

Figure 1. BellSouth's Special Access Revenue (per VGE Special Access Line), 1996-2003

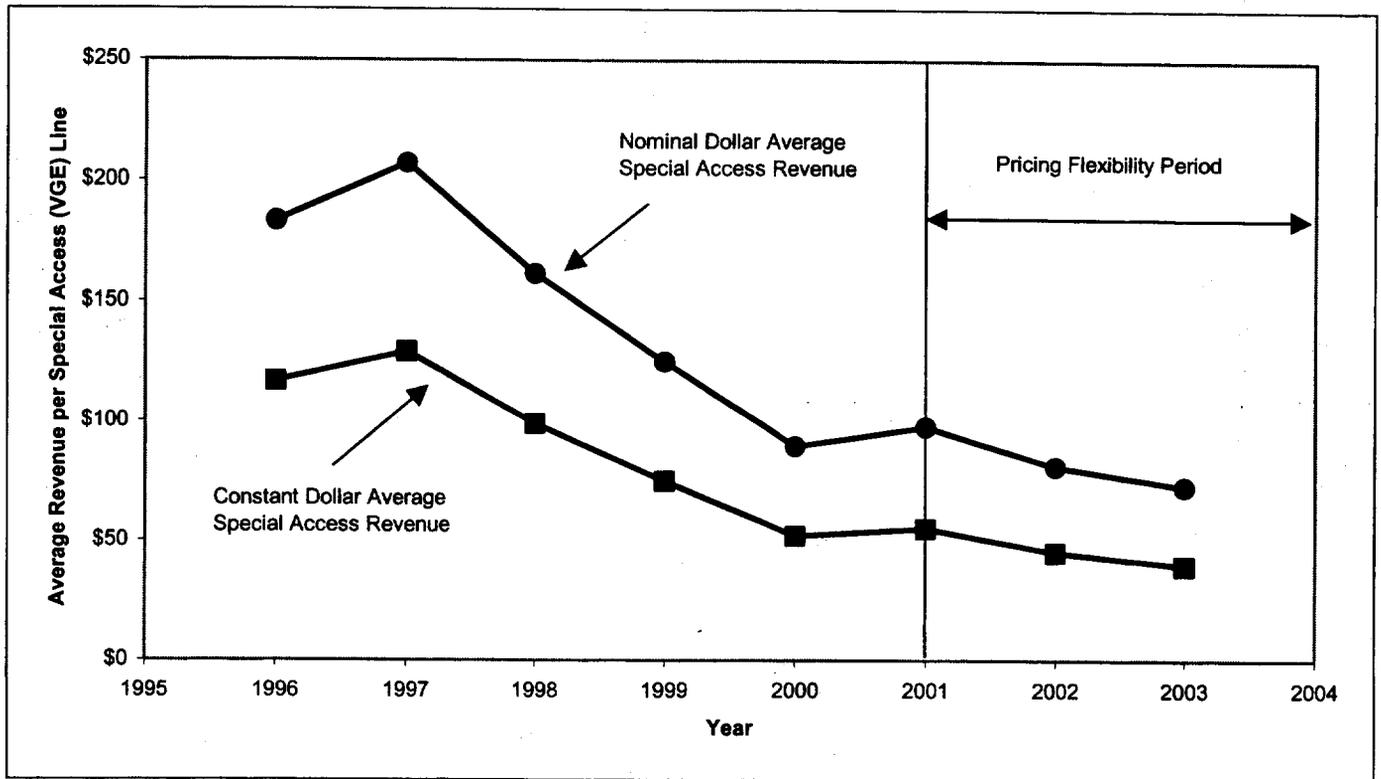


Table 1. CAGR of BellSouth's Revenue per Special Access (VGE) Line

Period	Nominal CAGR	Real CAGR
Full Period (1996-2003)	-12.36%	-14.33%
Price Caps (1996-2001)	-11.84%	-13.95%
Pricing Flexibility (2001-2003)	-13.65%	-15.29%

34. Table 1 (representing the growth rate of BellSouth's special access price on a VGE basis) is remarkably similar to that reported for Verizon.⁵⁹ Once again, there is clear evidence that special access prices of RBOCs (and ILECs, generally) have trended down at double-digit rates over time. More importantly, the decline in prices has been faster since the grant of special access pricing flexibility by the FCC. Finally, it is worth noting that

⁵⁹ Compare with Table 1 in Reply Declaration of William E. Taylor, on behalf of Verizon, in the *TRO Remand Proceeding*, October 19, 2004.

BellSouth's special access prices declined during the price cap period at an annual rate that far exceeded the maximum real rate of reduction imposed by price cap regulation (6.5% at the end of the period).⁶⁰

35. A demonstration of this type has sometimes drawn the critique that measuring average special access revenue at the VGE level obscures the differences in unit prices that are charged for special access facilities at different capacity levels.⁶¹ Suppose that DS-1 service has a higher unit price (on a VGE basis) than DS-3 service, and DS-3 service has a higher unit price (on a VGE basis) than OC(n) service. Next, suppose that rising demand for high-capacity services causes a special access customer to "migrate up," i.e., use relatively more DS-3 in place of DS-1 (or OC(n) in place of DS-3). Even *without* any change in the unit price of any of these services, the pure shift in the composition of purchases of special access at different capacity levels would produce an apparent reduction in price, when measured by the revenue per VGE. Hence, the critique goes, a chart like Figure 1 may reflect merely a shift in special access purchases toward higher capacity facilities with lower unit prices (that produce less revenue per VGE), rather than a genuine downward trend in special access prices over time.
36. The best way to determine whether, in fact, that is true is to study the trend in BellSouth's revenue per circuit for special access at a *specific capacity level*. Since DS-1 tends to be the most expensive on a VGE basis, and a shift away from DS-1 toward higher capacity special access would likely contribute the most to the spurious price change effect to which critics often allude, it is important to focus purely on the trend in revenue per circuit for BellSouth's DS-1 service. Figure 2 and Table 2 provide the necessary information, based on data provided by BellSouth.

⁶⁰ In light of this fact, Ad Hoc's contention that "the 6.5% X-factor was insufficient, and without further increase, excessive prices and returns would result" (*ETI Report*, at 5) simply has no credibility.

⁶¹ See, e.g., Reply Declaration of Michael Pelcovits and Chris Frentrup, on behalf of a coalition of 27 CLECs, in the *TRO Remand Proceeding*, October 19, 2004, at 3-5.

Figure 2. BellSouth's DS-1 Revenue per Local Channel, 1997-2003

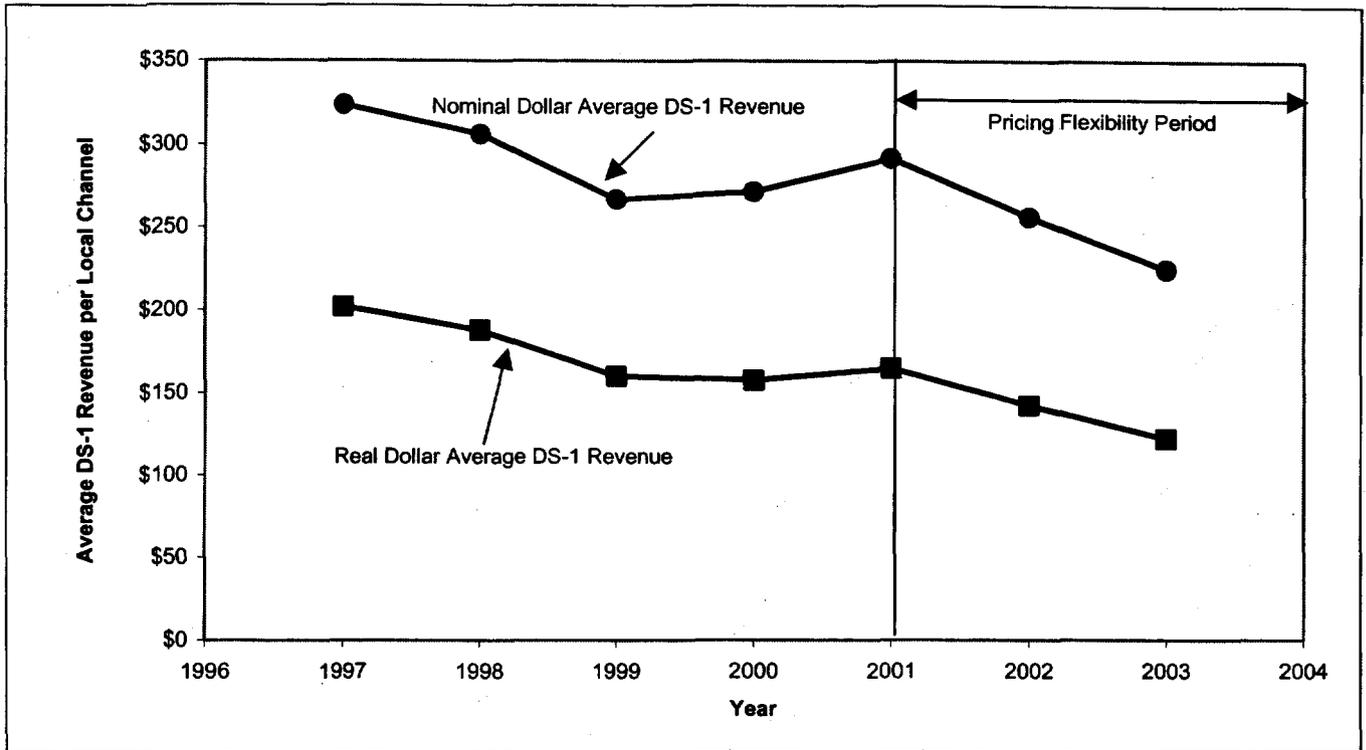


Table 2. CAGR of BellSouth's Revenue per DS-1 Local Channel

Period	Nominal CAGR	Real CAGR
Full Period (1997-2003)	-5.94%	-8.06%
Price Caps (1997-2001)	-2.59%	-4.96%
Pricing Flexibility (2001-2003)	-12.30%	-13.96%

37. Figure 2 and Table 2 show one incontrovertible fact. Even if the alleged shift in purchases of BellSouth's high-capacity services over time caused an appearance of declining prices (measured by revenue per VGE) to some degree, there is no question that DS-1 service did, in fact, experience genuine reductions in price (measured by revenue per circuit) since 1997. In fact, those price reductions (whether measured in nominal or real dollars) occurred in a far more impressive fashion *after* pricing flexibility was granted than before when BellSouth was under price cap regulation.

38. In light of these findings, Ad Hoc's claim that the *tariffed* prices of ILEC-supplied special access services have risen in MSAs in which ILECs have been granted Phase II pricing flexibility rings hollow.⁶² Under competitive conditions, it is not unusual for tariffed prices to rise even as prices *actually* paid (represented, for example, by the revenue per special access (VGE) line) decline. The customers represented by Ad Hoc are all large-volume purchasers of special access services, and are most likely to make those purchases under term or volume contracts that offer deep discounts.⁶³
39. It is worth recalling a significant parallel to this situation—one that has long characterized the (competitive) market for long distance services. For years, AT&T has argued that reductions in its average revenue *per minute* constituted price reductions for its long distance services. It pressed this claim, in particular, for the purposes of (1) assessing competition to support its non-dominance petition⁶⁴ and (2) asserting that it had passed through switched access charge reductions by lowering prices to end users.
40. Surely, if reductions in average revenue per minute in the long distance market imply that prices have decreased, then a more dramatic drop in average revenue per VGE line in the special access market must do the same. In the long distance market, competition led to increases in base rates, similar to those of which Ad Hoc complains today in the special access market. However, in special access—as in long distance—those base rate increases were offset by a proliferation of volume and term discount plans that had the effect of reducing IXCs' average revenue per minute. The fact that some special access tariff rates have risen while term and volume discount plans have caused average revenue per VGE to fall is not an unprecedented event.
41. In any event, lower average revenue per VGE line represents a lower price that the special access customer pays for the VGE line whether or not (1) the ILEC has actually reduced

⁶² *ETI Report*, at 36.

⁶³ See Reply Affidavit of Nancy Starcher, on behalf of BellSouth Telecommunications, Inc., in the *TRO Remand Proceeding*, filed October 19, 2004, for several examples of such discount plans offered by BellSouth.

⁶⁴ FCC, *In re Motion of AT&T Corp. to be Reclassified as a Non-Dominant Carrier*, Order, released October 23, 1995.

the price of some service or introduced a new term and volume discount plan or (2) the customer has chosen a higher capacity service at a lower price per VGE line. If competition or additional consumer choice brings about lower average revenue per VGE line for any of these reasons, consumers are better off.

4. Investment

42. Ad Hoc claims that, if anything, ARMIS understates actual rates of return because ARMIS methods overallocate investment to the special access category.⁶⁵ As evidence, Ad Hoc offers a calculation that purports to show that the proportion of total investment that is assigned to special access is much higher than the proportion of access lines that are special access. There are problems with both the line and the investment portions of this demonstration.
43. First, for lines, Figure 3.3 shows the ratio of 4 million “special access loops and associated interoffice transport facilities” to the 158 million “Common Line local service loops” in the RBOCs’ serving territories. Ad Hoc implies that investment should be assigned in proportion to circuits so that, if ARMIS were assigning costs correctly, we would expect about 2.5 percent of total investment to be assigned to special access services. On the contrary, if investment were actually made in proportion to the *capacity* of those circuits, we would expect about 44 percent of investment to be assigned to special access services.⁶⁶ While investment in special access facilities is surely not directly proportional to capacity, it is also not directly proportional to the number of circuits. The additional equipment needed to provision an additional DS1 circuit on an RBOC fiber ring, for example, is entirely electronic capacity, and investment to serve that kind of demand is unrelated to the number of circuits. On the other hand, equipment to supply a new point-to-point DS1 circuit consists of both circuit-related equipment (cable and support structures) and capacity-related equipment (electronics). Thus, it is not surprising to find that special access investment is more than 2.5 percent of total investment in the ARMIS accounts.

⁶⁵ *ETI Report*, at 33-34.

⁶⁶ For the RBOCs and BellSouth specifically, the proportions of special access VGEs to total VGEs in 2003 were 44 and 50 percent, respectively, based on ARMIS Report 43-08, Row 910, col. fj + col. fk and col. fl.

44. Second, Ad Hoc purports to calculate the special access proportion of total investment to compare with the special access proportion of total lines. However, what is shown in Figure 3.3 is the ratio of *interstate* special access net investment to *interstate* total net investment. Virtually all special access services are jurisdictionally interstate services, but the bulk of the costs of end user common lines are jurisdictionally *intrastate*.⁶⁷ Comparing interstate special access net investment to total interstate plus intrastate net investment, we find that special access comprises 7.7 percent of total net investment for BellSouth and 11.0 percent for the RBOCs, based on 2003 ARMIS data from Report 43-01 (Row 1910, cols. f and s).
45. In conclusion, Ad Hoc's comparison of the assignment of net investment to special access with the proportion of special access lines is entirely misleading. If the cost driver for special access investment were capacity instead of lines, the special access proportion of investment would be close to 44 percent. Moreover, one cannot gauge the proportion of investment allocated to special access as opposed to switched access services by looking exclusively at interstate data. Looking at total (intrastate plus interstate) data shows that 11 percent of investment is allocated to special access.

D. Price increases over their current regulated levels do not signify the possession of market power

46. Ad Hoc avers that:

The ability of a firm to charge higher prices without losing so much business to competitors as to make those higher prices unprofitable—the classic evidence of market power—should not be possible in a market in which actual and effective competition is present. ILECs should not *be able* to raise prices where competition is present, and thus have no legitimate need for pricing flexibility in the upward direction.⁶⁸

The implication, ~~however~~, that the sheer ability of ILECs to raise their special access service prices amounts to an exercise of market power is false. As we demonstrated

⁶⁷ 75 percent of non-traffic sensitive common line loop investment is allocated to the intrastate jurisdiction.

⁶⁸ *ETI Report*, at 4. Footnote omitted, emphasis in original.

earlier, (1) the special access market is unambiguously competitive and (2) special access prices, whether measured in nominal or real terms, have declined faster after the grant of pricing flexibility than in the price cap regulation period. Moreover, the prices that purchasers of special access services *effectively* pay have trended down, regardless of the levels of tariffed prices. The widespread ILEC practice of offering discounted special access services through volume and term contracts hardly supports a scenario with rampant exercise of market power.

47. A more fundamental point that is completely missed by the Ad Hoc analysis is that the ability to raise prices profitably above competitive levels (without effective retaliation from competitors) only constitutes market power if those initial prices were set at least at competitive levels to begin with. Historically, both before and after the advent of price cap regulation, prices of ILEC-supplied special access services were *not* set at levels expected to prevail in unregulated, competitive markets. Years of rate-of-return regulation of ILECs led to access service prices that were anchored firmly on embedded, fully-distributed costs, and price cap regulation was ushered in without any effort to first reset those prices to efficient, forward-looking incremental costs. When price cap regulation broke the link between prices and underlying costs, it became almost impossible for service prices to be made to reflect those incremental costs.⁶⁹ Therefore, it simply cannot be presumed that ILECs have raised their special access prices from the efficient levels expected in competitive, unregulated markets. Furthermore, no exercise of market power can be inferred purely from any increase in special access prices in the post-pricing flexibility era.
48. Although the authors of the *ETI Report* refrain from pressing their belief that a single, unified inter-carrier compensation regime should apply to UNEs and access services alike,⁷⁰ they make no secret of their view that total element long run incremental cost ("TELRIC") is the proper cost standard for pricing ILEC-supplied access services. We

⁶⁹ Price cap regulation forced annual access price reductions formulaically through a combination of an inflation rate and productivity offset factor. However, this could ensure neither that prices would be based on incremental costs (as would be expected in competitive markets) nor that price *changes* would reflect changes in underlying incremental costs.

⁷⁰ See, e.g., *ETI Report*, at fn. 10.

disagree with that view of how market prices of *services*—such as special access services—should be determined. Service prices in competitive markets may fairly be expected to reflect underlying incremental costs (such as TELRIC or even TSLRIC). In the presence of economies of scale and scope, however, service prices may contain market-determined markups over incremental costs that enable ILECs to recover their fixed and shared and common costs. In these circumstances, *efficient* prices under competition would not be constrained to equal underlying incremental costs; rather, they may lie somewhere in the range between their respective incremental costs (price floor) and stand-alone costs (price ceiling). Therefore, the sheer fact that special access prices exceed the appropriate measure of incremental cost is *not* sufficient to conclude that those prices are inefficient, supra-competitive, or excessive.

49. Finally, the empirical evidence on the ILECs' revenue per special access (VGE) line offers the clearest rebuttal to Ad Hoc's claim about ILEC market power. As demonstrated earlier, ARMIS data for BellSouth clearly indicate a trend of falling special access prices over time—a trend that is particularly pronounced in the post-pricing flexibility era.

E. Ad Hoc's proposed plan for corrective action does not merit serious consideration

50. Because competition in the markets for special access services is working as intended and prices are falling, there is no justification for Ad Hoc's proposed rollback of pricing flexibility. In addition, however, the four-point plan of action proposed by Ad Hoc as a "remedy" for the alleged excessive pricing by ILECs of their access services is flawed in several important respects and must be rejected. Ostensibly, that plan is a "self-executing regulatory paradigm" that would only be needed as long as the market for access services did not, in Ad Hoc's ~~view~~, behave competitively. In reality, it is a plan designed to hamstring the ILECs' ~~ability~~ ability to compete by saddling them with new layers of unneeded and ultimately harmful regulation, principally in the form of a rollback of the pricing flexibility granted to ILECs for special access services.

51. The restoration of a particularly onerous form of price cap regulation that Ad Hoc's plan envisions would be both asymmetric and regressive. At a time that ILECs face increasing competition for both retail and wholesale services, and have won several regulatory concessions as a result, a reversion back to the price cap regulations for access services that preceded the pricing flexibility era would amount to an unjustifiably asymmetric treatment of the ILECs. The effects of asymmetric price regulation are definitely not benign in a competitive market. Not only do those effects artificially tilt the competitive playing field in favor of unregulated competitors, they also distort competition among wireline telecommunications carriers and between alternative technologies and platforms.
52. Accepting Ad Hoc's plan would also be regressive and nullify the extensive record created since 1999 in the process of granting pricing flexibility for interstate access services. To receive Phase I and Phase II pricing flexibility, ILECs were required to satisfy progressively demanding competitive thresholds (i.e., volume and revenue triggers at the wire center level within individual metropolitan statistical areas). The FCC did not take lightly the task of ascertaining that those thresholds had indeed been met. For example, rather than rely merely on the level of tariffed special access prices as evidence of competition, the FCC actually sought out data on market structural factors, such as supply conditions within specified geographic markets. The presence of *actual* competitive options, as signified by competitor collocations and the use of competitive transport, became the primary basis for ILECs to qualify for pricing flexibility. Ad Hoc has not provided any evidence to overturn the record so meticulously built up by the FCC on those indicators of actual competition. For reasons noted above, complaints about the level of tariffed special access prices do *not* constitute sufficient grounds for re-imposing asymmetric and regressive regulation on the ILECs. Nor do meaningless calculations of single-service accounting rates of return provide any evidence of anti-competitive conduct on the part of the ILECs.
53. The specifics of Ad Hoc's proposed plan also inspire no confidence at all about that plan's purported goal. Re-initializing ILEC special access prices to earn no more than 11.25% on embedded costs would manifestly be an economically vacuous policy. If the desired goal

is to ensure that those special access prices reflect true underlying incremental costs *and* contain efficient contribution towards the recovery of fixed and shared and common costs, then that certainly cannot be achieved by any arbitrary re-initialization of prices based on historical embedded costs. No efficiency or competitive fairness goal can be advanced through that course of action.

54. It would make even less sense to subject specific services, such as special access, to individualized, service-specific price caps. The general price cap formula that limits how much prices can be adjusted annually by the rate of inflation less a productivity offset factor relies on a measurement of total factor productivity (“TFP”) that is made at the level of the *entire* firm. Ad Hoc’s argument that the “extreme disparity between switched and special access with respect to earnings requires that separate, service-specific X-factors be established for each”⁷¹ is impractical and meaningless. This flies in the face of the crucial assumption of price cap theory that the *entire* firm is regulated, not just some subset of its services. The TFP, on which the productivity offset (“X factor”) is based, is calculated for the regulated firm as a whole; designing service-specific X factors, as in Ad Hoc’s scheme, would presuppose an ability to conduct TFP studies at the service-specific level. This, of course, is an outlandish idea that appears to be driven by Ad Hoc’s preoccupation with its calculations of service-specific accounting rates of return. For a multiproduct firm like an ILEC that uses both dedicated and shared and common resources, such earnings calculations are meaningless indeed.⁷²
55. Perhaps Ad Hoc’s most regressive and reactionary recommendation is the reinstatement of an earnings sharing requirement. The thinking underlying Ad Hoc’s recommendation appears not to have evolved since the days of rate-of-return regulation when earnings were pegged within “authorized” levels solely because the concern was more with controlling monopoly behavior ~~with~~ with inducing more dynamic and efficiency-enhancing behavior

⁷¹ *Id.*, at 8.

⁷² It is possible to apply firm-level TFP growth measures to regulated services when some fast-growing services are unregulated. For such a mechanism, see J.K. Bernstein and D.E.M. Sappington, “Setting the X Factor in Price Cap Regulation Plans,” *Journal of Regulatory Economics*, 16, 1999, 5-25. That is very different, however, from what Ad Hoc has in mind.

through suitable incentives. The *raison d'être* for price regulation was to free up a regulated firm in a more competitive market to seek productivity enhancements and innovation (that would clearly benefit consumers and improve the quality of competition). Except in years of unusually high inflation, price cap formulas usually forced ILECs to lower their prices for regulated services. In order to prevent this from eroding their profits, ILECs had every incentive to lower their costs at an even faster pace through innovation and productivity enhancements. The absence of any earnings sharing requirement meant that the ILECs could benefit their bottom line even more by becoming increasingly efficient and sharing that productivity growth with consumers.⁷³ No harm to competitors or the competitive process could conceivably result from this because the price cap regulated ILEC was still prevented from being able to cross-subsidize its more competitive services or set prices below appropriate price floors. The lifting of the earnings sharing requirement proved, therefore, to be a powerful force for good in the telecommunications market that overcame some of the worst features of outmoded rate-of-return regulation (such as theoretical incentives for rate-base padding and goldplating, otherwise known as the Averch-Johnson effect).

56. A more essential truth that clearly eludes Ad Hoc is that, as shown earlier, ILECs have lowered special access prices progressively over time faster than even the most stringent target rates set by the FCC in the past through its choice of the *X* factor. If returns have increased to ILECs, as Ad Hoc contends, then they have done so in an environment in which special access prices have *fallen*, but ILECs' costs have fallen *even faster*. Consumers have benefited on account of both of these developments, and competitors purchasing special access from ILECs have certainly not been compromised (particularly when even lower-priced UNEs have been readily available alongside). Given these facts, Ad Hoc's real agenda would appear to be to make it impossible for ILECs to earn more than 11.25%, no matter how efficient they became or how much benefit was flowed

⁷³ For an explanation of why an earnings sharing requirement under price regulation dilutes incentives for *both* enhancing efficiency (by reducing operating costs) and making new investments, see David E.M. Sappington, "Price Regulation," in Martin E. Cave, Sumit K. Majumdar, and I. Vogelsang (eds.), *Handbook of Telecommunications Economics*, Vol 1, Amsterdam: Elsevier, 2002, at 268-270.

through to consumers. Unmistakably, this is a call for reverting back to discredited and anachronistic rate of return regulation. It *must* be seen for what it is and, quite properly, rejected.

57. The *ETI Report* cites approvingly the fact that the FCC, in its very first formulation of price cap regulation for major ILECs, had retained earnings sharing as a “backstop” to protect consumers against “excessive ILEC earnings.” We believe that the FCC’s adoption of such a policy was done in an abundance of caution, even though that went against the efficiency-enhancing incentives envisioned by price cap theory. The fact that the FCC dispensed with that policy eventually in its subsequent formulations of price cap regulation for ILECs is significant. Ad Hoc not only fails to appreciate the reasons for the FCC’s revised thinking on the matter, it makes the preposterous claim that

20/20 hindsight and more than a decade of actual experience under price caps confirms that the X-factor had been misspecified. In fact, on multiple occasions the [FCC] had determined that the X-factor needed to be increased. Even with those increases, RBOC earnings have continued to escalate to dizzying heights. Whatever efficiency gains the RBOCs may have achieved were not passed on to consumers in the form of lower prices.⁷⁴

58. There are several sweeping generalizations in this claim. First, Ad Hoc does not mention that just about every price cap plan—whether interstate or intrastate—that still exists today has no earnings sharing requirement in it.⁷⁵ It is simply not conceivable that the “error” of not requiring earnings sharing has been committed over and over again by different regulatory authorities pursuing regulatory policies independently of each other. It is far more likely that the efficiency-enhancing incentives of *not* having an earnings sharing requirement has been properly appreciated by regulators all along.
59. Second, Ad Hoc appears to suggest that the FCC has progressively raised the X factor in recognition of ILEC earnings that it characterizes as being excessive. That is false. In

⁷⁴ *ETI Report*, at 9.

⁷⁵ C. Ai, S. Martinez, and D.E.M. Sappington, “Incentive Regulation and Telecommunications Service Quality,” University of Florida Working Paper, January 2004, Table 1.

fact, as the history of interstate price cap regulation shows,⁷⁶ changes in the *X* factor have frequently been driven by considerations other than the TFP. For example, on various occasions in the 1990s, the FCC allowed regulated ILECs to choose among two or three *X* factors, coupling a lower earnings sharing requirement with the higher *X* factors. Such a regime was surely not based on just a single-valued measure of TFP. Following a successful court challenge by ILECs to the FCC's 1997 prescription of a 6.5% *X* factor, an industry consensus price regulation plan was adopted in 2000. Under this plan (called the "CALLS Proposal"), the 6.5% *X* factor was retained but, as the FCC explained, it was not based on TFP at all, but rather designed "to reduce local switching and switched transport rates to specified target rate levels, and to reduce special access rates over a set period of time."⁷⁷

60. Third, it makes no sense at all to assert that ILECs have never passed on efficiency gains to consumers. The fact is that, except in years of unusually high inflation, price caps for ILECs' interstate services have forced category-specific price caps down. This has led to lower prices despite the fact that those prices were never initialized to efficient levels to begin with. It is disingenuous to suggest that prices faced by end users have always been directly determined by the prices charged by price cap ILECs for their services. In many instances, such as for switched and special access used by competing carriers to provide retail local and long distance services, the prices paid by end users have been, arguably, a function of how much of the ILEC-initiated price reductions for the access services have been passed on to end users by the competing carriers.
61. Finally, as noted earlier, Ad Hoc labors under the supposition that earnings can be measured for a single service, such as special access. Not only is that supposition

⁷⁶ See, e.g., FCC, *In the Matter of Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Low-Volume Long Distance Users, Federal-State Joint Board on Federal Universal Service*, CC Docket Nos. 96-262, 94-1, 99-249, 96-45, Sixth Report and Order in CC Docket Nos. 96-262 and 94-1, Report and Order in CC Docket No. 99-249, and Eleventh Report and Order in CC Docket No. 96-45 ("CALLS Order"), released May 31, 2000, at ¶¶135-137.

⁷⁷ *CALLS Order*, at ¶140. The FCC acknowledged that this "transforms the X-factor from a productivity factor into a transitional mechanism that operates to reduce rates at a certain pace, and it would not be linked to a specific measure of productivity."

spurious, it also makes no economic sense to share earnings at a service-specific level, as Ad Hoc suggests. Such sharing could only be achieved by making arbitrary cost allocations across regulated and unregulated services, an exercise further complicated by the presence of shared and common costs (i.e., costs not directly attributable to specific services). In that sense, earnings for the subset of special access services are essentially a figment of regulatory cost allocations.

62. That concludes our Declaration.

STATEMENT OF QUALIFICATIONS

William E. Taylor, Ph.D.

My name is William E. Taylor. I am Senior Vice President of NERA Economic Consulting ("NERA"), head of its Communications Practice, and head of its Boston office located at 200 Clarendon Street, 35th Floor, Boston, Massachusetts 02116.

I have been an economist for thirty years. I earned a Bachelor of Arts degree from Harvard College in 1968, a Master of Arts degree in Statistics from the University of California at Berkeley in 1970, and a Ph.D. from Berkeley in 1974, specializing in Industrial Organization and Econometrics. For the past thirty years, I have taught and published research in the areas of microeconomics, theoretical and applied econometrics, and telecommunications policy at academic and research institutions. Specifically, I have taught at the Economics Departments of Cornell University, the Catholic University of Louvain in Belgium, and the Massachusetts Institute of Technology. I have also conducted research at Bell Laboratories and Bell Communications Research, Inc.

I have appeared before state and federal legislatures, testified in state and federal courts, and participated in telecommunications regulatory proceedings before state public utility commissions, as well as the Federal Communications Commission ("FCC"), the Canadian Radio-television Telecommunications Commission, the Mexican Federal Telecommunications Commission, and the New Zealand Commerce Commission.

Aniruddha Banerjee, Ph.D.

My name is Aniruddha Banerjee. I am a Vice President with the Communications Practice at NERA Economic Consulting, 200 Clarendon Street, 35th Floor, Boston, MA 02116.

I earned a Bachelor of Arts (with Honors) and a Master of Arts degree in Economics from the University of Delhi, India, in 1975 and 1977, respectively. I received a Ph.D. in Agricultural Economics from the Pennsylvania State University in 1985, and served there subsequently as an Assistant Professor of Economics. I have over eight years of experience teaching undergraduate and graduate courses in various fields of economics and econometrics,

and have conducted academic research that has led to publications and conference presentations.

I have filed expert testimony before the Federal Communications Commission and state regulatory commissions on a variety of issues, including depreciation requirements of incumbent local exchange carriers, interLATA long distance entry by Regional Bell Operating Companies, efficient inter-carrier compensation for Internet-bound traffic, unbundling, competition and entry policy and reform of the TELRIC methodology, interconnection arrangements and imputation analysis, price regulation reform, local service rate rebalancing, potential deployment analysis for unbundled transport and high capacity loops, universal service, and demand analysis for intraLATA long distance service. I have published articles on telecommunications and finance in academic and industry journals and presented research findings periodically at industry and academic conferences.