, there are few practical reasons to believe that mandatory capacity-based rate structures would unambiguously lead to improvements in economic efficiency. Just as a rate structure based on peak minutes of use has practical limitations—so that theoretical welfare gains cannot be achieved with tariff structures that could be used in practice—so does one based on capacity. When the significant information requirements to implement the new rate structure are taken into account, it is likely that any theoretical gains will be outweighed by the practical difficulties of implementation. On this basis, it is not clear whether in an unregulated, competitive market, competitive forces would push towards per-minute or per-trunk recovery of these costs. Particularly as local exchange markets are being opened to competition, it is not the time to lock any participant in these markets into a rate structure mandated by some vague theoretical expectation of efficiency. Whether motivated by forces of competition or price cap regulation, the price cap LECs have all the incentive they need to choose an efficient rate structure. Moreover, there has been no suggestion that it is necessary to mandate a capacity-based rate structure for price cap LECs because of alleged residual market power. As the Commission moves to fulfill the deregulatory requirements of the Telecommunications Act of 1996, increasing regulatory micromanagement in other areas, as this proposal does, is a step backwards. It denies the carrier customers of the price cap LECs the flexibility to buy service either by the minute or by the trunk which, in turn, places the price cap LECs at an artificial competitive disadvantage in an increasingly competitive market. Instead, price-cap LECs should have the flexibility to respond to market conditions and opportunities as customers require and as they perceive those requirements.

6. A downward adjustment to the traffic-sensitive price cap index ("PCI") to account for the recovery of NTS costs on a minute-of-use basis is economically incorrect and would result in serious economic harm. As I discuss below, as an empirical matter there has been no windfall. Moreover, the X-factor in place from 1990 to 1997 was based, in part, on a study which used historical trends in telecommunications prices relative to the economy as a whole to determine reasonable changes in output prices under the price cap plan. When the historical rate of growth of prices (keeping earnings constant) is used to measure X, the fact

that non-traffic sensitive costs may be recovered on a minute of use basis does not give rise to an over-recovery of costs. As long as the relationships among line growth and minutes growth are approximately constant over time, their effects are fully reflected in the value of X necessary to keep prices at a level that maintains constant earnings. In addition, as I demonstrate below, the rate of growth in minutes per line has been decreasing over time, indicating that any alleged windfall due to the mismatch between the manner in which costs in the traffic-sensitive basket were incurred and recovered could not be responsible for alleged overearning by price cap LECs. Moreover, since 1997 the X-factor has been determined based on direct measurement of industry total factor productivity ("TFP") growth, which incorporates the effects on overall productivity growth of all inputs. All costs and revenues are captured in this measurement of the X-factor, and if interstate minutes of use have grown more rapidly than costs during the historical period, the TFP formula directly captures this growth differential. Once again, there is no need for a one-time adjustment to the PCI to account for the recovery of non-traffic sensitive costs on a minute-of-use basis.

7. On a going forward basis, there should not be a q factor included in the traffic-sensitive PCI and—rather than increasing the g/2 factor in the common line basket to a full g—it should have already been eliminated. Since the X-factor already accounts for all changes in costs and revenues, a formula that includes an adjustment for demand growth would effectively "double-count" a component of historical productivity gains that has already been reflected in the measurement of TFP growth.

8. Moreover, in the Access Reform First Report and Order, the Commission altered the then existing rate structure in the traffic-sensitive and common line baskets to better align the manner in which certain costs are incurred and recovered.[4] NTS costs are in the process of being recovered primarily in the manner they are incurred—i.e., through flat-rated charges. The costs that remain in the traffic-sensitive basket arise because of the use of shared resources and thus vary with use. As I describe in greater detail below, under these

[4] In the Matter of Access Charge Reform, et. al., CC Docket No. 96-262, 94-1, ("*Access Reform First Report and Order*").

conditions, a "q" problem does not exist because: (1) there is no evidence that minutes grow faster than peak capacity, and (2) under the conditions assumed by the Commission, switching to a different (slower-growing) output measure would require a lower X-factor.

II. A CAPACITY-BASED RATE STRUCTURE SHOULD NOT BE MANDATED

9. The Commission (at ¶ 213) seeks comment on revising Section 69.106(f)(2) of its Rules to require price cap LECs to develop capacity-based local switching charges rather than per-minute charges. Erroneously motivated by alleged windfalls, the Commission is attempting to find a solution to a problem that simply does not exist. In this section, I explain why developing capacity-based switching charges is merely another form of traffic-sensitive cost recovery and, in theory, why such a move does not unambiguously increase economic efficiency. I also explain that the perceived deficiencies of the current recovery mechanism are smaller and less likely to occur than the *NPRM* suggests and that the costs of implementing a capacity-based rate structure are likely to be high. For these reasons the Commission should not mandate a capacity-based rate structure; instead, price-cap LECs should have the option of developing a capacity-based rate structure for local switching in order to be able to respond, if needed, to changing market conditions.

10. Price cap LECs invest in switching in order to provide a broad range of services to their customers. Modern digital switches perform a variety of functions and the manner in which LECs' switching costs are incurred vary depending on the function being performed. Broadly speaking, switches consist of: (1) peripheral components such as line cards that connect subscriber lines to the switching network and trunk ports that connect switches via interoffice trunks, and (2) a switch processor[5] that provides a continuous path connecting two subscriber lines (or a line and an interoffice trunk). Some of the services are jurisdictionally interstate while others are intrastate. Interstate services are governed by Section 61 and 69 of the Commission's rules which determine, respectively, the maximum

[5] In general, a switch processor refers to the processor, switching fabric and other common equipment in the switch.

yearly allowed price change and the rate design or cost recovery mechanism permitted.[6] In order to achieve economic efficiency LECs should recover costs in the manner in which they are incurred and from the cost-causing entity that brings the costs into existence. This precept means that costs that vary with usage should be recovered on a usage-sensitive basis while costs that do not vary with usage should be recovered through flat-rated charges (*i.e.*, charges invariant to the amount of usage).

11. In the *Access Reform First Report and Order*, the Commission altered the then existing rate structure in the traffic-sensitive basket to better align the manner in which certain costs are incurred and recovered. Specifically, the Commission concluded that the costs of the line side port (including the line card, protector, and main distribution frame) and dedicated trunk port (including the trunk card and DS1/voice-grade multiplexers if needed) are non-traffic sensitive and should therefore be recovered through flat-rated charges. The remaining switching costs that are recovered on a traffic-sensitive basis consist primarily of the switch processor and common equipment. The switch processor and common equipment are resources that are shared by various end users and a recovery mechanism that apportions costs to those entities that are the cost causer (thereby providing proper signals at the margin) increases economic efficiency.

12. The *NPRM* asks whether a recovery mechanism based on trunk capacity does a better job of encouraging efficient use of the switch than one based on minutes and thus better aligns the manner in which costs are incurred and recovered. There are two important facts to consider. First, the proposed rate structure is merely another way to recover the same traffic-sensitive switch costs on a basis which, in the long run, remains traffic sensitive. Whether a capacity-based structure more accurately reflects the way switched costs are incurred may be a matter of debate. What is not a matter of debate is that the switch costs which are at issue in this proceeding are those that arise exclusively from the use of a

[6] The costs of switches are common to different intrastate and interstate services. The separations process arbitrarily "allocates" these common resources between the interstate and intrastate jurisdiction based on relative minutes. As I discuss below, the separations process arbitrarily affects accounting earnings in a way that has no relation to the economic performance of the firm. Thus, any conclusions based on accounting earnings are practically meaningless.

shared resource. And because the cost of shared resources varies with the use customers make of those resources, basing cost recovery on minutes or trunks makes little difference in principle; in both cases, costs that vary with usage are recovered from measures which vary with usage.

13. Second, the Commission is critical of the current minute of use recovery mechanism because it does not distinguish between peak and off-peak minutes. As the Commission has recognized (¶ 211), there are practical problems associated with a peak-sensitive rate structure. While true, it does not follow that the mandatory use of a capacity-based rate structure is a welfare improvement. The economic harm from not using a peak-sensitive rate structure based on minutes (and instead using overall minutes) is likely to be smaller than indicated in the *NPRM*, and some of the problems of implementing a peak-sensitive rate structure based on minutes applies to a rate structure based on trunk capacity as well. In other words, any potential gain from a capacity-based rate structure may be more than offset by implementation costs, and the end result of this regulatory intervention would be increased costs and reduced consumer choice.

14. The economic harm from not using a peak-sensitive rate structure is likely to be smaller than indicated in the NPRM. While it is true that the current interstate rate structure fails to distinguish between busy hour and non-busy hour usage, it is not the case that economic efficiency losses of the type suggested in the NPRM have been significant or that a change to trunks as the basis for recovery would, without fail, improve efficiency. First, peak-load pricing for access charges is unlikely to impact appreciably end user behavior. The demand for carrier access services is a derived demand. It is an input to the IXCs' production function, and end users (the ultimate cost causers) face long distance prices that recover the costs of many different inputs not just access charges. For example, IXCs have their own switches that peak at different times, and a single geographically averaged national long distance rate cannot reflect differences in peak periods across all of the IXC's switches. In addition, LEC switches peak at different times in different offices. LEC switches also support a broad range of services other than interstate access, including local and intraLATA toll usage and intrastate carrier access services. The aggregate demand for all

these services, not just interstate access service, determines the peak period in each switch, and the peak period will differ based on geographical location, customer calling pattern and type of switch.[7] For example, switches serving predominantly business customers may experience a daytime peak while switches serving residential neighborhoods may peak in the evening. A peak-sensitive local switching rate structure that averages across such different switches will not achieve anywhere near the theoretically possible welfare gains from peak load pricing than would occur if service in each switch were priced individually. As the Commission observed in the original Access Charge Order:

> It should be noted that the efficiency benefits of peak pricing flow from the use of peak pricing in end user rates. The use of peak pricing in a carrier's carrier charge need not have any direct effect upon usage. Consistency between carrier's carrier charges and end user rates would be desirable, but time of day pricing of access service compensation is not a condition precedent for time of day pricing of end user services.[8]

15. Empirical evidence suggests that the achievable welfare gains resulting from peak-load pricing are low. For example, using local calling data from GTE in Ohio, one study found that the theoretical welfare gains from peak load pricing could not be achieved using rate structures that could actually be implemented.[9] Moreover, in the current Docket the Commission's concern is that charges based on overall minutes may over-recover costs which depend on peak-period minutes. For this effect to be a problem, it must be the case that the growth rates of overall minutes and peak minutes are different, otherwise the alleged inefficiency of charges based on non-peak minutes would be *de minimus*.[10] There is simply no evidence that this is the case.

16. In addition, the *NPRM* overestimates the ease of implementing a capacity-based rate structure based on trunks. Some of the problems of implementing a peak-sensitive rate

[7] As the Commission points out in the *LEC Price Cap Performance Review* (¶ 268) nationwide averaging of toll rates attenuates the impact of LEC-specific access charges.

[8] MTS and WATS Market Structure, Third Report and Order, CC Docket No. 78-72, Phase 1, FCC 2d 241, ¶ 225.

[9] See Edward Rolla Park and Bridger Mitchell, "Optimal Peak-Load Pricing for Local Telephone Calls," Technical Report R-3404-1-RC, RAND.

[10] And in order for the bias to be in favor of the LECs, it must be the case that the growth in overall minutes is increasing relative to the growth in peak minutes.

structure based on minutes apply to a rate structure based on trunk capacity as well. First, as in the case for peak-load pricing based on minutes, the information requirements for a rate structure based on trunk capacity are likely to be significant. For example, to the extent that peak period switch processor capacity varies with both dedicated and common trunks terminating at the switch, one would need to attribute use of common trunks to particular carriers, which for practical purposes is little different than measuring minutes. More fundamentally, it is not at all clear that the relationship between trunks and peak period processor demand is stronger than the relationship between minutes of use and peak period processor demand. The demand of carriers for trunking resources is determined by their peak demands, which do not necessarily coincide with the peak demand for the switch itself. The latter demand is determined by the volumes delivered by not only these carriers (whose own peak periods might differ from one another) but all other peak usage for that switch, e.g., local calling.

17. The *NPRM* suggests that a benefit of the proposed rate structure would be to encourage IXCs to develop off-peak pricing plans to encourage long distance consumers to increase off-peak usage. As mentioned above, peak-period pricing for access charges does not necessarily lead to peak-period pricing for end user long distance services. Moreover, consumers seem to value simplicity in their telecommunications pricing plans. For example, long distance prices appear to be moving away from time of day and length of haul pricing towards various two-part tariff pricing plans in which customers pay a flat monthly fee and a single usage rate for all minutes. Competition for bundles and packages seems to be what the market is demanding and any theoretical gains in welfare resulting from peak and off-peak pricing must be balanced with consumer preferences that seem to prefer simplicity over efficiency in rate structures.

18. To summarize, the Commission should not mandate a rate structure based on trunk capacity. For the reasons discussed above, there is simply no certainty about the practical benefits of such a proposal. Conceptually, minutes and trunks are just two means by which to recover traffic-sensitive costs, and the use of minutes rather than peak minutes has not resulted in significant welfare losses. Any potential welfare gains from moving to a rate

structure based on trunk capacity is likely to be outweighed by the significant implementation and information costs. At a time when market forces are increasingly disciplining market behavior in this industry, increased regulatory intervention of the type being contemplated is unwarranted and results in losses in economic efficiency and distortions in the exchange and exchange access markets. A better solution is not to micromanage the rate design process—especially given the significant information asymmetries facing the Commission—rather it is to permit market forces to determine whether, in fact, a rate structure based on trunk capacity can pass a market test.

III. ADJUSTMENTS TO THE PCI ARE INAPPROPRIATE

19. The Commission states (at ¶ 222):

> If we find that local switching costs are more appropriately recovered through capacity-based charges, then permitting LECs to charge per-minute local switching rates since LEC price cap regulation was adopted in 1991, without including a q factor in the traffic-sensitive PCI formula, may have created an imbalance between the interests of IXC customers and LEC stockholders...

The Commission implies that putative above-normal LEC returns may be explained by the "error" in the traffic-sensitive rate structure and that, therefore, a one-time correction to the formula may be required. This conclusion is fundamentally incorrect for several reasons. First, higher earnings (even if they are accurately measured) are a sign of success, not failure, in a price cap plan.[11] Second, regulatory earnings are not likely to be measured accurately: the alleged windfall is based on an analysis of interstate-only accounting rates of return in a single basket. In these circumstances, higher regulatory earnings provide virtually no indication of the economic performance of the LEC industry because: (i) telecommunications production is characterized by the use of resources that are common to

[11]Over the *long-run*, a properly established productivity target would produce normal earnings for a firm performing at the average level implied by the target. Firms performing above average will earn more and those performing below average will earn less. This property of a proper X factor should *not* be interpreted to imply that if price-capped firms generally have high *short-run* accounting earnings, that X should be deemed to be incorrect. In particular, as I explain below, interstate accounting earnings systematically overestimate the true earnings of price-capped firms, i.e., they provide the illusion, but not the reality of supracompetitive earnings. In fact, my comparison to nonregulated firms shows that price capped firms are earning less than the competitive level, which, if anything, would imply that X has been too high.

a host of interstate and intrastate services, and (ii) accounting rates of return for interstate services are entirely dependent on an economically arbitrary separations process to allocate investment and expenses between the Federal and state jurisdictions. Third, a comparison of LEC accounting earnings to a broad group of U.S. industrial firms shows no support for the proposition that LECs have experienced a windfall, while at the same time, the LECs' customers have experienced greater real price reductions as a result of price cap regulation. Fourth, the manner in which the X-factor is estimated (using either the historical trends in telecommunications prices relative to the economy as a whole or a TFP approach) precludes the existence of a windfall.

20. The Commission's proposal is particularly harmful because it is an unpredictable and opportunistic adjustment to the price cap plan. Such opportunistic adjustments to the parameters of the plan diminish the firm's confidence in the terms of its agreement with the regulator, dilute the efficiency incentives of the plan and ultimately reduce economic efficiency below what would have been achieved under proper price cap regulation. Changing the plan based on basket-level interstate accounting earnings would be more draconian than simple rate of return regulation which, in principle, applied an earnings test to the aggregate interstate or intrastate earnings of the firm. Such a policy would reverse a decade of movement towards efficient, incentive-based regulation and would vitiate the efficiency-enhancing incentives that are the prime reason for price cap regulation.

A. The Commission Should Not Base Decisions on LEC Accounting Earnings

21. Increases in earnings under price caps (even if they can be measured accurately) are a sign of success, not failure. Assuming the X-factor is properly set, higher accounting earnings under a price regime imply that the regulated firm has been able to reduce its unit accounting costs more rapidly than required by the target value of X.[12] Customers—at least IXCs—receive an up-front, guaranteed benefit in the form of lower prices irrespective of the ability of the LEC to reduce its unit costs. Price cap regulation only makes sense if the

[12] Below, I discuss the problems with using accounting rather than economic earnings.

regulated firm is financially exposed to the full range of market outcomes produced by its skill or stupidity. If increased earnings come to be interpreted as a failure of price cap regulation, then price cap regulation will become little more than rate of return regulation in disguise. The inference that prescriptive regulation or a higher value of X is warranted because of high or increasing accounting earnings is inimical to the incentives intended under price cap regulation. The manager of a regulated firm must be able to face her accountant at the end of a successful month without fear that increased reported earnings will trigger regulatory retaliation. Otherwise, price cap regulation is no better than rate of return regulation with an institutionalized lag. As stated by the D.C. Court of Appeals regarding MCI's request to reinitialize the X-factor back to 1991:

> Universal, complete reinitialization would impair the supposed incentive advantages of price caps—which derive from firms' supposing that their efficiencies will not come back to haunt them.[13]

22. In order for earnings to provide any meaningful information about a firm's performance, they must, at a minimum, be accurately measured. This is certainly not the case in this context because the Commission is basing its conclusion that price-cap LECs have experienced a windfall on an analysis of interstate accounting rates of return in a single basket. Such a conclusion is economically meaningless because earnings analysis cannot be done at the basket level. Telecommunications production is characterized by inputs that are common to many services: *e.g.,* a single switch handles local, long distance, carrier access and ISP-bound traffic. In order to attempt to estimate earnings at the level of an interstate price-cap basket, some type of separations process is needed. And therein lies the fundamental problem because the separations process gives rise to the appearance but not the reality of increased earnings.

23. Specifically, accounting earnings are dependent on the investment and expenses that have been separated and allocated to the inter and intrastate jurisdictions. Currently, the relative allocator upon which many separations factors are based is relative minutes of use, and

[13] United States Court of Appeals For the District of Columbia Circuit, United States Telephone Association, et al., Petitioners v. Federal Communications Commission and United States of America, Respondents AT&T Corporation, et al., Intervenors, May 21, 1999 No. 97-1469.

different minutes (local and interstate) grow at different rates. Thus, the amount of fixed investment and expenses allocated to each jurisdiction (and therefore, the amount of earnings that apparently occurs) depends on the relative growth of local and interstate minutes. If, for example, local minutes grow faster than interstate minutes, fewer fixed costs would be assigned to the interstate jurisdiction, and a jurisdictional earnings analysis would show, incorrectly, higher interstate earnings. Earnings would appear to be increasing because of an arbitrarily diminishing interstate investment base, not because fundamental forward-looking economic factors have changed.

24. Moreover, anomalies in the separations process itself make reported earnings even less useful. An example would be Internet-bound traffic. Internet-bound minutes are assigned to the intrastate jurisdiction even though, as the Commission has determined, calls made to Internet destinations are jurisdictionally interstate rather than local.[14] The fact that Internet-bound traffic continues to be classified as local mistakenly increases the level of measured interstate earnings: these calls carry costs along with them but no revenue, so assigning costs and revenues for Internet-bound traffic to the intrastate jurisdiction artificially inflates interstate earnings. Since Internet-bound traffic is growing much faster than intrastate usage, this bias can only get worse, and its magnitude is far from trivial. Based on a recent data request to its members, NECA estimates that approximately 18% of 1998 local/intrastate dial equipment minutes represent Internet traffic.[15] And, for the NECA pool members, treating this jurisdictionally interstate traffic as intrastate for separations purposes produces a $170 million misallocation of costs to the intrastate jurisdiction and a corresponding overstatement of interstate earnings.[16]

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[14] FCC, *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* and *Inter-Carrier Compensation for ISP-Bound Traffic*, CC Docket Nos. 96-98 and 99-68, Declaratory Ruling in CC Docket No. 96-98 and Notice of Proposed Rulemaking in CC Docket No. 99-68 ("*Internet Traffic Order*"), released February 26, 1999.

[15] Letter from Richard A. Askoff , Deputy General Counsel NECA, to Lawrence E. Strickling Chief, Common Carrier Bureau, October 5, 1999.

[16] Recently, SBC was required to reassign approximately 23 billion dial equipment minutes from the interstate to the intrastate jurisdiction. This re-assignment was due to Internet traffic that SBC had identified that was delivered to CLECs serving ISPs. The end result of this re-assignment was that interstate costs declined by approximately $117.5 million thereby giving the appearance of increased interstate earnings.

25. Fundamentally, regulatory accounting distorts both the level and growth of price cap LEC earnings. When accounting rates of return are adjusted to approximate economic rates of return, the actual rate of return achieved by price cap LECs during the 1991-1995 period averaged only 8.75 percent.[17] As the Commission has itself noted in previous occasions:

> Interstate rate base and expense levels, and thus reported earnings, are also directly affected by accounting depreciation rates, which we prescribe for most incumbent price cap LECs. By contrast, in a competitive marketplace, decisions are governed by economic costs and economic depreciation rates. Reduced reliance on accounting costs thus facilitates our transition to the competitive paradigm of the 1996 Act.[18]

26. The *NPRM* has it wrong, however, when it suggests that the price cap LECs have experienced an earnings windfall. On a comparable basis, neither the level nor the growth in price cap LEC interstate or intrastate earnings are out of the range observed in unregulated competitive markets. A reasonable control group for the price cap LECs is the U.S. non-farm business sector because of the use of the performance of this sector in the price cap plan.[19] As shown in Figure 1 in the Appendix, from 1990 to 1998, the rate of growth of interstate and intrastate BOC operating income is well below that for the Value Line Industrials.[20] For example, during the period 1990 to 1998, the annual growth of interstate operating income for the BOCs averaged 3.3% compared to 8.7% for the Value Line Industrials: less than half the rate of growth of the control group. Over the price cap period, operating income for the price cap LECs has not performed as well as that of the average industrial firm over the same period.

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[17] *Ex parte* letter to Richard Metzger, Jr., Chief, Common Carrier Bureau, FCC from Lawrence E. Sarjeant, Vice President Legal and Regulatory Affairs, USTA, CC Docket Nos. 94-1 and 96-262, May 29, 1998. Ironically, when the FCC evaluated AT&T's performance under its price cap plan, AT&T strongly resisted the use of the same accounting returns concept that AT&T and MCI urge be applied to the price cap LECs. See Comments of AT&T, *Price Cap Performance Review for AT&T*, CC Docket No. 92-134, 1992.

[18] *Fourth LEC Price Cap Performance Review*, ¶ 152.

[19] Specifically, the input-price differential and total factor productivity differentials in the X-factor model are based upon the aggregate performance of firms in the non-farm sector.

[20] Value Line Selection and Opinion, pp. 5445-6, July 23, 1999. The Value Line Industrial I Composite consists of 875 industrial, retail and transportation companies and provides a good proxy for the performance of the non-farm sector. Operating income is calculated as revenues minus total operating expenses including depreciation.

27. Nor is it the case that price-cap LEC consumers have been harmed by the movement to price cap regulation. By the construction of the price cap index, customers of the price cap LECs have experienced greater real reductions in prices than in the past. In addition, aggregate real price reductions for price cap LECs exceeded those for non-price cap LECs. For example, according to data supplied by USTA, during the 1990-1998 time frame, price reductions for the price cap carriers averaged approximately 58% while the average price reductions for the NECA companies was less than half that amount.

28. Implementing the Commission's proposal would be a throwback to the world of rate-of-return regulation. A one-time adjustment to the traffic-sensitive PCI formula would reduce economic efficiency and reverse the efficiency-enhancing incentives that are the primary reason for adopting price cap regulation. The basis of price cap regulation is to motivate efficiency-enhancing performance by not penalizing the firm for such productivity gains. These incentives are generated by setting in place the parameters of the plan and, once set, accepting the results. Any unanticipated, unilateral one-time adjustment because of excessive earnings constitutes a form of recontracting which reduces the firm's incentives to increase productivity. In addition, any return to earnings-based regulation would require:

    - resolution of contentious cost-accounting questions including changes in separations factors, depreciation rates, the authorized rate of return, etc., and

    - reconsideration of competitive safeguards whose adequacy may depend on the incentive properties of price cap regulation; *e.g.*, accounting safeguards to prevent cross-subsidization.

    But, at the end of the day, a return to earnings-based regulation is unthinkable because it flies in the face of efforts by Congress and the Commission to rely on market forces to control behavior in telecommunications markets. The lure of increased earnings is possibly the most compelling of market forces in the economy, and changing the regulatory contract to control the earnings for particular services and particular companies in markets opened to competition would be a large step backward.

Excluding depreciation from the measure of operating income does not affect the conclusions. Data on BOC earnings were provided by USTA.

B. The Price Cap Formula Has Captured Any Misalignment Between Usage and Costs

29. In addition to the fact that the level and growth of the price cap LEC's accounting earnings are not excessive, price cap LECs have not experienced an earnings windfall due to the putative misalignment between NTS costs and the rate structure of the traffic-sensitive basket. Use of either the indirect (historical price) approach or the direct TFP approach to measuring the historical value of the X-factor precludes any windfall from occurring as long as growth rates captured in the historical period persist in the future.

30. The X-factor in the Commission's price cap plan was set in place in 1990 based, in part, on an indirect study of LEC productivity.[21] The initial rates for the LEC price cap plan in 1990 were specifically determined so that revenues would equal costs, including a normal return on investment. LECs subject to price cap regulation were ordered to use their July 1, 1990 rates as the basis for their first price cap filing. Those rates were specifically chosen by the Commission because they had recently been the subject of "scrutiny as part of the annual access filing and review process" and because they had "recently been retargeted to earn the authorized rate of return."[22] The Frentrup-Uretsky study examined switched access revenue, cost and demand data from June 1984 to June 1991 and determined the productivity offset (X-factor) that would have been necessary to yield the same 1991 prices that had been obtained under rate-of-return regulation. In brief summary, the study computes switched access unit revenue (i.e., the rate per minute) for each of the six post-divestiture periods. The calculated unit revenue for each period was adjusted to recast both the traffic sensitive and common line revenue to earn 12.00 percent, the contemporaneous authorized rate of return.

[21] See *A Study of Local Exchange Carrier Post-Divestiture Switched Access Productivity*, by J. Christopher Frentrup and Mark I. Uretsky (Frentrup-Uretsky) and *A Long Term View of the Appropriate Productivity Factor for Interstate Exchange Access*, by Thomas C. Spavins and James J. Lande (Spanvis-Lande), respectively Appendix C and Appendix D of the *LEC Price Cap Order*.

[22] In the Matter of Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313, released October 4, 1990, ("*LEC Price Cap Order*") ¶17.

31. Using the indirect method to calculate X makes it impossible for a supranormal return to result from the misalignment in costs and cost recovery alleged in the *NPRM*. This statement is true as long as the initial rates at the outset of the price cap plan were determined to obtain zero excess profit, and the relative growth rates of minutes and lines (TS and NTS cost elements) during the study period used to determine the X-factor remain the same during the period in which X is applied in the price cap index formula. If, as I show below, growth in minutes per line diminishes during the period in which X is applied (relative to what it was during the period for which X was determined), then the effect of the alleged misalignment of NTS costs and TS prices would be a systematic decrease in accounting earnings, not the increase in earnings hypothesized by the *NPRM*.

32. In Table 1 in the Appendix, I show that recovering NTS costs on a TS basis does not result in an earnings windfall. Table 1 shows that zero profits can be retained over time even when NTS (line) costs are recovered together with traffic-sensitive costs in a single per minute rate. Looking at the table, Years 1 and 2 represent the rate of return period. The (hypothetical) data show that Year 1 line and minute quantities (200,000 and 250,000,000 respectively) generate costs of $36,000,000 and $2,500,000 respectively, based on unit costs of $180 per line per year and $0.01 per minute respectively.[23] The price per line is set at $0 so that all non-traffic sensitive costs will be recovered in the traffic-sensitive rate and so that the per-minute price ($0.1540) is calculated to recover both NTS line and TS minute costs and result in zero profits, i.e., the result that rate of return regulation is expected to obtain. In Year 2, lines and minutes grow at 3.00 and 9.00 percent respectively. Given those growth rates, the unit revenue change—applied to both lines and minutes—necessary to maintain zero excess profits in Year 2 is –5.1 percent.[24]

33. Based on ROR-adjusted unit revenue, the indirect study calculated the X-factor which, had it been applied to the study period beginning rate using the PCI formula, would have resulted in exactly the ROR-adjusted rate at the end of the study period. An X-factor was

[23] I could add a fixed cost component and not alter my conclusion, but it would make Table 1 more complicated.

[24] While I only show a two year period of ROR results (rather than six periods as used in the Frentrup-Uretsky study) it is nonetheless sufficient to simulate the ROR study period and result obtained by Frentrup-Uretsky.

thus determined that specifically precluded excess earnings during the study period. Given the data in this example, the indirect approach would have determined an X-factor that would have resulted in an average annual –5.1 percent change in unit revenue.

34. Table 1 then shows that if this unit revenue change were imposed on subsequent (price cap) periods—shown as Years 3, 4, and 5—so long as the underlying relationship between the growth rates of minutes and lines remained unchanged, profit continues to be zero. Indeed, in Year 5, I show that the individual growth rates for lines and minutes can change but that so long as the growth in minutes per line remains constant (5.83 percent in this example), there continues to be no systematic excess earnings of the kind alleged in the *NPRM*.[25]

35. Table 2 in the Appendix adds an additional price cap period (Year 6) to the analysis and shows what happens if the ratio of minutes per line declines. The example holds line growth at 6.00 percent but reduces minute growth to 10.00 percent, resulting in a reduction in the growth of minutes per line from 5.83 to 3.77 percent per year. If, as under the price cap plan currently in place, the unit revenue change embodied in the X-factor averaged 5.1 percent per year, then profits would decline under the plan, despite the recovery of NTS costs on a TS basis.

36. In fact, the underlying growth rate of minutes per line has diminished since the period over which the productivity offset was initially determined. Figure 2 shows the actual annual growth in minutes per line from 1985 to 1997, from which a downward trend in the growth in minutes per line can be seen. Given this empirical observation and the analysis above, the Commission's concern of a misalignment caused by the recovery of NTS costs on a usage basis is misplaced. Since the current growth in minutes per line is less than its growth during the period over which X was estimated, there is more reason to increase the current traffic-sensitive PCI than to decrease it.

[25] The fundamental phenomenon illustrated by Table 1 is that reductions in unit costs that arise from demand growth are captured in an historical study and to the extent that the pattern of demand growth is expected to persist in the future, the resulting X factor properly and competely captures this demand effect. In Table 1, the unit cost per minute is made up of the variable cost ($0.01) and the average per minute recovery of line costs. Since the latter cost decreases at the rate of the increase of minutes per line, an X factor that captures the historical decreases works into the future as long as minutes per line growth matches the historical rate.

37. Since 1997, the Commission has used the direct TFP approach to calculate the productivity offset X in the price cap annual adjustment formula. As is the case with the use of the indirect approach, use of TFP precludes earnings windfalls stemming from the possible misalignment between the manner in which costs are incurred and recovered. Recall that productivity growth is the difference between the growth rates of outputs and inputs. In the *Fourth Price Cap Performance Review*, the Commission discussed in detail the method by which it measured X. A quantity index of output was created using physical output measures such as access lines, messages, and minutes, and an input index was calculated using physical measures of labor, capital services and material.[26] The question posed in the *NPRM* assumes that revenue from increased switch usage exceeds increased switch costs, because either: (i) in the past, NTS costs were recovered in the TS basket on a usage basis or (ii) switching costs increase with capacity while revenue increases with usage.

38. However, because the X-factor in the annual price adjustment formula was set using historical growth in TFP, neither of these misalignments would produce windfall earnings. If switch costs (inputs) were growing more slowly than the output the switch makes possible, then the TFP analysis would show a more rapid growth in TFP: an increase in the difference between the growth rates of outputs and inputs. This difference in growth rates is exactly what is captured in a TFP analysis and no adjustment to the historical X (or the PCI produced by that X) is needed to account for a misalignment of costs and cost recovery. For example, the fact that LEC switching rates do not distinguish between peak and off-peak periods has no bearing on the analysis. If the Commission is correct that off-peak output is significantly less costly to produce than peak output, then this fact is automatically incorporated in a higher historical X-factor. As discussed below, if the Commission does, in fact, redefine its measure of output for pricing purposes, holding other factors constant, a move to a slower growing output would reduce the X-factor.

39. Finally, even though an earnings review is fundamentally inconsistent with price cap regulation and should be avoided at all costs, it is important to note that for all practical purposes, the Commission has already corrected for any earnings windfalls during the first

[26] See *Fourth LEC Price Cap Performance Review*, ¶93 for a description.

four years of the LEC price-cap plan. In the *LEC Price Cap Performance Review* the Commission made an adjustment to the PCI in the LEC price-cap plan to correct for any alleged windfalls that may have occurred in the first four years of LEC price-cap regulation due to errors in calculating the then current X-factor.

40. In that Order, for all practical purposes, the Commission made corrections to the price-cap plan to eliminate high LEC earnings. In defending the changes made to the LEC price cap plan, the Commission expressed concern regarding high earnings, and a fair reading of the case shows that the elimination of excess earnings—for whatever reason—was an important motivation. As the Commission stated (¶ 208):

> Our conclusion is supported by the observation of a rapid rise in LEC earnings under price caps, which suggests that the productivity factor used during the initial price caps period was too low.

Moreover, the Commission's concern in the *FNPRM* is that the mismatch between the manner in which costs in the traffic-sensitive basket were incurred and recovered resulted in an imbalance in the interests of IXC customers and LEC stockholders, *i.e.*, that price-cap LECs had likely "over-recovered." However, the Commission's own analysis in the *LEC Price Cap Performance Review* of whether there in fact was "overrecovery" of any costs revealed just the opposite. The Commission stated (¶ 253),

> Indeed, we do not hold here that price cap LECs overrecovered from ratepayers during the past four years of price caps.

And there is nothing in the current circumstances to warrant a change in that position.

IV. GROWTH ADJUSTMENTS ARE NOT JUSTIFIED FOR PRICE CAPS

41. From the above analysis, it should be clear that adjustments to the annual price adjustment formulas for the traffic-sensitive and common line baskets are unnecessary and would effectively double-count historical productivity growth. Thus, the Commission should not add a q factor to the traffic-sensitive PCI, and, rather than increasing the g/2 factor in the common line basket to a full g, the Commission should eliminate it entirely. As discussed above, irrespective of whether the direct or indirect measure of X was used, it already

accounts for all changes in costs and revenues so that a price cap formula that included an adjustment for demand growth would effectively double-count a component of historical productivity gains already reflected in the measure of TFP. This logic applies to both q and g which I address below.

A. G-Factor

42. The Commission is considering (at ¶ 227) increasing the g/2 factor in the common line basket to a full g, citing two reasons. First, the phasing-out of per-minute CCL rates and the separate common line formula (as was supposed to happen as a result of the 1997 *Access Reform First Report and Order*) is progressing more slowly than expected so this issue has not disappeared as rapidly as anticipated. Second, the Commission hypothesized that IXCs are more causally responsible for the growth in minutes than the price cap LECs and therefore should benefit more from that growth than do the LECs. There are several problems with these arguments.

43. First, as discussed above, use of either the indirect (historical price) approach or a direct TFP approach to calculate productivity growth in the X-factor makes the use of a g factor redundant and would penalize price cap LECs, in the sense that it would become more difficult for them to achieve the unit cost reductions required by the annual reduction in the PCI. This fact was recognized by the Commission in its *LEC Price Cap Performance Review Fourth Report and Order* where it states (at ¶ 169-170):

> In the Price Cap Fourth Further Notice, we noted that using an X-Factor based on TFP in the common line formula might tend to double-count demand growth...In the Access Reform First Report and Order, we adopt for price cap incumbent LECs a common line rate structure that will recover almost all common line costs through flat charges on subscribers and on IXCs. LECs will phase out the per-minute CCL over a period of one to three years. We also decide to apply to the common line basket the formula that we use for the traffic-sensitive and trunking baskets as soon as the per-minute CCL charge has been phased out. Thus, any double-counting that results from our adoption of a TFP-based X-factor will be short-lived. [emphasis added and footnotes omitted].

44. Second, even assuming that it is economically correct (which it is not) to keep the g/2 factor in the common line formula, there are reasons why the Commission should not increase it

to a full g. As a practical matter, the proportion of revenues from the CCL charge is decreasing significantly, and in fact, most price-cap LECs have already practically eliminated the CCL charge.[27] Therefore, assuming there were a problem (which there is not), the magnitude of that problem would be much less than when the g/2 factor was first put in place. Moreover, the alleged problem which gave rise to g in the first place (minutes growing significantly faster than lines) is no longer an important issue. As Figure 2 in the Appendix shows, the growth in minutes per line has been decreasing significantly since the mid 1980s so that a driver of increased productivity growth during the period over which X was measured has reversed in recent years.

45. Finally, the argument that the agent that causes output growth is somehow entitled to its benefits has no basis in economics. Prices follow incremental costs, and when Dell expands the markets for computers, Intel's earnings may increase faster than Dell's. In addition, analysis of the growth in interstate switched minutes shows that reductions in LEC access charges—together with changes in income—more than account for the demand stimulation that took place, leaving no role for IXC marketing in the explanation of demand growth. In theory, increases in output are caused by downward movements along the market demand curve resulting from lower prices or outward shifts in the demand curve caused by changes in income or tastes. The Commission states (at ¶ 227) that it found evidence that IXCs influence per-minute demand growth more than LECs, suggesting that IXCs, through their marketing, advertising and customer care have a greater impact on per-minute demand growth. A more likely explanation is that price reductions caused by reductions in carrier access charges stimulated the observed increases in demand. Using consensus price and income elasticities, and assuming the IXCs fully pass through reductions in access charges in lower long distance prices, I have shown that the resulting estimated demand stimulation more than accounts for the observed increases in demand. Thus, there is no demand stimulation left to be attributed to IXC marketing efforts.[28] The

[27] Of the remaining price cap LECs with CCL revenues, less than 5% of common line revenues are comprised of CCL revenue and of that revenue nearly half is for the universal service fund.

[28] See William E. Taylor and Lester D. Taylor, "Postdivestiture Long-Distance Competition in the United States," *American Economic Review Paper and Proceedings*, May 1993, and William E. Taylor and J. Douglas Zona,

benefits of lower prices and expanded demand for interstate switched services that are sometimes ascribed to competition or to IXCs' marketing efforts should be properly attributed to the regulatory policies that have lowered access charges—i.e., factors that are outside the control of long distance carriers.

46. Given that the Commission has already recognized that retaining a g factor in the common line formula double counts productivity growth when direct measures of productivity growth are used to estimate the X-factor, the Commission should focus its reform on accelerating the recovery of NTS costs through flat rates rather than dividing the putative benefits of growth between IXCs and LEC shareholders. The latter exercise is unnecessary, has no economic foundation, double counts productivity growth and (fortunately) would be implemented only for a short period while the CCLCs transition to zero.

B. Q-Factor

47. The Commission states (at ¶ 218):

> "[I]f we decide to adopt a capacity-based local switching rate structure, it may be appropriate to include a factor in the traffic-sensitive PCI formula similar to the g factor currently in the common line PCI formula."

On the contrary, there is no economic connection between implementing a capacity-based local switching charge and adopting a q factor in the traffic-sensitive price cap basket. Moreover, examined on its own, a q-factor adjustment in the traffic sensitive basket is not required to mitigate effects of inefficient cost recovery and would, if adopted, double count the effects of demand growth. This problem with the q-factor adjustment occurs regardless of whether price cap LECs are required to develop a capacity-based switching charge. Even if minutes grow faster than peak capacity, productivity growth has been measured in terms of minutes; if: (1) the Commission applies minutes in the future, and (2) the underlying relationships between minutes (output) and capacity (inputs) stay the same, the historical value of X fully accounts for the misalignment of costs and revenues.

"An Analysis of the State of Competition in Long-Distance Telephone Markets," *Journal of Regulatory Economics*; 11:227-255 (1997).

48. In fact, changing to a different measure of output and a different rate structure under the conditions assumed by the Commission (i.e., slower-growing output) would require application of a lower X-factor. Since TFP growth is given by the difference between the growth rates of outputs and inputs, changing a component of output to a slower-growing measure would reduce measured productivity growth. A similar point was recognized by AT&T, MCI and Sprint in the *LEC Price Cap Performance Review*. The comments of AT&T and Sprint, summarized by the Commission in that Order, maintained that a change to a per-line formula would lead to a .8 percentage point change in the X-factor while MCI maintained that it would lead to a .5 percentage point change.[29]

V. CONCLUSIONS

49. At this late stage of reform in the telecommunications industry, the Commission, motivated by the appearance of high LEC earnings, is contemplating significantly increased regulatory intervention in the LEC price cap formula to solve problems that simply do not exist. Price cap regulation has worked well in its intended goals: providing real economic benefits to consumers and ensuring that superior firm reward arises only from superior firm performance. The changes proposed by the Commission are simply not needed and create more problems than they solve. Specifically, I conclude that:

- The proposal to require a capacity-based rate structure for local switching is not materially different from the current rate design in which traffic-sensitive switch costs are recovered on a minute of use basis. Thus, there are few theoretical or practical reasons to believe that the proposal would unambiguously lead to improvements in economic efficiency, and the use of a mandatory rate structure in these circumstances would reduce consumer choice and competitively handicap price cap regulated firms.

- There has been no opportunity for the price cap regulated LECs to experience a windfall due to the putative misalignment between NTS costs and the usage-based prices in the traffic-sensitive basket. Use of either the indirect (historical price) approach or a direct TFP approach to calculate the productivity offset X in the price cap adjustment formula prevents any earnings windfall from occurring. Moreover, the growth rate in usage per line has slowed compared with the period over which X was measured so that a

[29] *LEC Price Cap Performance Review*, ¶ 262.

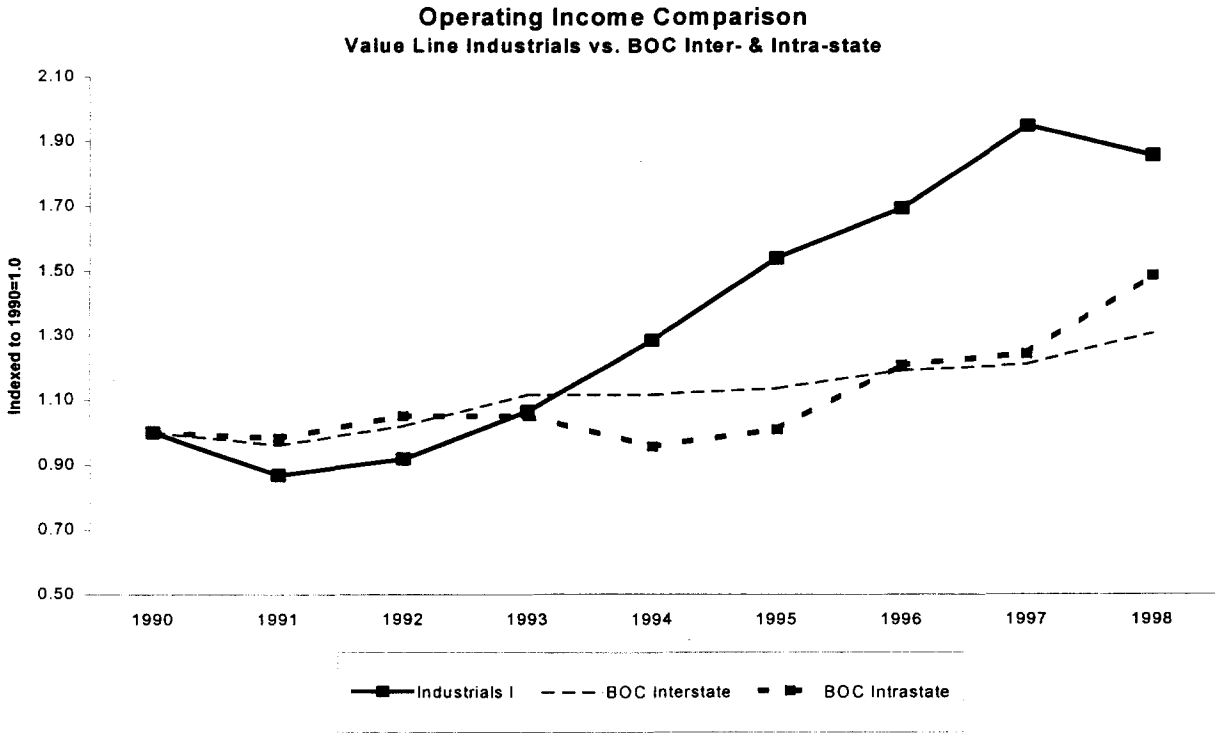
downward adjustment to the traffic-sensitive PCI to account for the misalignment between costs and rates would be in the wrong direction.

- On a going forward basis, there should not be a q factor included in the traffic-sensitive PCI, and rather than increasing the g/2 factor in the common line basket to a full g, it should have already been eliminated. Since the X-factor already accounts for all costs and revenues, a formula that includes an adjustment for demand growth would effectively double-count a component of historical productivity gains already reflected in the measure of TFP.

- To the extent the Commission changes to a different rate structure and measure of output, under the conditions assumed by the Commission (i.e., slower-growing output) a lower X-factor would be required.

VI. APPENDIX

Figure 1



Source: Value Line Industrial data, *op. cite* n. 20, ARMIS, "Basic Financial Data Reports," 1990-98.

TABLE 1: LINES

Year	Period	Lines	Growth	Price	Revenue	Variable Cost	Cost	Profit
1	ROR	200,000	3.00%	$0	$0	$180	$36,000,000	-$36,000,000
2	ROR	206,000	3.00%	$0	$0	$180	$37,080,000	-$37,080,000
3	PC 1	212,180	3.00%	$0	$0	$180	$38,192,400	-$38,192,400
4	PC 2	218,545	6.00%	$0	$0	$180	$39,338,172	-$39,338,172
5	PC 3	231,658		$0	$0	$180	$41,698,462	-$41,698,462

TABLE 1:MINUTES

Year	Period	Minutes	Growth	Price	Revenue	Variable Cost	Cost	Profit
1	ROR	250,000,000	9.00%	$0.1540	$38,500,000	$0.0100	$2,500,000	$36,000,000
2	ROR	272,500,000	9.00%	$0.1461	$39,805,000	$0.0100	$2,725,000	$37,080,000
3	PC 1	297,025,000	9.00%	$0.1386	$41,162,650	$0.0100	$2,970,250	$38,192,400
4	PC 2	323,757,250	12.18%	$0.1315	$42,575,745	$0.0100	$3,237,573	$39,338,172
5	PC 3	363,190,579		$0.1248	$45,330,368	$0.0100	$3,631,906	$41,698,462

TABLE 1: MINUTES AND LINES

Year	Period	Minutes/Line	Growth	Revenue	Cost	Profit	Unit Revenue Change
1	ROR	1,250		$38,500,000	$38,500,000	$0	
2	ROR	1,323	5.83%	$39,805,000	$39,805,000	$0	-5.1%
3	PC 1	1,400	5.83%	$41,162,650	$41,162,650	$0	-5.1%
4	PC 2	1,481	5.83%	$42,575,745	$42,575,745	$0	-5.1%
5	PC 3	1,568	5.83%	$45,330,368	$45,330,368	$0	-5.1%

TABLE 2: LINES

Year	Period	Lines	Growth	Price	Revenue	Variable Cost	Cost	Profit
1	ROR	200,000	3.00%	$0	$0	$180	$36,000,000	-$36,000,000
2	ROR	206,000	3.00%	$0	$0	$180	$37,080,000	-$37,080,000
3	PC 1	212,180	3.00%	$0	$0	$180	$38,192,400	-$38,192,400
4	PC 2	218,545	6.00%	$0	$0	$180	$39,338,172	-$39,338,172
5	PC 3	231,658	6.00%	$0	$0	$180	$41,698,462	-$41,698,462
6	PC 4	245,558		$1	$245,558	$180	$44,200,370	-$43,954,812

TABLE 2: MINUTES

Year	Period	Minutes	Growth	Price	Revenue	Variable Cost	Cost	Profit
1	ROR	250,000,000	9.00%	$0.1540	$38,500,000	$0.0100	$2,500,000	$36,000,000
2	ROR	272,500,000	9.00%	$0.1461	$39,805,000	$0.0100	$2,725,000	$37,080,000
3	PC 1	297,025,000	9.00%	$0.1386	$41,162,650	$0.0100	$2,970,250	$38,192,400
4	PC 2	323,757,250	12.18%	$0.1315	$42,575,745	$0.0100	$3,237,573	$39,338,172
5	PC 3	363,190,579	10.00%	$0.1248	$45,330,368	$0.0100	$3,631,906	$41,698,462
6	PC 4	399,509,637		$0.1185	$47,325,352	$0.0100	$3,995,096	$43,330,256

TABLE 2: MINUTES AND LINES

Year	Period	Minutes/Line		Revenue	Cost	Profit	Unit Revenue Change
1	ROR	1,250		$38,500,000	$38,500,000	$0	
2	ROR	1,323	5.83%	$39,805,000	$39,805,000	$0	-5.1%
3	PC 1	1,400	5.83%	$41,162,650	$41,162,650	$0	-5.1%
4	PC 2	1,481	5.83%	$42,575,745	$42,575,745	$0	-5.1%
5	PC 3	1,568	5.83%	$45,330,368	$45,330,368	$0	-5.1%
6	PC 4	1,627	3.77%	$47,570,910	$48,195,466	-$624,557	-5.1%

Figure 2

Source: 1984-87 data on Total Switched Access Lines for LECs, Table 14, SOCCC.
1988-1997 data on Total Switched Access Lines for all Reporting LECs, Table 2.10 SOCCC
Data on Interstate Switched Access Minutes from Table 8.7, SOCCC, 1997-98.

Notes: SOCCC is the FCC's Statistics of Communications Common Carriers.