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	)	

COMMENTS OF

WILLIAM E. TAYLOR, Ph.D.

ON BEHALF OF

UNITED STATES TELECOM ASSOCIATION

JANUARY 7, 2000

nera
Consulting Economists

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COMMENTS OF WILLIAM E. TAYLOR, PH.D.
JANUARY 7, 2000

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 was recently chosen by the Mexican Federal Telecommunications Commission and Telmex to arbitrate the renewal of the Telmex price cap plan in Mexico. 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 Telecom Association ("USTA") to comment on three economic issues raised in the Federal Communication Commission's ("Commission") *Further Notice of Proposed Rulemaking* ("*FNPRM*"), released on November 15, 1999:

   - the effect of recontracting on the incentives of the price-cap-regulated firm to increase productivity growth,
   - the theoretical validity of the Staff's imputed X study that purports to calculate the X-factor that would yield the aggregate revenues that would have been generated if carrier access services had been supplied in a competitive market, and
   - the continued inclusion of a consumer productivity dividend ("CPD") in the X factor.

3. In my opinion, the Commission's proposed represcriptions amount to retrospective regulation of the price cap plan which, if adopted, would undermine the reasons why price cap regulation was implemented in the first place. The incentive gains from price cap regulation depend critically on the firm's belief that the parameters of the plan are (i) fixed and not subject to recontracting and (ii) entirely unaffected by the success or failure of its future actions. For customers to realize the potential benefits expected from price cap regulation, the regulated firm must incorporate into its business and investment planning processes as well as into the management of its daily activities, the same types of incentives that unregulated firms in competitive markets incorporate into theirs. Frequent changes in the parameters of the price cap plan make it difficult for a rational firm to plan and invest as if it were subject to price cap regulation. In addition, any sense that the firm's successes or failures—however measured: e.g., earnings, change in earnings, levels or changes in market share, etc.—will ultimately feed back into the regulatory process and affect future regulation would further mitigate the force of those incentives.[1] The Commission's adoption of price cap regulation promised consumers more than this, and its administration

[1] As many economists have observed, pure price cap regulation with a fixed duration and periodic recontracting based on the individual firm's historical earnings provides no additional incentives compared with pure rate of return regulation with a statutory regulatory lag. This observation is not entirely applicable to the Commission's proposed recontracting which would be based on the average earnings of <u>all</u> price cap regulated LECs, rather than on each individual LEC's earnings. Regulation of individual LEC prices using historical earnings of the LEC industry also entails inefficiencies: (i) the financial successes and failures of the firm still feed back into the regulatory mechanism, albeit in proportion to the firm's share of industry earnings and (ii) yardstick regulation based on industry earnings does not attempt to adjust the individual firm's prices to match its costs.

of a similar price cap plan for AT&T actually delivered more. The Commission should refrain from retrospective represcription of parameters of the price cap plan irrespective of the observed accounting earnings of the regulated firms, alleged errors in method or availability of better data than those used to determine parameters at the outset of plan.

4. The Staff's imputed X study is theoretically unsound and inferior to the use of total factor productivity ("TFP") growth to determine the appropriate X-factor in the Commission's price cap plan primarily because it relies on jurisdictionally separated data and an interstate-only calculation makes no economic sense. In addition, using accounting measures of the productivity gains realized under price caps to recalculate the firm's price cap productivity target would eviscerate the productivity incentives for which price cap regulation was implemented. If the Staff's imputed X study were used to determine a value of X going forward, the price cap LECs would face perverse productivity incentives—essentially the same disincentives of traditional cost-plus regulation. Such a plan would re-impose the need to collect detailed accounting data from the regulated firm (and all the associated difficulties with separating common costs) and would represent a step backward, slowing the transition toward a competitive marketplace where market forces determine outcomes and consumers benefit. At a time when market participants are fiercely battling to provide new bundled services using a broad range of technologies, it would be inconceivable for the Commission to adopt a proposal that would distort the price cap LEC's incentives to compete and to provide the benefits of new technologies to a broad range of customers in disparate geographic areas.

5. I also conclude that there is no economic basis to continue imposing the CPD as an additive to an historically-determined X-factor. The Commission cites the elimination of earnings sharing as a one-time event that would increase productivity growth in the future and whose benefit should be shared between ratepayers and price cap LECs. However, price cap LECs have had the option to avoid some earnings sharing for interstate services since 1991 and all earnings sharing since 1995. In addition, many LECs have operated under pure price caps (i.e., without earnings sharing) for their intrastate services. Continuing to include a CPD of

0.5 percent thus double-counts the benefits of the elimination of sharing and, as a result, defeats the original purpose for eliminating sharing in the first place.

II. RETROACTIVE REPRESCRIPTION OF THE X-FACTOR REMOVES THE "INCENTIVE" FROM INCENTIVE REGULATION.

6. The fundamental reason why telecommunications regulation in the U.S. has evolved away from rate of return principles is its promise of improved incentives for regulated firms to achieve two important economic goals: use the fewest resources possible to achieve a given level of output (technical efficiency) and develop and introduce innovative new products and services (dynamic efficiency). Since price cap regulation does not link permitted revenues to realized production costs, the regulated firm has the proper incentive to use the cost-minimizing level and mix of resources to provide a given level of output. For example, if the regulated firm negotiates a contract with a switch manufacturer, the firm is permitted to keep whatever benefits it achieves—and is required to live with whatever losses it incurs—until such time as market conditions permit or require changes in end user prices. The incentives to seek out these profitable opportunities (thereby achieving technical efficiency) are greater under pure price cap regulation than under any form of rate of return regulation in which prices are linked to accounting costs, but that improvement in incentives requires that firm to actually face the financial consequences of its actions in the same way that firms in unregulated markets do.[2]

7. These theoretical properties of regulatory regimes have been studied extensively by economists. The resulting economic theory of incentive regulation generally begins with an idealized picture of the regulator as possessing three important things: (i) policy instruments (controls over price, quality, entry earnings, etc.), (ii) expertise and information (but less than the regulated firm concerning its cost or demand conditions) and (iii) the ability to

[2] Another reason why, in theory, the FCC's price cap plan does not precisely reproduce the incentives of unregulated markets is that it includes a backstop mechanism (the "LFAM") to prevent drastic underearnings. However, the distortion in incentives is mitigated because the backstop adjustments are not costless to the firm: the PCI adjustment is set below the regulated firm's cost of capital, the adjustment is not permanent and it takes place retrospectively. Thus, while the LFAM reduces the incentive to avoid losses, it does not eliminate it.

commit themselves and future regulators to fulfill the contracts they propose.[3] It is the third regulatory resource that concerns us here. Without the commitment of the regulator, the regulated firm would have no confidence that the rewards and punishments set out in the regulatory contract would actually come to pass. Thus, adoption of an incentive regulation plan without regulatory commitment would have no important or lasting effect on the firm's behavior. In order to affect investment, for example, the regulated firm would need to believe that the parameters of the plan were sufficiently permanent that they could be used in a business plan covering the economic life of the contemplated investment. The incessant recontracting that the Commission has undertaken with respect to the important parameters of its price cap plan severely undercuts its ability to induce the type of behavior (with respect to investment in new infrastructure technology, pricing, implementation of new services, etc.) that we would see in unregulated, competitive markets.

A. Changing the Rules Reduces the Incentives.

8. Two related components of the price cap plan are important in determining the incentives the regulated firm actually faces: (i)) the length of time the firm is allowed to succeed or fail before the plan ends and the regulatory contract is recalculated and (ii) the regulator's commitment that the plan not change with the firm's success or failure (i.e., that the formula be truly exogenous).[4] In theory, the price cap regulatory contract first determines an exogenous value (or formula) for annual price changes, where "exogenous" in this context means "independent of the outcomes of the firm's decisions." This characteristic reflects pricing behavior in unregulated, competitive markets where firms take prices essentially as exogenous—determined by market forces rather than company policy—so that neither price-cap regulated firms or unregulated firms in competitive markets can use power over prices to maximize profits. When a price-cap regulated firm takes the annual

[3] See, e.g., D.E.M. Sappington and D.L. Weisman, *Designing Incentive Regulation for the Telecommunications Industry*, Cambridge: The MIT Press, 1996, Chapter 4.

[4] This formulation of the regulatory contract implicitly assumes that the contract is of finite length and that there are no limits placed on the information that can be used by the firm or the regulator when the contract is renegotiated. Thus, events occurring during the price cap period are fully taken into account in calculating future values of parameters such as X.

price change formula as exogenous, it expects whatever gains or losses it makes will persist until the end of the plan or until competitive forces restore normal profitability through the mechanism of entry, exit or the adoption of cost saving methods by other firms. This transitory period in which abnormal profits are permitted to persist is not a regulatory or market failure but paradoxically an important engine of economic growth.[5] If competitive forces were always so swift, strong and certain as to rule out temporary supranormal profits, who would ever risk capital and effort in an uncertain enterprise? To give the regulated firm the same incentives as an unregulated firm, the price cap mechanism should mimic as closely as possible the pattern of transitory rewards and punishments meted out in competitive markets.

9. An example will help show the effects of the exogeneity of the price cap parameters and the length of time between formal recontracting. Suppose a regulated firm considers a fixed investment in some network infrastructure embodying new technology. If successful, the investment would reduce unit costs by 10 percent when fully diffused throughout the network. Under pure price cap regulation, the firm would find the investment profitable whenever the net present value of the stream of cost savings exceeded the up-front investment and installation costs, assuming no regulatory-induced changes in price. An unregulated firm in a competitive market would make the same calculation, and—except for possible differences caused by different price elasticities of the firm's demand curve—the firms would end up with a similar profile of investments. Under traditional rate of return regulation, however, the firm would recognize that—if successful—its output price would fall after each regulatory period came to an end, so that the profitability to it of any given fixed investment would likely be smaller than for a price-cap regulated or unregulated firm.[6] In general, the shorter the period of time during which the firm is at the

[5] See, e.g., J.A. Schumpeter, *Capitalism, Socialism and Democracy*, New York: Harper Colophon.

[6] In theory, the incentives for a rate-of-return regulated firm to invest are not unambiguously smaller. If the investment were not successful, the rate of return regulated firm might be able to recover its costs in higher prices, provided it could convince the regulator that its investment was nonetheless prudent. Appendix A to the *FNPRM* is confused on this point. At 26, it suggests that removal of the Averch-Johnson bias in investment when price cap regulation began would lead to a reduction in capital-intensive investment which would bias measurement of the historical X downward. Both points are wrong. The Averch-Johnson effect presupposes that the actual cost of capital to the firm is less than its allowed rate of return, and there is no evidence that the

mercy of the market—subject to over or under-earning—the less the firm's behavior will reflect the incentive structure of the plan. And the period for which price cap incentives actually matter depends formally on the duration of the plan as well as the ability of the regulator to commit to future actions and persuade the regulated firm that its commitment is valid.

10. Only if the regulated firm actually perceives credible rewards for success and credible penalties for failure will it have a greater incentive to invest in risky projects that have some palpable probability of increasing the likelihood of success or decreasing the likelihood of failure. The incentive regulation literature examines this premise and shows, in general, that the more likely success is to be rewarded and failure punished, the sooner the firm reaps its rewards or punishments and the longer the period over which the firm must live with the consequences of its behavior, the closer its behavior becomes to that of unregulated firms in competitive markets.[7] In theory, X should be set at the beginning of the price cap plan, using the best information available regarding historical changes in unit costs, and then left alone.[8] In contrast, the FCC has proposed or adopted five different methods for calculating X since 1990, with values that differ by nearly a factor of 4. Even ignoring the inference a price-cap LEC might draw from the consistent increase in the proposed values of X, no LEC could safely assume that its current earnings were irrelevant

Commission persistently erred in its allowed cost of capital during the period preceding price cap regulation. Moreover, irrespective of the direction of the distortion, adoption of price caps permitted the regulated companies to move towards a more efficient mix of capital and labor, generating productivity growth that could not have occurred—and could not be repeated—but for the initial, inefficient input mix induced by rate-of-return incentives. TFP growth measured over this period thus is higher than that which an efficient firm could sustain, and the bias in the measure of an historical X is positive, not negative. In fact, what is measured here is a one-time (i.e., not permanent) component of the CPD.

[7] See, for example, M. Weitzman, "The Ratchet Principle and Performance Incentives," *The Bell Journal of Economics and Management Science*, Vol. 11 (1980) at 302-308; D. Baron and D. Besanko, "Commitment and Fairness in a Dynamic Regulatory Relationship," *Review of Economic Studies*, Vol. 54 (1987) at 413-436; and J-J. Laffont and J. Tirole, "The Dynamics of Incentive Contracts," *Econometrica* Vol. 56 (1988) at 1153-1176.

[8] While most studies measure an achieved X over a particular historical period by separately calculating rates of growth of total factor productivity and input prices, the price cap formula (the inflation less X) actually measures the historical reduction in costs per unit of output. To see this, note that the change in cost per unit of output is given by the difference between the change in costs and the change in output. The change in costs can be expressed as the sum of the change in input prices and the change in input quantities. Recombining, the change in cost per unit of output is equal to the difference in the rate of change of output and input quantities (i.e., TFP growth) plus the change in input prices.

to the determination of future values of X, given the Commission's history of past revisions.[9]

11. If implemented, the actions contemplated in the Commission's *FNPRM* would seriously jeopardize the links between price cap regulation and improved incentives on the part of the regulated firm to achieve technical and dynamic efficiencies. The fundamental weakness with plans proposed by the *FNPRM* is that they apply price cap regulation retrospectively: determining the X that an omniscient Commission would have set had it known the future course of competition, technology, productivity growth, input prices and inflation. An inescapable consequence of such retrospective regulation is the signal the Commission sends regarding its unwillingness to abide by the terms of the price cap contract. The end result of this process is an unintended dulling of incentives and the loss of future credibility. I discuss these in turn.

B. Matching Revenues and Costs is not the Only Goal of Regulation.

12. For better or worse, a principal focus of regulation has always been the matching of revenues and costs. Traditional rate of return regulation attempted this feat in the aggregate (for all services over which the regulator claimed jurisdiction), and even the Commission's recent implementation of the Telecommunications Act of 1996 focuses on the matching of revenues for unbundled network elements or interconnection with some measure of their forward-looking economic costs. Matching revenues and costs is an attractive goal for regulation because (i) it imitates a feature of competitive markets where market forces push prices towards economic costs and (ii) it reduces allocative economic inefficiency and is thus a reasonable outcome to be pursued for its own sake.[10] However, allocative efficiency is not the only goal of regulation: while it is important to divide the pie in a way that makes

[9] For example, in its recent Access Reform Order, the Commission cited high and increasing earnings as a reason for reducing the traffic sensitive PCI: see *Fifth Report and Order and Further Notice of Proposed Rulemaking*, CC Docket Nos. 96-262, 94-1, 98-157 and CCB/CPD File No. 98-63, released August 27, 1999 at ¶ 222.

[10] Allocative inefficiency is measured by the difference between price and forward-looking incremental cost. When price differs from cost, what customers give up to purchase a good differs from what society as a whole gives up to produce it. As long as price and cost differ, there remain unrealized gains from trade that could be used to make all agents in the economy better off.

the recipients as well off as possible, it is at least equally important to ensure that the pie itself is as big as possible. Technical efficiency measures the difference between the current cost of producing a unit of service and the cost using the most efficient method possible. Dynamic efficiency measures over time the change in forward-looking economic costs and the movement of the firm's realized costs towards economic costs. A regulatory scheme that attempts to achieve allocative efficiency by some mechanism that sacrifices dynamic and technical efficiency can dramatically reduce economic welfare.[11]

13. In practice, prices do not equal costs at every instant in time in well-functioning competitive markets, and imposing this condition on a regulated firm will adversely affect its performance. Whether the Commission attempts to match revenues to costs explicitly by setting X *ex post* to accomplish this goal (as the Staff's imputed X study attempts to do), or implicitly by changing the parameters of the contract ("recontracting") when earnings appear high has the same effect: it dulls the firm's incentives to reduce costs and undermines the future credibility of the regulator. In addition, matching service prices to jurisdictionally-separated accounting costs imposes the "quid" without the "pro quo": dynamic and technical efficiencies are sacrificed but because prices differ from forward-looking economic costs, allocative efficiency is not achieved.

14. In the *FNPRM*, one of the Commission's goals seems to be to modify the current price cap plan in order to match revenues with realized costs *ex post*.[12] But this contravenes the price cap plan agreement reached in the *1997 Price Cap Performance Review*. Having decided that earnings sharing was no longer a proper tool to maintain in the price cap plan, the Commission ought not use price cap LEC earnings as a basis for altering the plan. The economic literature is replete with the dangers inherent in unilaterally altering the terms of the contract in order to fulfil other regulatory objectives that were not specifically set out in

[11] This tradeoff between instantaneous allocative efficiency and dynamic efficiency is explored in R. Schmalensee, "Good Regulatory Regimes," *Rand Journal of Economics*, Vol. 20, 1989 at 417.

[12] For example, the staff's Imputed X study estimates the X-factor by solving for the past X-factor that would have been required to produce revenues equal to costs, including the Commission's view of a competitive cost of capital. As I describe below, in order to calculate the X-factor, $1 to 2 billion in income is eliminated in order to match revenues with realized costs.

the plan—such as ensuring that profits are not too high. As described by David E. M. Sappington and Dennis Weisman:

> Only if the regulated firm is confident that the reward structure contained in an incentive regulation plan will truly be implemented can the incentive scheme have a meaningful impact on the firm's behavior. Absent credible rewards for superior performance and credible penalties for poor performance, the regulated firm will have little incentive to undertake costly activities that increase the likelihood of good performance.[13]

15. In essence, when the parameters of a price cap plan are altered (either during the course of the plan or ex post) because the regulated firms are too successful, the damage to future productivity performance is likely to be significant.[14] The economic literature has coined the term "the ratchet effect" to describe the losses in economic welfare that likely arise when an incentive scheme is updated in a mechanistic way by taking into account past performance.[15] If regulated firms believe that superior performance during the life of the plan will be used in setting the target during the next period, the firm's incentive to maximize technical and dynamic efficiency is compromised. The regulated firm will weigh and balance the increase in profits in the short run from investments in technology that lowers costs with the likelihood that in the next period the cost-reducing investment will increase the yardstick by which performance is measured thus leading to lower profits in the short run.[16] The course of action that is most consistent with avoiding the inefficiencies

[13] David E. M. Sappington and Dennis L. Weisman, *Designing Incentive Regulation for the Telecommunications Industry*, pp. 116-117, MIT and AEI Press, 1996.

[14] See D.E.M. Sappington, "Strategic Firm Behavior Under a Dynamic Regulatory Adjustment Process" *Bell Journal of Economics*, Vol. 11, No. 1, (1980) pp. 360-372. which shows how a regulatory mechanism (the Vogelsang-Finsinger mechanism) which resets prices periodically to match realized costs can induce inefficient behavior on the part of the regulated firm. The *FNPRM* cites this study (at footnote 26) incorrectly to imply that the inefficient behavior is inherent in price cap regulation, rather than a consequence of imperfectly implemented price cap regulation. Prospective price cap regulation does not suffer from these inefficiencies.

[15] See, Martin L. Weitzman, "The Ratchet Principle and Performance Incentives" 11 *Bell Journal of Economics*, 1980; Xavier Freixas, Roger Guesnerie and Jean Tirole, "Planning under Incomplete Information and the Ratchet Effect" 52 *Rev. Econ. Studies* (1985); and Jean-Jacques Laffont and Jean Tirole, "The Dynamics of Incentive Contracts" 56 *Econometrica*, 1988.

[16] The FCC's price cap plan mitigates this danger to some degree by using historical productivity growth for the industry rather than for the individual firm. Because changes in a firm's current productivity growth have a smaller effect on industry average productivity growth, the ratchet effect will be smaller than if the historical productivity growth for each firm were applied to determine an X for each firm. See D.E.M. Sappington and J.

is for the regulator to credibly commit not to revise the plan in light of the information revealed through the company's performance.[17]

16. Indeed, the inability of regulators to credibly commit to the regulatory plan decided upon in the past (in this case the Commission's decision in the 1997 Price Cap Performance Review not to consider earnings as a reason to modify the plan) undermines future credibility. And by undermining future credibility, the regulated firm is less likely to implement cost-reducing and welfare-enhancing investments (or will reduce the amount of cost-reducing and welfare-enhancing investments) for fear that the gains from such investments will not correspond to the initially agreed-upon level. Nor will the regulated firm have the same incentives to improve the services offered or create new and innovative services that consumers value. Both the regulated firm and consumers are worse off as a result.

17. In addition, even perfect price cap regulation will not equate revenues and costs in each year going forward, for the individual firm or for the industry as a whole. Revenues, costs and productivity growth are subject to considerable uncertainty and variation over time and across firms. Earnings for unregulated firms in competitive markets vary significantly from year to year, so that mechanically equating costs and revenues for regulated firms has no precedent in the behavior of unregulated markets. Accounting earnings are also subject to artificial variations, including write-offs, amortizations and one-time expenditures in ways that do not reflect an average annual rate of change that could be used as a target going forward.

Bernstein, "Setting the X Factor in Price Cap Regulation Plans," *The Journal of Regulatory Economics*, Vol. 16(1), June 1999, pp. 5-25.

[17] See David P. Baron and David Besanko, "Commitment and Fairness in a Dynamic Regulatory Relationship" *Review of Economic Studies*, 1987. As they state, "[Commitment] strikes the optimal balance between the marginal reduction in consumer surplus resulting from distorting price above marginal cost and the marginal reduction in rents resulting from that distortion...The ex ante reduction in welfare from fully exploiting this information always exceeds the ex ante increase in second-period surplus that would result from marginal-cost pricing."

III. THE COMMISSION SHOULD REJECT THE STAFF'S IMPUTED X STUDY

18. As an alternative to the TFP methodology previously used, the Bureau staff performed a new "imputed X" study designed to "calculate the X-factor that yields the aggregate revenues that would have been generated in a competitive market."[18] The Commission requests comments (¶ 40) on, inter alia, the theoretical appropriateness of this methodology and whether an interstate-only calculation is conceptually correct.

19. As I discuss in detail below, the Staff's imputed X study has no basis in economics. It relies on accounting costs rather than economic costs and—in particular—on measures of cost that have been jurisdictionally separated using fully distributed cost methods. Consequently, the study is not forward-looking nor is it consistent with the Commission's own stated goals of relying less on regulatory accounting and earnings data. As the Commission stated in its 1997 Price Cap Review Order:

> Finally, we 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.[19]

20. When recently arguing before the United States Court of Appeals for the District Columbia Circuit the Commission cited the Court in a previous decision highlighting the benefits of less reliance on detailed cost data:

> Nor is there [under price caps] any reward for shifting costs from unregulated activities into regulated ones, for the higher costs will not produce higher legal ceiling prices. <u>Finally, the regulator has less need to collect detailed cost data from the regulated firms or to devise formulae for allocating the costs among the firm's services</u>."[20] [emphasis added]

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[18] *FNPRM* Appendix C.

[19] *Price Cap Performance Review for Local Exchange Carriers*, Fourth Report and Order in CC Docket No. 94-1 and Second Report and Order in CC Docket No. 96-262, ¶ 60, (1997) ("*1997 Price Cap Performance Review*").

[20] Federal Communications Commission, Brief for Respondents, June 15, 1998 at12 in *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*, No 97-1469. ("*FCC Brief for Respondents*".

21. As many economists have pointed out before, in the presence of shared-fixed and common costs, TFP growth is undefined for a subset of the firm's services. Fixed costs can be allocated to the interstate and intrastate jurisdictions by any number of methods, but the resulting assignment of costs and associated rates of growth of interstate and intrastate TFP is arbitrary and meaningless. The Commission should reject the Staff's imputed X study and instead rely on the results of USTA's update of the FCC's X-factor study which indicates that the appropriate X-factor is 4.86%.[21]

22. Adopting the Staff's imputed X study would provide price cap LECs with perverse productivity incentives—essentially the same disincentives of traditional cost-plus regulation. Using the productivity gains realized under price caps to recalculate the firm's price cap productivity target is inconsistent with price cap regulation and is a step backward away from a transition towards a competitive marketplace where market forces determine outcomes and consumers benefit. In order to maximize the economic surplus and gains available to consumers and the firm, the Commission should not penalize price cap LECs in the future for efficiency improvements in the past.

A. Implementing Staff's study would diminish LEC productivity incentives

23. The Staff's imputed X study is a variant of the Direct Model proposed by AT&T which the Commission has called the Historical Revenue Approach.[22] The study calculates the change in 1998 revenue and operating income for each price cap LEC that would result from imposing a hypothetical X-factor from the inception of price caps in 1991 through 1998. The hypothetical X-factor is calculated by solving for the past X-factor that would have been required to produce revenues equal to costs, including the Commission's view of

[21] USTA *ex parte*, September 10, 1999, Professor Frank Gollop's update of the FCC 1997 X-factor model. The 4.86% is an average for the period 1991-1995.

[22] *Price Cap Performance Review for Local Exchange Carriers*, Fourth Further Notice of Proposed Rulemaking in CC Docket No. 94-1 (1995) ("*1995 Fourth Further Notice*").

a competitive cost of capital.[23] The data used for these estimates differ from those used for the TFP calculations in that they are purely interstate in nature.

24. If the Staff's imputed X study were to become the method by which the productivity offset were determined in the price cap plan, LECs would no longer have adequate incentives to increase productivity and become more innovative. The proposal would maintain the appearance of incentive regulation but would undo all of the changes in incentives that were intended to benefit consumers. If implemented, the plan would eviscerate the Commission's attempted regulatory reform and institute in its place, traditional cost-plus regulation with a lag. The very design of incentive regulation requires that the LECs not be required to forfeit the entirety of the gains from their own improved performance. According to the study, at risk is between $1 to $2 billion in LEC income that, in the Staff's opinion, was above the target rate of return in 1998 (i.e., the rate that the Staff believes would have been observed in a competitive market).[24] Apart from the economic problems with the target rate of return—as discussed by Dr. Vander Weide—and the use of fictitious stimulated minutes produced at zero economic costs, measurements of achieved productivity growth should have only a limited role in an incentive regulation plan: to serve as a diagnostic measure of whether the original parameters of the plan were seriously in error.

25. There are three reasons for this limitation. First, economists measure productivity growth for firms or aggregates of firms using data on quantities and prices of inputs and outputs, not accounting measures of earnings for particular subsets of the firm's outputs. Second, measured correctly, productivity growth exhibits fairly large year-to-year variations, so that most observed deviations of accounting earnings from their expected value are well within the normal range anticipated at the outset of the plan. It would be senseless to vary parameters of the plan to track random fluctuations in annual productivity growth and even less sensible to adjust the plan to track random fluctuations in accounting earnings for

[23] The staff uses Moody's Baa corporate bond rates to create a competitive capital compensation index. USTA attaches a paper by Dr. James Vander Weide showing why the competitive capital compensation index used by the Staff is wrong and does not accurately measure the LEC's true capital opportunity costs.

[24] Appendix C, Table C-3.

interstate services. The revenue, expense and investment data that the Staff adjusts in its Imputed X study were the results of the Commission's three price cap plans in effect during the time period, and those results varied within limits that were foreseen when the plan was implemented.[25] Adjusting a plan on the basis of actual outcomes that are clearly within the range contemplated by the plan is a return to the bad old days of traditional cost-based regulation, which the Commission rightly rejected as antiquated and in need of change.

26. Third, under price cap regulation productivity gains are expected as the result of management effort induced by improved incentives. As discussed above, recontracting subsequent to this effort would severely erode the incentives of the plan to the point of creating a thinly-disguised version of traditional cost-plus regulation. While the actual performance (including the change in productivity) of the LECs during the price cap period may be germane to a review of the program, the results must be interpreted in the context of the Commission's intent in establishing the plan, a part of which was to emulate competitive markets by subjecting the regulated firm to the same transitory pattern of profits and losses that competitive firms experience when they are successful or unsuccessful. In order to ensure long-term stability and to avoid a return to traditional cost-plus regulation, it is essential that the productivity gains realized under price caps not be used to recalculate a firm's price cap productivity target.

27. For example, suppose the LEC industry implemented a one-time cost-saving program that reduced inputs by one percent but did not affect the rate of change of input quantities in the future. Such a change would show up as a one percent increase in productivity growth in the year it occurred. If this measurement then caused subsequent productivity targets to increase by one percent, the LECs would be forced to give back their increased earnings and would be committed to make similar additional cost savings in every future year. Returning earnings from cost reductions would be exactly what occurs under traditional cost-plus regulation with regulatory lag and would constitute a failure to reward efficiency

[25] *Policy and Rules Concerning Rates for Dominant Carriers*, Second Report and Order, CC Docket No. 87-313 (1990) ("*LEC Price Cap Order*"); *Price Cap Performance Review for Local Exchange Carriers*, First Report and Order, CC Docket No. 94-1 (1995) ("*1995 Price Cap Performance Review*"); and *1997 Price Cap Performance Review.*

improvements that the Commission sought to encourage with price caps. And it would be wholly incorrect to incorporate a one-time cost reduction into a long-term productivity offset by effectively assuming that the cost reduction would continue to take place in every year.

28. At a time when telecommunications providers are racing to provide a bundled offering of local exchange, long distance, high-speed internet access, wireless and cable services and the LECs are competing vigorously with IXCs, CLECs and cable companies to provide such services, it is necessary that regulation not penalize LEC efficiency as the staff's imputed X study would do. Contrary to the FNPRM (¶ 35) that "...this method should have the same incentive effects as the TFP approach or any other method of calculating an X-factor" the fact is that tying price changes to changes in efficiency reduces LEC productivity incentives.

29. But this fact has already been recognized by the Commission. In the 1995 FNPRM (¶ 81) the Commission stated:

> The Historical Revenue Method basically reprices access services over a historical period to achieve a target rate of return. To the extent that increases in earnings resulting from increases in productivity would increase the X-Factor, the Historical Revenue Method may not create adequate incentives for increasing productivity.

30. In again rejecting the Historical Revenue Method in the 1997 Price Cap Performance Review (¶ 22), the Commission stated:

> Adopting the Historical Revenue Method on a moving-average basis, as GSA recommends, would create substantially similar incentives to those under rate-of-return regulation, because the X-Factor would be explicitly linked to earnings.

31. In addition, in its response to the Appeals Court, the Commission cites approvingly the Court's language highlighting the efficiency gains from price cap systems which separate actual cost savings from future price reductions:

> Under a price cap system, the regulator sets a maximum price, and the firm selects rates at or below the cap. Because cost savings do not trigger reductions in the cap, the firm has a powerful incentive to reduce costs.[26]

32. The Commission acknowledged this conclusion in ¶ 39 of the current NPRM: "We note that the Commission declined to adopt the Historical Revenue Approach in the 1997 Price Cap Review Order due to administrative concerns and incentive effects.". The differences between the Staff's proposed method and the Historical Revenue method—namely, the adjustment to the rate of return and the estimation of stimulated minutes—do not address the Commission's reasons for rejecting this method in the first place. The Staff has not even attempted to refute earlier Commission criticisms of this method in its Appendix C.

33. Rewriting the price cap contract using the Staff study would reverse the direction of previous Commission initiatives towards incentive regulation. Changing the target during the course of the plan is generally a poor idea because it vitiates the incentives that price caps were designed to instill. In order that the price cap LECs embody efficiency incentives in the networks under construction and in the planning process, those firms must believe that a stable price cap formula can be used in their business plans. If LECs believe that X will be constantly recalculated to keep interstate accounting earnings at an allowed level, their incentives and business plans will be very different. Moreover, the industry has had nearly ten years of experience under price caps, and it is difficult to believe that it is still necessary to track outcomes of the process incessantly to be sure that the plan is working. Finally, measurements of levels or growth rates of interstate accounting earnings cannot be used to signal whether the plan is working. Earnings are the wrong subject to measure because management decisions play a role in the high or low earnings that firms achieve, and high or low earnings are the reward and punishment for success or failure in the market. The Commission has already adopted an economically sound TFP method which does not suffer from the infirmities of the Staff's imputed X study and provides appropriate productivity incentives.

[26] *FCC's Brief For Respondents* (at 12).

B. An interstate-only X-factor calculation is conceptually incorrect

34. A fundamental weakness in the staff's imputed X study is its attempt to estimate an interstate-only X-factor. Productivity growth must be calculated on a total company basis principally because there is no economically meaningful way to assign portions of common facilities to individual services. The Commission acknowledges these difficulties at ¶ 37 in the context of a TFP study. Its previously expressed concerns apply equally to any study that attempts to separate costs on a jurisdictional basis.[27] For this reason a TFP study that is based on a total company basis is superior to the Staff's imputed X study because the data used in the latter are called into question due to the economically arbitrary manner in which revenues, expenses and investments are assigned.

35. From an economic perspective, we have shown in the past that in the presence of common costs, productivity growth for a subset of the firm's services (i.e., interstate vs. intrastate services) is not defined.[28] Only in the case that the firm's production function is separable in those services—so that the marginal rates of substitution among interstate factors of production are independent of the levels of intrastate demand—can productivity growth for interstate and intrastate services be individually defined.

36. This inability to define interstate TFP growth is not just a theoretical economic quibble; the fact that productivity growth inures to the entire firm (except under conditions of separability of the production function) is reflected in the prices that emerge from market forces. Prices in competitive markets characterized by common costs are not determined

[27] In fact, the Commission, in its Brief for Respondents, defended its decision not to adopt an X-Factor based on interstate operations for this very reason. The Court upheld the Commission's decision and stated, "... it is not clear that "interstate productivity," as opposed to total company productivity, is measurable, or even economically well-defined. This is so because direct productivity measurement requires measurement of inputs, and there is no obviously meaningful way to segregate LEC interstate and intrastate inputs because, as is undisputed, "interstate and intrastate services are usually provided over common facilities." " (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, No 97-1469, Section IV. Interstate v. total company productivity). The Staff has not addressed these infirmities in its imputed X-study and, therefore, it would be illogical for the Commission to adopt a method that both the Commission and the Court found unsound.

[28] See W. E. Taylor, T.J. Tardiff and C.J. Zarkadas, "Economic Evaluation of Selected Issues from the Fourth Further Notice of Proposed Rulemaking in the LEC Price Cap Performance Review," Attachment C to USTA Comments, December 18, 1995 at 16-17.

randomly. Rather, as output levels of individual services change, unit costs for the individual services change, and prices will move in predictable ways following costs. One reasonable standard to use in setting a productivity offset is to emulate this movement of prices under competitive conditions. Two examples will help our intuition regarding the relationships among changes in output and technology, productivity growth and changes in unit costs and prices for individual services, showing that changes in interstate output growth can lead to changes in unit costs and prices for intrastate services.

37. First, suppose the regulated firm supplied only two identical services (interstate and intrastate usage) initially at equal volumes and equal prices, using identical facilities which could have both fixed and variable cost components. Suppose that over time, demand for interstate usage doubled while demand for intrastate usage remained constant so that the aggregate quantity of output increased by 50 percent. If aggregate input quantities were assumed to grow at 40 percent, the resulting growth in TFP for the firm would be about 10 percent. Assuming input prices were unchanged, unit costs would fall by about 10 percent.

38. How would this productivity growth be distributed—if it all—between interstate and intrastate usage? First, it should be clear by the symmetry of the assumptions that the change in variable cost is the same for interstate and intrastate usage: an additional minute of each service would increase total costs by exactly the same amount both before and after the change in output. Even though interstate demand growth is assumed to be responsible in this example for the reduction in unit costs, that reduction applies equally to interstate and intrastate services. In this example, it is cheaper to produce an additional unit of intrastate service at higher levels of interstate demand. Thus, if all costs were variable, unit costs for interstate and intrastate services would fall by the same amount (10 percent), and—in unregulated competitive markets—output prices for these services should fall by about the same amount.[29] Second, if all costs were fixed, incremental cost would be zero in each jurisdiction and each additional minute of use would reduce unit costs by the same

[29] This statement is strictly true under the assumption of perfect competition. More generally, reductions in unit costs will result in reductions in prices, but relative price reductions (across services) will depend on demand conditions in each market.

amount, irrespective of whether the usage were interstate or intrastate. Thus, it is pointless to ascribe faster TFP growth to one service compared with another, when both services share common facilities.

39. A second example in which technological change drives productivity growth may be helpful. Suppose, again, there are only two services—interstate and intrastate usage—of equal size and both services use switches. Suppose asynchronous transfer mode ("ATM") switches reduce costs, and firms place ATM switches in their networks when it is cost-effective to do so. All else equal, if usage grows more rapidly, ATM switches will diffuse more rapidly throughout the network since where new switch capacity is required, ATM switches would be placed rather than digital switches. The more rapid diffusion of the new technology then leads to an increase in the rate of total factor productivity growth and in the rate at which unit costs for usage falls over time.

40. Now, the rate at which ATM switches are placed in the network depends on the growth in usage but not on the jurisdiction of that usage. For a traffic engineer, the need for additional capacity depends only on peak-period demand, not on whether that demand is interstate or intrastate. As a result, a firm whose interstate demand grew at 10 percent per year while its intrastate demand was constant would experience the same rate of introduction of ATM switches as an otherwise identical firm whose interstate and intrastate growth rates were reversed. Unit costs and—under competitive conditions—market prices for usage would fall more rapidly in both jurisdictions as output in either jurisdiction grows. Thus, growth in interstate usage leads to lower unit costs and lower prices equally for interstate and intrastate usage. The technological change that is assumed to drive productivity growth in this example is induced equally by growth in interstate or intrastate usage, and it reduces costs (and thus prices) for both the slow-growing and fast-growing services identically.

41. In the FCC's Brief For Respondents (at 41), the Commission acknowledges that interstate productivity is undefined in telecommunications:

> One possibility is to calculate an interstate-only measure of productivity growth. To do this, however, the Commission would need to know the changes in

> quantity of interstate outputs and changes in the quantity of interstate inputs because TFP productivity growth is calculated as the percentage change in the index of outputs minus the percentage change in the index of inputs. While it is relatively straight-forward to ascertain the quantity of interstate outputs, it is far more difficult to derive an economically meaningful measure of interstate inputs. This is because a LEC's inputs are not compartmentalized into those providing interstate services, and those providing intrastate services: the LEC provides both over the same network.

As I point out above, the problem is not (merely!) assigning common costs to jurisdictions in some economically meaningful way.[30] If, as in the ATM example, growth in interstate and intrastate output causes total costs to fall equally, we would observe in competitive markets, similar reductions in intrastate and interstate prices irrespective of the relative rates of growth of interstate and intrastate inputs or outputs.

C. Use of Interstate accounting earnings results in erroneous conclusions

42. The results in the Staff's imputed X study are primarily driven by the observation that interstate earnings exceeded the level that would have been observed in a competitive market. Apart from the Staff's determination of accounting earnings in a competitive market (which Dr. Vander Weide addresses), LEC earnings—as measured by regulatory accounting—do not pretend to measure economic profit and are notoriously poor proxies for it. Moreover, changes in accounting earnings are also a poor measure of changes in economic profit. This is the case for three reasons. First, economic profit is not defined for interstate services because there is no economic basis upon which to split common costs between interstate and intrastate services. Second, regulatory earnings are affected by numerous accounting conventions that provide no forward-looking information regarding profit opportunities. And third, the accounting treatment of depreciation for regulated

[30] The jurisdictional separations process, for all its warts, unambiguously assigns costs between the jurisdictions to determine regulatory responsibility. While the separations process assigns costs on a cost-causal basis to the extent possible, because it must assign all costs, it uses arbitrary but not capricious algorithms to assign shared fixed and common costs on bases unrelated to economic cost. Accounting costs in the aggregate are often used to determine a revenue requirement, but there is no economic basis for using jurisdictionally separated costs for individual services for pricing purposes. When the Commission wishes to estimate the costs (and prices) for individual services that would prevail in competitive markets, it generally begins with forward-looking economic cost concepts. Thus, the Commission reconciles the use of separated costs for some purposes (jurisdictional authority) and economic costs for others (pricing).

LECs is based on asset lives that are currently too long and have historically been too long, so that LEC accounting profits are overstated relative to economic profits.[31] As telecommunications markets become more competitive, market forces will undertake a more realistic appraisal of the LEC capital stock, and as asset lives are reduced, the associated changes in accounting profits will be again a poor measure of changes in economic profits. I discuss each of these reasons below.[32]

43. In my comments to the Commission's Further Notice of Proposed Rulemaking ("FNPRM") in CC Docket 96-262 et al. (released on August 27, 1999), I raised two issues.[33] As an empirical matter, accounting earnings of price cap LECs have not performed as well as the average industrial firm over the same time period. 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.[34] Of course, prices for price cap LECs by construction fall faster (increase more slowly) than average prices in the economy so that the LECs' wholesale and retail customers have done considerably better than average firms as a result of price cap regulation. In addition, because of the manner in which the price cap index was constructed,[35] customers of the price cap LECs have experienced greater real reductions in prices than they did under rate of return regulation. Thus, the application of price caps has generated economic surplus for customers because customers are better off under price caps they than would have been under rate of return regulation. For example, as I mentioned (¶ 27) in my comments to the Commission's Further Notice of Proposed Rulemaking ("FNPRM") in CC Docket 96-262 et al. (released on August 27, 1999):

[31] Thus, staff has been one-sided in its advocacy of economic measures of cost by choosing the economic cost of capital when in its (erroneous) opinion, the X factor would increase as a result, but eschewing the use of economic depreciation, which would have the opposite effect on Staff's estimation of X.

[32] In addition, in his paper (USTA attachment) Dr. Vander Weide discusses issues surrounding the cost of capital.

[33] Comments of William E. Taylor on behalf of United States Telephone Association, October 29, 1999. *In the Matter of Access Charge Reform et. al.,* CC Docket No. 96-262 et al.

[34] *Ibid.*, ¶ 26 and Figure 1.

[35] From 1991 to 1997, the price cap index was based on an X-factor that was derived by replicating the growth in prices that prevailed during rate of return regulation in the 80s. And a CPD was also included that guaranteed that the initial economic gains from price caps flowed to consumers. Since 1997, the X-factor is based on the

> [A]ccording 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.

44. In order for earnings to provide any meaningful economic information about a firm's performance, they must, at a minimum, be accurately measured. This is certainly not the case for the Staff's imputed X study which bases its conclusion that price-cap LECs have experienced a windfall on an analysis of interstate accounting rates of return. Such a conclusion is economically meaningless because earnings analysis done at the interstate level cannot provide any meaningful economic information. As discussed above, 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 interstate level, some type of separations process is used to assign fixed costs to each jurisdiction. And therein lies a fundamental problem because the separations process gives rise to the appearance but not necessarily the reality of increased earnings.

45. Specifically, accounting earnings are dependent on the investment and expenses that have been separated and allocated to the inter- and intrastate jurisdictions. The Commission's Part 36 Rules do not jurisdictionally separate costs for the purpose of setting forward-looking prices. They do not accurately reflect cost causation, and interstate accounting costs do not even approximate the economic forward-looking cost of supplying interstate services. Earnings growth measures based on separated costs would be distorted by changes in the separations formulas and factors and would provide no meaningful information about the earnings growth of interstate services.

46. Currently, an allocator upon which many separations factors are based is relative minutes of use, and 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

difference between TFP of the LEC industry and nationwide TFP, an input price differential and a consumer productivity dividend.

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.

47. Moreover, as discussed in my comments on the Commission's Further Notice of Proposed Rulemaking ("FNPRM"), the separations process itself makes reported earnings even less useful for such economic purposes as pricing. An example is 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.[36] The fact that Internet-bound traffic continues to be classified as local increases the level of measured interstate accounting earnings: these calls carry costs along with them but essentially no revenue,[37] 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.[38] And, for the NECA pool members, treating this jurisdictionally interstate traffic as intrastate for separations purposes produces a $170 million allocation of costs to the intrastate jurisdiction and a corresponding overstatement of interstate earnings.[39] While various solutions to this accounting problem are under

[36] 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.

[37] Because ISPs compete with one another by providing seven-digit numbers by which customers can reach them without incurring toll or local per-minute charges.

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

[39] 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.

consideration in other dockets,[40] it is worth noting here that current accounting practices in the separations process make the use of jurisdictional (interstate) earnings as an indicator of the success or failure of the price cap plan particularly unreliable.

48. 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.[41] As the Commission has itself noted in the 1997 Price Cap Performance Review (¶ 152):

> Reported earnings are calculated on the portion of embedded investment and expenses that are allocated to the interstate jurisdiction by Part 36, the jurisdictional separations manual. 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.

49. Finally, accounting earnings are affected by the depreciation rates allowed by state and federal regulators. In its recent Report and Order on Depreciation, the Commission acknowledged that past depreciation rates and factors have been too low, giving rise to a $30 billion difference for the largest ILECs between the capital costs on their financial (SEC-GAAP) books and their regulatory books.[42] This discrepancy distorts comparisons of *levels* of accounting earnings between ILECs and unregulated firms. In addition, as regulatory depreciation lives are reduced to reflect economic lives, *changes* in regulated

[40] The inability to isolate and track these minutes separately from other conversation minutes may make any economically meaningful adjustment to separations to account for these minutes impossible.

[41] *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.

[42] In the Matter of 1998 Biennial Regulatory Review, Review of Depreciation Requirements for Incumbent Local Exchange Carriers, United States Telephone Association's Petition for Forbearance from Depreciation, Regulation of Price Cap Local Exchange Carriers, Report And Order In CC Docket No. 98-137 and Memorandum Opinion And Order In ASD 98-91, Released December 30, 1999.

costs or earnings will no longer track changes in economic costs or profits. Historical studies which measure—directly or indirectly—the rate of change of ILEC unit costs for the purpose of setting a value of X going forward cannot correctly use accounting earnings or accounting costs, since both the level and the rate of change over time of accounting costs are distorted by the shift away from artificially prolonged depreciation lives.

D. Staff's study ignores the costs associated with stimulated minutes

50. Apart from the conceptual errors in the Staff's imputed X study, by adding stimulated revenues, Staff has incorrectly biased its estimate of X upwards. The Staff states in Appendix C that: "We have no evidence of the effects of an increase in output on costs, but short-run marginal costs are generally believed to be very low." Staff assumes that additional volumes, such as lines or minutes, can be provided with absolutely no increases in capital or operating expenses (apart from taxes). While short run marginal costs may be a relevant factor to consider under certain limited circumstances, those circumstances do not apply in this case.[43]

51. In the first place, while it may be the case that—in the short run—capital costs are low if there are no capacity constraints, the same is not necessarily the case for operating expenses.[44] Every additional call entails measurement, rating and billing. And repair and maintenance expenses can be significant even in the short run. Second, usage in the short run can affect the timing of capital additions in the long run. The price decreases assumed in the Staff's model result in permanent increases in demand and therefore affect the timing of capital additions. For example, the costs of the switch processor and switch matrix are recovered in the traffic-sensitive basket, and call attempts and minutes of use cause the

[43] For example, a firm introducing a new product may initially price at short run marginal costs to attract customers and develop brand loyalty and customer acceptance. Pricing at short run marginal costs accomplishes this and permits the firm to break even. However, due to the presence of fixed costs, a firm cannot price all of its services at short run marginal costs and break even. In the long run, it must price each service to recover its variable and service-specific fixed costs and recover all shared and common costs from some set of services. The recovery of shared and common fixed costs is especially important for the LEC industry, which relies on large, primarily fixed-cost capital intensive networks to provide access services.

[44] According to the 1999 SOCC, the RBOCs' total plant specific operation expenses were $16 billion, nearly the same as depreciation and amortization expenses of $16.5 billion.

capacity of the switch processor and switch matrix, respectively, to exhaust. As a result, call attempts and minutes of use are the cost drivers of the switch processor and switch matrix. And because each additional call attempt and minute of use generally advances the time that the resource's capacity will exhaust, the end user who places an additional call or who remains on the line an additional minute is causally responsible for increasing switching costs and should therefore face the correct economic price for her usage. Therefore, the Staff's assumption that additional output generates revenues but not expenses biases its estimate of X upwards.

IV. THE CONSUMER PRODUCTIVITY DIVIDEND SHOULD NO LONGER BE APPLIED

52. In the LEC Price Cap Order, the Commission included a CPD of 0.5 percentage points to ensure that the first efficiency gains from the switch to price cap regulation flowed to consumers. After nearly 10 years of a price cap regulation plan that has included the CPD, the time is long overdue to remove it from the plan. The CPD was never intended to be permanent fixture in the price cap plan. The original purpose for the CPD—to ensure that customers are the first to achieve the benefits of efficiency gains from price cap regulation—has been accomplished. Adding a CPD to an historical X factor measured over a period that includes price cap regulation would effectively double-count expected productivity gains.

53. In the 1997 Price Cap Performance Review, the Commission devised a new reasoning supporting the continued application of the CPD. The Commission decided to retain a CPD of 0.5 percent in the X factor to offset the elimination of sharing requirements. In remanding this issue to the Commission, the Court questioned the Commission's justification for the CPD, citing the Commission's failure to tie the CPD to a specific productivity increase that could reasonably be expected from the elimination of sharing. It is certainly plausible that the elimination of the sharing requirement from a price cap plan might—all else equal—lead to an increase in a firm's efficiency incentives and subsequent productivity growth. However, as a factual matter, consumers have already partly benefited from the increased efficiency resulting from the elimination of the sharing requirements.

Continuing to include a CPD would effectively double-count the benefits of the elimination of sharing and, as a result, defeat the original purpose for eliminating sharing in the first place.

54. In the 1997 Price Cap Performance Review, the Commission adopted an X-factor based on a TFP study that was derived from data pertaining to the seven Regional Bell Operating Companies ("RBOCs") for the period 1985 through 1995. Today, the Commission is considering adopting an X-factor that is based on data through 1998. Measurements of productivity growth over those periods effectively include the shift to price cap regulation without earnings sharing, so that continuing to apply a 0.5 percent CPD above and beyond the estimate of the historical X-factor constitutes double-counting.

55. First, in the 1997 Price Cap Performance Review the Commission completely eliminated earnings sharing as an option. As a result, the level and rate of change of price cap LECs' inputs and outputs for 1997 and beyond (used in TFP studies) already reflect whatever impact the elimination of earnings sharing had on their efficiency incentives. In addition, in the 1995 Price Cap Performance Review, the Commission gave price cap LECs the option of selecting three different X-factors, the highest being 5.3% with no earnings sharing. Ultimately the vast majority of price cap LECs selected this higher option with no earnings sharing, so that the level and rate of change of price cap LECs' inputs and outputs for 1995 and beyond are influenced by whatever impact the elimination of earnings sharing had on their efficiency incentives. Finally, in the original LEC Price Cap Order the Commission permitted price cap LECs the option of selecting an X-factor of 3.3% with a 50-50 sharing zone for earnings between 12.25 and 16.25 percent or an X-factor of 4.3% with less onerous sharing rules. Three of the seven RBOCs (Pacific Telesis, U S West and BellSouth) chose the higher X-factor with less stringent sharing requirements in some years during the 1991-1994 period, so that price cap LECs have experienced at least some of the incentive benefits from elimination or reduction in sharing since as early as 1991.

56. Moreover, TFP studies use total company data, not just interstate data, and the type of regulation at the state level—whether rate of return, price cap with earnings sharing or price cap with no earnings sharing—has an impact on the LECs' levels and rates of change of

inputs and outputs. Since 1994, when price cap regulation began in earnest at the state level, few states have implemented earnings sharing. Currently, among the price cap states, only New Jersey has any provision for earnings sharing. Thus, the incentive effect on measured productivity growth from eliminating rate of return regulation and earnings sharing has largely already occurred: for interstate services, partially between 1991 and 1995 and completely after 1997 and for intrastate services, nearly completely between 1994 and the present. If it were correct to assign customers a 0.5 percent CPD in 1991 to share the benefits from improved regulation, it cannot be correct to do so again.

57. The Commission has (correctly, in my view) been wary in the past of basing price cap plan parameters on forecasts of future events, relying instead on measures of past productivity and input price growth. The CPD was an exception to that rule, adopted originally so that customers[45] would receive an immediate dividend from the new regulatory compact. That justification no longer applies, since the additional productivity growth anticipated from the movement toward incentive regulation is already counted in the current studies. Other attempts to justify a productivity growth target higher than its historical rate fall into the forecasting quagmire: some anticipated changes—e.g., new technology[46]—may lead to more rapid productivity growth but others—e.g., increased competition, required rate rebalancing, opening the ILECs' local exchange networks—will likely retard measured productivity growth. No economic case can be made why the likely future effect of one factor—improved regulatory incentives already reflected in historical data—should be taken into account while all others are ignored.

V. CONCLUSIONS

58. Frequent represcription of the price cap parameters undermines the behavioral foundation of price cap regulation in two ways. First, in order for price cap incentives to take effect,

[45] Or, at least, interexchange carriers.

[46] But the simple fact that technology change will occur and will reduce costs does not determine whether future TFP growth will be slower than historical. Fast packet switches are more efficient than electromechanical switches, but the adoption of electromechanical switching may well have increased productivity growth at the time more rapidly than the implementation of fast packet switching will do today.

the regulated firm must be able to use the price cap rules in its planning, having confidence that it will be bound tomorrow by the rules that it faces today. Incessant recontracting—ostensibly to correct data or methods—destroys that confidence and prevents firms from investing in projects whose profitability might depend on future regulatory parameters. Second, the firm must believe that financial success today will not penalize it tomorrow: that there should be no feedback between historical profitability and future productivity targets. Under the Commission's proposal, historical *industry* accounting earnings (as opposed to the specific ILEC's earnings) would be used to set the productivity target for future pricing, but, as the Appeals Court noted:

> When all profits are taken away, a firm has no incentive to make them; when some proportion is taken away, firms will avoid at least some otherwise desirable choices with a prospect of enhancing profit but a risk of loss.[47]

Since each ILEC contributes proportionately to total ILEC profitability, a link between current profitability and a future value of X would still be present under the Commission's proposal, and ILEC incentives would suffer.

59. Adopting the staff's imputed X study would be a significant and unexpected departure from the Commission's previous price cap regime. By using the productivity gains realized under price caps to recalculate the firm's price cap productivity target, the Staff's imputed X study would provide the price cap LECs with perverse productivity incentives—essentially the same disincentives of traditional cost-plus regulation. The Commission has previously acknowledged the detrimental effects of unexpected changes in the price cap plan and the importance of stability. In its Brief For Respondents (at 47), the Commission:

> recognized that each unexpected change in the X-Factor diminished the LECs' incentive to reduce costs to the maximum extent possible (because such changes increased the chances that the LECs might not retain all of the benefits of doing so) and therefore diminished the efficacy of the incentive-based price cap system.

This recognition is particularly germane as new and old firms and new and old technologies race to develop and market the next generation of communications services. Incumbent and

[47] USTA v. FCC, 188 F.3d 521 (D.C. Cir. 1999)

entrant providers are currently competing to develop new bundled offerings of local exchange, long distance, high-speed internet access, wireless and cable services, and neither they nor the Commission know for certain what technologies or services would best serve customers and thus prevail in unregulated, competitive markets. It is essential that constant represcription of the rules of engagement not distort this process nor penalize price cap regulated firms for whatever efficiencies or market success they are able to achieve.