

opportunity cost of capital. Ideally, this measure would reflect a composite opportunity cost of capital which represents a weighted average of the opportunity cost of debt and the LEC's opportunity cost of equity. As a practical matter, however, there is no publicly verifiable time series for the opportunity cost of equity. Accordingly, the simplified Christensen TFP calculation utilizes the cost of capital implicit in the U.S. National Income and Product Accounts, as discussed in a February 1, 1995, USTA ex parte presentation.<sup>11</sup>

While the original Christensen study utilized the Moody's bond yield to approximate changes over time in the cost of capital, USTA and Christensen have elected to forego using Moody's in the simplified TFP because year-to-year changes in the bond yield do not mimic year to year changes in the cost of equity.<sup>12</sup> Accordingly, the use of Moody's bond yield as a proxy for the cost of capital is less economically meaningful than other measures, particularly with respect to measurements of input price growth. Developing a widely-accepted annual data series on the opportunity cost of equity would involve complex and lengthy debates that would not be worth the time and effort, given the limited role and importance of the cost of capital estimates used in the TFP study method. In the context of a TFP study method, it is the change in cost of capital rather than the level of cost of capital that is most important. Accordingly, the simplified Christensen method includes the best measure of the cost of capital, because it is administratively simple and economically meaningful.

The Commission asks whether it might be more appropriate to use the prescribed rates of return, and in fact whether it would be reasonable to use anything other than the 11.25%

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<sup>11</sup>"Affidavit of Dr. Laurits R. Christensen on behalf of the United States Telephone Association, CC Docket 94-1, February 1, 1995.

<sup>12</sup>USTA does not now and has never supported the use of the Moody's yield as an appropriate measure of the level of the cost of capital; Moody's was used by Christensen as a rough approximation of changes over time in the cost of capital. See, e.g., Comments of USTA, CC Docket 92-13, (March 30, 1992), at 34, 47-51. As discussed above, the simplified Christensen method utilizes the cost of capital implicit in the U.S. National Income and Product Accounts.

rate of return prescribed for the price cap LECs for the purpose of initializing their rates. FNPRM, para. 35. The Commission's prescribed rate of return is not an appropriate measure of the cost of capital, and does not represent an appropriate measure of the changes in the economic opportunity cost of capital for use in a TFP study. The prescribed returns change only in discrete steps at irregular intervals, while the U. S. economy's cost of capital changes regularly as external capital market conditions change.

If the Commission were to recommend an alternative to the cost of capital proxy utilized in the simplified Christensen TFP method, such an alternative would require the calculation of a consistently-developed data series for the opportunity cost over a significant number of years and the incorporation of that cost of equity estimate into a measure of the opportunity cost of capital. The Commission's prescribed rates of return were not generated using a consistent set of economic principles and as such do not represent an economically meaningful measure of the opportunity cost of capital. Instead, they represent the results of a regulatory process under changing capital market conditions and inconsistent Part 65 rules. See, e.g., NPRM and Order, CC Docket 92-133, 7 FCC Rcd 4688, paras. 15-16, 51-53, 55-56; Order, 5 FCC Rcd 7505 (1990) para. 19-23, 48, 161-66; Order, 51 Fed. Reg. 32920 (September 17, 1986), para. 36. To be economically meaningful, a long-term TFP-based method for calculating the productivity offset should not rely on authorized rates of return to measure the cost of capital. Cf. Barbeau, Grimm, Phillips and Selzer, "Railroad Cost Structure Revisited," 1987 Transportation Research Forum 237 (Vol. 28, No. 1) ("A major improvement of our study over most previous estimates is an assessment of capital costs based on current economic value in lieu of accounting valuation").

**Issue 1c: What are appropriate depreciation rates for a TFP study?**

The Commission also requests comment on whether it would be reasonable to require that depreciation rates for future updates of the TFP study be within the bands established by the Commission for streamlined treatment. The Commission asks whether it would be

reasonable to rely on estimates of “economic” depreciation rates made by the LECs or some other party for future updates. FNPRM, para. 40. Use of the Commission’s prescribed depreciation rates (or the range of depreciation parameters in the Commission’s depreciation simplification orders) would be inappropriate for a TFP study. See Simplification of the Depreciation Prescription Process, Report and Order, CC Docket 92-296, FCC 93-452, 8 FCC Rcd 8025 (1993); Second Report and Order, CC Docket 92-296, FCC 94-174 (June 28, 1994); Third Report and Order, CC Docket 92-296, FCC 95-181 (May 4, 1995) (“Depreciation Simplification Orders”). As a matter of fact, not all of the LECs’ currently prescribed depreciation parameters fall within the bands established by the Commission for streamlined treatment. This is because even the ranges recently adopted in the depreciation simplification dockets were not designed to accommodate all of the current Commission prescriptions for capital recovery of the LECs.<sup>13</sup>

Proper calculation of TFP requires the use of economic depreciation rates. The depreciation rates determined by regulation are not economically meaningful in the context of a productivity study. The Commission’s current depreciation parameter ranges were set based on the past history of LEC net salvage rates, retirements and remaining lives. See Depreciation Simplification Orders. Past depreciation rates, prescribed lives, retirements and salvage rates were heavily influenced by the historical path of regulation and are significantly different from the economic obsolescence of capital.<sup>14</sup>

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<sup>13</sup>These rates are also generally do not meet LECs’ actual requirements for capital recovery.

<sup>14</sup> The Commission designed the currently prescribed ranges of depreciation parameters (projection lives and net salvage ratios) using only approximately one standard deviation around the then previously Commission prescribed depreciation parameters. A one standard deviation range automatically leaves out about 33 percent of the observations. Thus, even the Commission’s ranges omit a third of the Commission’s past regulatory decisions regarding accounting depreciation.

Economic depreciation rates are the relevant rates for TFP. The economic rates used in the simplified Christensen TFP study were obtained by a productivity expert (Jorgenson). They are consistent with BLS methods. On an ongoing basis, these rates would change only if the rates used by the BLS change (which would be no more frequently than every five years). Going to more detailed capital accounts would make the computations more complicated. In addition, a requirement to use the Commission's depreciation parameter ranges would necessarily require: the gathering of data on reserve ratios and the age distribution of capital; and the application of mathematical curve shapes - all of which are a function of the outcomes of the regulatory process, not the economic obsolescence of capital. Such a requirement would produce a less accurate estimate of TFP and would require a significant number of data items that would be difficult to verify.

Also, to the extent that explicit federal regulation of LEC depreciation rates may not be needed in the future, the Commission should not base its future estimates of TFP on any results of depreciation rate regulation that will not be available. In an environment where accounting depreciation rates have no effect on the prices that customers pay for services, there is no purpose for Commission regulation of accounting depreciation rates. The Commission has tentatively concluded that it prefers to eliminate all sharing provisions from the LEC price cap plan. Also, pending federal telecommunications legislation contemplates the same result. Thus, the Commission should not rely on its expected future regulation of LEC depreciation in the measurement of TFP.

**Issue 1d: What is the most reasonable method to estimate capital stock?**

The Commission notes that the original Christensen study utilizes the perpetual inventory method to calculate the annual level of capital stock. FNPRM, para. 41. The new and simplified Christensen study utilizes the perpetual inventory method also, and establishes a benchmark value of capital by calculating replacement values through a method which takes into account the economic rate of depreciation, and employs economic stock adjustment factors. Christensen derived the economic stock adjustment factors by comparing the U.S. Bureau of

Economic Analysis's (BEA) replacement cost measures to the BEA's quantity of capital stock measures. See Attachment A at 16.

The Commission seeks further comment on the perpetual inventory method, and on the reasonableness of using replacement values instead of original cost for benchmark values. FNPRM, para. 41. The Commission also seeks comment on the validity of the economic stock adjustment factor method, and the data on which it relies. FNPRM, para. 43. The "replacement value" discussed by the Commission is a measure of gross stock in current prices. That is, the measure corrects for price changes in new assets over time, but is based on economic depreciation. The "economic stock adjustment factors" are utilized to make replacement value conceptually consistent with economic depreciation. The economic stock adjustment factors can be meaningfully calculated in only one way - the ratio of capital stock (with economic depreciation) to gross stock in current dollars. The simplified Christensen TFP calculation utilizes the best available information on the age distribution of telephone industry assets - that collected by the Bureau of Economic Analysis. See Attachment A at 16.

The Commission requests comment on whether the use of replacement values instead of original cost is reasonable. FNPRM, para. 41. As Christensen points out, the original cost (book value) of plant and equipment does not account for changes in the purchase prices of new assets over time. Additionally, original cost measurements are based on depreciation assumptions that differ from economic depreciation. In order to establish a capital benchmark which utilizes economic depreciation, original cost is not appropriate.

The Commission notes that the Christensen methodology uses Telephone Plant Indexes (TPIs) in order to calculate capital stock quantities. The TPIs are used to deflate dollar investments in plant and equipment, and they also play an important role in the calculation of the value of capital services. The Commission seeks information regarding the calculation of these indexes, including a detailed description of data sources and methods employed, and how the accuracy of the indexes is ensured. FNPRM, para. 45. TPIs are subject to external

controls and validation, and are based on a measurement process which was in place long before the current effort at measuring industry TFP was initiated, and uses data that is drawn from internal accounting systems which are routinely audited.

The simplified Christensen TFP calculation utilizes price indexes currently published by the Bureau of Economic Analysis. Use of this data in place of existing TPI data has virtually no effect on LEC TFP. Additionally, by relying on a public data series, the simplified Christensen TFP calculation eliminates a potential source of controversy in the evaluation of TFP results.

The Commission also asks whether the perpetual inventory method can be improved upon for measuring capital stocks. FNPRM, para. 46. The perpetual inventory method and methods used to construct the benchmark are based on a consistent methodology which has been designed specifically for productivity measurement. As Christensen notes, to improve upon the perpetual inventory method, one would need to collect information on all LEC plant and equipment, by vintage, for each year of the LEC study. See Attachment A, at 15. The collection of such information represents an excessive administrative burden, particularly when compared to the minimal benefits that would result, if any.

**Issue 1e: Is the imputation of capital services from capital stock rather than from capital consumption reasonable?**

The Commission also requests comment as to whether it would be appropriate to assume that real capital services are proportional to the level of capital stock. The Commission also asks whether a measurement of capital services should be based on the consumption of capital. FNPRM, para. 47. The Jorgenson methodology (as well as the BLS methodology) clearly states that the quantity of capital stock is the appropriate basis for measurement. As the attached Christensen paper discusses, capital consumption is essentially the loss of capital efficiency over time. Attachment A at 21. There is no basis to assume that the capital services

provided in any year equals the amount by which a capital asset has been consumed or lost efficiency. Alternative assumptions, such as assuming that capital services are proportional to the “consumption” of capital, would not be economically meaningful.

**Issue 1f: What is the most reasonable method to develop an implicit rental price?**

The Commission asks for comment on the most reasonable method for developing an implicit rental price, and how timely updates to this figure would be. FNPRM, para 49. The rental price equation in the Christensen method is based on a well-accepted theory of capital. The simplified Christensen model employs three-year moving averages in the cost of capital and capital gains. See Attachment A at 12. Data are available for an update on a timely basis.

**Issue 1g: What is the most reasonable method of developing a labor index for inclusion in a TFP calculation?**

The Commission notes that the original Christensen study divides labor into two categories: management and nonmanagement, and seeks comment on whether the labor categories should be further subdivided in order to increase the accuracy of the labor index. The Commission also seeks comment on whether it would be theoretically or practically desirable to make further adjustments for varying levels of educational and vocational experience. FNPRM, para. 52.

There are no internal or external sources for determining the relative worth of different levels of attainment. For example, there is no basis to compare a Bachelors Degree in electrical engineering with vocational experience in switching design, installation and maintenance. Any attempt to qualify human capital in a TFP approach would not yield meaningful results, and could not be developed based on accessible and verifiable data. Similarly, further subdivision of the labor index based on functional characteristics other than management/non-management would not yield meaningful results, and could not be developed

using public data. As discussed below, the simplified Christensen methodology eliminates the need to examine these issues by utilizing the number of employees as the quantity measure for the labor input category. The number of employees provides a meaningful measure of labor input and does not change the TFP results from those derived using the labor index of the original Christensen study.

The Commission also asks whether adjustments should be made to total labor compensation prior to forming average shares of total labor costs. FNPRM, para. 52. The FNPRM also asks whether the cost shares should be adjusted to eliminate the effect of any accounting changes on the labor indexes. FNPRM, para. 52. Again, in the simplified Christensen study, the labor input index is calculated directly from the ARMIS 43-02 data on the number of LEC employees. The ARMIS 43-02 data does not distinguish between management and non-management, and thus eliminates the need to weight the two categories to derive an index of labor input. This modification provides a meaningful measure of the labor input, relies on publicly available data, and eliminates the need to address issues concerning such adjustments.

Finally, the Commission asks for comment on whether adjustments should be made to the labor index or to total labor compensation for “outsourcing,” that is, replacing the services of LEC employees with services provided by outside firms. FNPRM, para. 52. The simplified TFP calculation already incorporates the effects of outsourcing and no adjustments are necessary. To the extent that labor input falls when outsourcing occurs, services input also rises as a direct result. Any increased purchases of outside services for services previously provided by LEC employees results in higher expenses for services. The simplified Christensen TFP study explicitly measures the materials, rents and services input of the LECs in the calculation of total inputs. If in fact companies become more (or less) productive as a result of outsourcing, this effect is captured in the TFP calculation and will be reflected in increased (or decreased) TFP growth. Thus, no additional adjustments are required.

**Issue 1h: What is the most reasonable method for developing a materials index for inclusion in a TFP calculation?**

The Commission seeks comment on whether the materials quantity index should be based on a price index for materials instead of the GDP-PI. FNPRM, para. 53. For this broad and diverse category, containing numerous goods and services, Christensen adopted an economically meaningful approach using GDP-PI as a deflator. Given the diversity and breadth of elements in this category, GDP-PI is a reasonable deflator, as it also represents a broad and diverse measurement of miscellaneous business service expenses. Accordingly, there is no basis to conclude that use of GDP-PI would cause any material inaccuracies in the TFP measurement. Moreover, the ARMIS 43-02 information on materials purchases does not readily provide information on prices or quantities of the numerous and diverse types of materials purchased by the LECs. Additionally, the LECs do not maintain price indexes for these goods and services. In light of the goal of developing a meaningful TFP measurement which relies on publicly available data, the Christensen study did not expend the significant resources necessary to originate historical LEC cost indexes for miscellaneous expenditures, particularly where GDP-PI is a meaningful, readily available proxy.

**Issue 1i: What is the most reasonable way to account for changes in LECs' input prices for use in a TFP approach to calculating the X-factor?**

The FNPRM observes that changes in a firm's unit cost of output are not only affected by changes in productivity, but also by changes in the price of the resources used in the production process, i.e. input price changes. On this basis, the Commission tentatively concluded that the X-factor should include an adjustment to reflect changes in LECs' input prices. FNPRM, para. 54. The Commission now requests comment on its analyses and conclusions regarding the estimation and use of the input price differential, as presented in Appendix F of the Price Cap Review Order.

Because the long-term differential between LEC input prices and input prices for the economy as a whole is zero, the X-factor for the long-term price cap plan should not include an input price differential. Additionally, the input price differential presented in Appendix F of the Price Cap Review Order is not economically meaningful. That differential was developed using inappropriate statistical techniques, and does not fully consider the evidence placed on the record. A meaningful input price differential would recognize that short-term changes in input prices should not be utilized in a predictive fashion to establish a fixed input price adjustment. As the studies by both Christensen and NERA show, the best estimate of the expected long-term input price differential is zero.

The analysis presented in Appendix F does not fully consider the evidence placed on the record, and is based on a faulty statistical analysis. The NERA analysis attached to these comments as Attachment C critiques the Bush/Uretsky model used in Appendix F and reestimates each of their four ordinary least squares models incorporating post-1990 data. Post-1990 data is important if, as advocated by Bush/Uretsky, more recent data is believed to be a better indicator of the future input price differential. Based on NERA's analysis utilizing post-1990 data, an input price differential based on the Bush/Uretsky post-divestiture analysis would be misleading. NERA also notes that the Bush/Uretsky approach to an input price differential may be inherently flawed, for example because of the endogeneity of both the U.S. input price series and the Moody's bond yield series. See Attachment C at 6-7.

Additionally, the Appendix F study ignores a USTA ex parte filed February 1, 1995, in which Dr. Christensen demonstrates that there is no statistical validity to the claim that there has been a structural change in the relationship between telephone industry and U.S. economy input prices. The February 1, 1995, ex parte demonstrated that in the long run, as economic theory would predict, LEC industry input prices average 4.7% while US economy input prices average 4.8% over the 1948 to 1992 period. As explained in the attached Christensen paper, the fact that this ex parte relied on an input price data series which differs slightly from another data series utilized by NERA is not a basis for ignoring the study. See Appendix F study, at 13

(“Christensen’s time-series is completely different from NERA’s . . . [b]ecause of these discrepancies, we cannot accept Christensen’s conclusion.”); but see USTA ex parte filing, March 21, 1995 (USTA explains the sources of the U.S. input price numbers and why they may differ between the Christensen and NERA data sets). The Christensen attachment explains its analysis of LEC input prices relative to inflation, and relative to other studies.

The attached Christensen analysis supports the conclusion of the February 1 ex parte that there is no statistical basis for using an observed short-run input price growth differential as a projection of expected future trends. The movement of input prices represents merely random “noise”: short-term changes are equally likely to be followed by short-term differences in the opposite direction, such as with a rise and subsequent fall in interest rates, as they are to be repeated in the same direction. Thus, the best estimate of the expected input price growth differential is given by the long-term differential of zero. See Attachment A, at 40-53. Telephone companies have no inherently greater buying power when purchasing vehicles, labor, buildings, cable & wire, etc., than do other companies of similar size and scope.

Accordingly, the long-term price cap plan should not include an adjustment to reflect changes in LECs’ input prices based on a projection that the average of recent prior short-term changes in input prices represents a valid prediction of future changes. In such circumstances, an adjustment would not be economically meaningful. Rather, the long-term price cap plan should recognize that the most likely differential between LEC input prices and input prices for the economy as a whole is zero.

### **3. Calculating the Index on a Less than Total Company Basis Will Not Yield Meaningful Results**

The Commission has found that interstate and intrastate services are largely provided over common facilities, and the record contains no evidence that there is an economically meaningful way to measure productivity other than on a total company basis. For example, a

TFP based on costs separated through the Part 36 jurisdictional separations rules would not be economically meaningful.<sup>15</sup> Accordingly, the Commission concluded that TFP should be calculated on a total company basis. FNPRM, para. 62-63.

The Commission's tentative conclusion correctly recognizes the inseparability of inputs to the production function. TFP on a total company basis is the best economic approach to measuring LEC productivity and is therefore consistent with the Commission's stated criteria that the productivity offset should be "economically meaningful." See FNPRM, para. 16. The Commission has previously noted that the fact that intrastate and interstate services share common facilities (and thus common inputs) demonstrates that any difference in outputs does not demonstrate two meaningfully different measures of productivity. See First Report and Order, para. 159, n. 309. Separation of these common inputs, using existing accounting rules, does not fully reflect economic costs. Comparison of any differences in outputs to any jurisdictionally separated inputs will not yield meaningful differences in productivity. Thus, the Commission correctly decided to measure productivity on a total company basis.

The Commission asks whether there is a valid distinction between intrastate and interstate productivity for the purposes of calculating a TFP index and whether a satisfactory method of accounting for these differences exists. As the Commission's reference to the Section 2(b) of the Act demonstrates, jurisdiction is a political distinction only. Arbitrary regulatory boundary lines have no economic meaning or basis with regard to the input or output components of the production function.

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<sup>15</sup> The forced jurisdictional assignments of both revenue and cost data embodied in the interstate accounting results invalidate all methods that rely on accounting results, including the Historical Revenue Method and the Historical Price Method. While arbitrary allocations abound, obvious examples are the jurisdictional allocation of non traffic-sensitive costs and revenues, subsidy programs like USF and DEM weighting, and percent interstate usage (PIU) factors.

The inputs (costs) of production of capital, labor, and supplies are not tied to intrastate or interstate. Telecommunications firms do not deploy “interstate” switches, buy “interstate” cable trucks, or employ “interstate” engineers. These costs of production are common to both interstate and intrastate services provided by LECs. While telephone companies are required to allocate portions of these costs between the jurisdictions for regulatory purposes, those allocations are similarly arbitrary and political in nature. See Attachment C, at 17. The Commission has established that the X-factor should be economically meaningful as a threshold criteria for the long-term price cap plan, and any method for calculating the X-factor which relies on separations procedures would fail this criteria.

Any attempt to reach conclusions regarding the effects on overall productivity of single sources of output produced from joint and/or common inputs requires arbitrary assumptions about inputs. Because joint and common costs are present, the input growth cannot be meaningfully separated, assigned or allocated to individual outputs. Assertions regarding the contribution of one source of output growth to productivity growth are erroneous. Likewise, outputs are not tied to jurisdiction in an economically meaningful way. Use of a telecommunications network for interstate or intrastate services is functionally the same. An interstate unit of output is exactly the same as an intrastate unit of output -- a minute of use is a minute of use. The fact that a service is classified as interstate based on a regulatory threshold of interstate use does not demonstrate that including such output quantity in a less than total company TFP measurement will yield economically meaningful results.

The Commission need not be concerned that a total company method of setting price caps for interstate rates somehow impermissibly exceeds the Commission’s jurisdiction, which is limited by Section 2(b) of the Communications Act to “charges, classifications, services, facilities” for or in connection with interstate telecommunications services. See 47 U.S.C. § 221(b). This argument was also raised and rejected in the process leading up to the Price Cap Review Order. Basing the productivity offset for interstate price caps on an economic measurement of total company LEC productivity does not constitute exercise of the

Commission's authority with respect to intrastate communications service. In fact, it has long been understood that the Commission may utilize economic tools such as proxies, developed by whatever means, to develop the findings which support regulation of interstate rates. The Commission can and should calculate LEC productivity on the basis of total company performance. This is not at all inconsistent with the Commission's jurisdiction under the Communications Act, 47 U.S.C. § 221(b).

Indeed, the Commission's use of an economically meaningful measurement of LEC productivity should not be contingent on actions of the states. The Commission notes that it is concerned that reliance on total company TFP data to set price caps for interstate rates would be inappropriate if state commissions continue to regulate rates in their jurisdictions on the basis of solely intrastate data, and asks whether reliance on a total company TFP method should be contingent upon states' adoption of the same or similar methods for setting rates within their jurisdiction. FNPRM, para. 67. But state regulation of rates should not be a determining factor for the federal price cap plan; the Commission should select a long-term plan on the basis of sound economic principles.

Because the regulatory environment and the pace at which competition is being introduced in each state varies, each state's reliance on price regulation and LEC productivity measures will vary. Several states have already adopted or are in the process of adopting alternative regulation plans and they have taken and will continue to take different approaches in adopting these alternative regulation plans. These state plans may or may not incorporate the same or similar measures of LEC productivity as does the Commission, and some states may not utilize a productivity factor at all. If the Commission concludes that total company TFP is conceptually the most economically meaningful approach, it must adopt that approach.

Finally, the Commission requests comment on whether any of its monitoring or reporting requirements should be modified to reflect solely total company data, and whether sharing requirements should be modified to reflect total company performance, under a total

company TFP approach. FNPRM, para. 68. The Commission should eliminate any aspects of rate-of-return regulation from the price cap plan altogether and eliminate sharing. This would make Form 492A unnecessary. Where there are joint and common costs, non-regulated data is included in the TFP calculation, and where there are no joint and common costs, non-regulated data should not be included in the measurement of LEC productivity for use in the price cap plan.<sup>16</sup>

#### **4. Universal Service and Other Subsidy Programs Do Not Distort Productivity Measurement**

The Commission notes that both it and state regulatory commissions require LECs to participate in various universal service programs that are designed to increase access to the public switched network. The Commission, for example, oversees the operation of the Universal Service Fund (USF), which adjusts the jurisdictional separations rules for LECs whose unseparated loop costs significantly exceed the nationwide average. See 47 C.F.R. § 36.601. In addition, the FCC's rules permit LECs to offer other services that are designed to advance the same overall goals, e.g. waiving the EUCL charge for certain low-income residential subscribers. See 47 C.F.R. § 36.701 et seq. The Commission requests comment on the impact of such programs on LEC productivity. FNPRM, para. 71.

Since the outputs created by the increased access to the public switched network facilitated by these plans are included within the TFP output growth, the benefits of subsidy programs are captured by a TFP-based productivity factor. Likewise, the costs of compliance with regulatory mandates and obligations are included in the input side of the TFP method.

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<sup>16</sup> This principle is reflected in the Commission's Part 32 rules, which state that the non-regulated revenue account shall be used for non-regulated operating revenues when a non-regulated activity involves the common or joint use of assets or resources in the provision of regulated and non-regulated products or services and when such activity is accounted for, as required in 47 C.F.R. §32.23(c), within the accounts prescribed in the Part 32 system for telephone company operations. 47 C.F.R. § 32.4999(l).

Also, when TFP is appropriately calculated on a total company basis, the forced jurisdictional assignments embodied by subsidy programs like USF and DEM weighting, see 47 C.F.R. §§ 36.601; 36.125, will not distort productivity measurement.

Similarly, where a telephone company provides lifeline connection assistance to eligible subscribers, the revenues which would have been received from subscribers are instead recovered through an interstate expense adjustment, calculated by the National Exchange Carrier Association (NECA) through a formula established in the Commission's rules. See, e.g., 47 C.F.R. §§ 36.711, 36.731, 36.741. While the adjustment is subtracted from total intrastate expenses and added to total interstate expenses, 47 C.F.R. § 36.741(c), this jurisdictional shift has absolutely no effect on TFP, where TFP is properly calculated on a total company basis. Of course, use of a TFP-based productivity offset calculated on a moving average basis does not mean that the Commission should not examine whether extraordinary future changes may impact TFP results.

**5. USTA Properly Submitted Updated Figures and Corrected Data Errors Produced by Manual Data Entry Processes For The Data Submitted in the Original Christensen Study**

The Commission notes that USTA submitted corrections to the levels of current dollar investment (plant additions) used in the original Christensen study, and asks that the sources of these "errors" be explained in more detail, e.g., how closely the data were audited internally by the LECs in the normal course of business. FNPRM, para. 44. Specifically, the Commission is seeking further explanation of the sources of the data corrections provided in the re-calculation of the TFP as submitted by USTA on January 20, 1995. The original Christensen study required eight years of data to calculate TFP results; this data was collected from nine separate price cap LECs. In an effort to ensure the accuracy of the TFP offset, the industry started collecting data as soon as the companies' next year's data was available. It was at the point in time when the LECs were preparing to add an additional data point, 1993, that the need to correct the original study data was discovered. Most of these corrections were in

the input side and were associated with the 1984 current cost of gross capital stock figures, capital investment, TPIs and the categorization of some of the expense dollars between materials and labor. Some corrections to data on the output side were also made. The output side errors were in the billed revenue series for long-distance and intrastate access.

Although late in the proceeding, the industry felt that it was important to correct the data and inform the Commission. The industry also felt that an additional data point should be added to create the most accurate and timely X-factor. On January 27, 1995, an ex parte was filed providing the detail of each of the corrections. In addition, on February 3, 1995, USTA representatives met with the Common Carrier Bureau staff to provide the exact nature of each correction and to document the effect on the TFP study. On February 24, 1995, USTA filed a roadmap which explained how TFP would be calculated each year using the moving average productivity offset.<sup>17</sup> The LECs submitted these corrections and revised data to ensure the accuracy of the X-factor. As noted above, USTA is submitting along with its comments a TFP Review Plan (TFPRP), which should assist the Commission and other parties in analyzing the data submitted.

Many of the data corrections arose because data from the 1984-88 period was originally recorded manually. As is inevitable with any manual data entry process, certain errors resulted, either from keystroke errors or other human errors. Not surprisingly, many of the corrections needed in the Price Cap Review proceeding were to the 1984-88 data. After 1989, the data entry process was mechanized. Accordingly, instances of such data errors are unlikely to arise in a long-term plan which utilizes a moving average TFP-based X-factor based on public data, much of which is in machine readable form.

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<sup>17</sup>USTA ex parte letter, January 27, 1995; USTA ex parte letter, February 3, 1995; USTA ex parte letter, February 24, 1995.

**C. The Commission Should Reaffirm its Tentative Conclusion to Avoid Costly Performance Reviews and Calculate the X-Factor as a Moving Average**

In the Price Cap Review Order, the Commission tentatively concluded that there were a number of benefits to adopting a moving average X-factor, and that a moving average X-factor would be preferable to a fixed X-factor developed through periodic reviews. FNPRM, para. 96. Additionally, the Commission requests comments on whether it would be desirable to schedule a LEC price cap performance review, regardless of whether the Commission adopts a moving average X-factor. FNPRM, para. 142. This performance review could, for example, examine whether the long-term price cap plan should be modified to encourage LECs to make appropriate responses to competition which is developing in their service areas.

As discussed below, the Commission should affirm its tentative conclusion to calculate the X-factor as a moving average, for the reasons recognized in the FNPRM. The moving average X-factor eliminates the need for periodic reviews to adjust the X-factor.<sup>18</sup>

**Issue 3a: Should the X-factor be based on a moving average or should the Commission establish fixed factors to be reviewed periodically?**

The FNPRM notes that calculating the X-factor as a moving average would assist the Commission in eliminating sharing by flowing through unit cost savings to customers on a lagged basis. FNPRM, para. 96; see Price Cap Review Order, para. 153. This conclusion is correct. Use of a moving average X-factor will adjust for any changes in productivity, after a lag period, thus flowing through to consumers the appropriate portion of any increased productivity (or provide LECs with a backstop mechanism if necessary). As the Commission found in the Price Cap Review Order, use of sharing (or low-end adjustment) mechanisms to serve this same purpose would be superfluous. Price Cap Review Order, para. 192. Also, as

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<sup>18</sup> Of course, the Commission should be open to reexamining those aspects of the long-term price cap plan that are not addressed by the moving average productivity offset, particularly in light of developing competition. FNPRM, para. 142.

discussed in Section II.B. infra, with a rolling average TFP factor, the productivity gains of all price-cap LECs will be captured over time, and thus there is no incentive for intertemporal cost shifting to avoid incurring sharing obligations in any particular period. The FNPRM also correctly notes that an X-factor calculated as a moving average would also be superior to a fixed factor in that a moving average X-factor could function to both reflect the dynamics of LEC performance and flow-through recent productivity gains. FNPRM, para. 97.

The Commission should also affirm that calculating the X-factor as a moving average is superior to utilizing periodic reviews to adjust the X-factor. FNPRM, para. 96. The elimination of periodic performance reviews would save substantial public and private resources, and eliminate uncertainty for both LECs and their customers. See Price Cap Review Order, para. 153. In particular, by eliminating the need for periodic review of the level of the X-factor, Commission and industry resources can be re-directed towards review of the structure of price cap regulation, access reform, and other proceedings needed to implement competition.

The FNPRM raises again arguments raised in the Price Cap Review proceeding by Ad Hoc that a moving average X-factor might create incentives for LECs to intentionally hold down productivity gains in order to achieve a lower X-factor. FNPRM, para. 98; see Price Cap Review Order, para. 152. To the extent that the incentives inherent in price cap regulation are tied to increased productivity, these concerns are contrary to common sense. Individual LECs are not likely to forego both short-term financial incentives as well as long-term structural efficiencies in order to achieve a lower X-factor (and hence a higher PCI), particularly when the history of price caps has been that LEC prices were substantially below their PCI (until the higher X-factors and one-time reductions were introduced in the interim plan). Moreover, it is even more improbable that the LEC industry would even attempt, much less succeed, at a concerted effort to lower productivity and thus “game the system” to obtain a lower productivity factor. Competitive developments in all types of LEC markets are too significant to permit this type of collusive behavior to occur.

The FNPRM requests comment on the administrative burdens of calculating a moving average X-factor, e.g. whether it would be necessary to establish a procedure for correcting errors or updating the data from prior years. The Commission also seeks comment on how often the moving average X-factor should be recalculated. FNPRM, para. 99. In its initial proposal for a TFP-based moving average, USTA proposed that the X-factor be recalculated annually. USTA again agrees that the moving average should be calculated on an annual basis.

The Commission also asks whether each year should be weighted equally, or whether more recent years should be given more (or less) weight because of their level of reliability. The Commission also notes that the USTA proposal did not specify whether tariff years or calendar years should be utilized. FNPRM, para. 101. Where the Christensen TFP methodology is calculated as a moving average, there is little economically meaningful change which would result from weighting any of the years, provided at least five years of data are utilized. Additionally, the moving average methodology utilizing Christensen data supported by USTA would calculate the moving average using calendar years, because this would facilitate calculation of the TFP figure using publicly available and verifiable data. The data on which the simplified Christensen methodology relies is released on a calendar year basis.

**Issue 3b: How many years of data should be included in a moving average?**

**Issue 3c: Should there be any lag in the moving average; if so, how long?**

These issues are both addressed below. The FNPRM notes that, in the Price Cap Review proceeding, USTA proposed including five years of data in the moving average, noting that this would be sufficient to smooth out short term fluctuations in data. FNPRM, para. 100; see Price Cap Review Order, para. 118. USTA continues to believe that five years of data should be included in a moving average. See USTA ex parte presentation, January 18, 1995. USTA also continues to believe that there should be a two-year lag in the moving average calculation, to ensure that the Bureau of Labor Statistics (BLS) data is available. As noted in the FNPRM, BLS data for a particular year is often not available until two years hence.

FNPRM, para. 102. This lag in the moving average would permit the TFP calculation to utilize publicly available and verifiable data.

## **II. The Commission Should Establish a Baseline Productivity Factor for the LEC Industry, and Eliminate Sharing**

### **A. The Commission Should Establish a Baseline Productivity Factor Based on the Simplified TFP Methodology**

**Issue 4: Should there be multiple X-factors in the long-term plan and, if so, how many should there be and how should they be determined?**

In order to eliminate sharing and foster the development of a pure price cap plan which is administratively simple and economically meaningful, the Commission should adopt a long-term price cap plan which utilizes a baseline productivity factor, calculated as a LEC industry average of TFP. This productivity factor should have no sharing obligations associated with it. A baseline productivity factor based on a LEC industry average TFP emulates competition, and would be administratively simple and economically meaningful. There is no need to set the baseline productivity factor at a level above the industry productivity average. In areas where there are high price-to-marginal cost ratios, LECs are facing increasing competition. This competition will yield lower output growth for these areas and services. Accordingly, a productivity factor higher than the industry average would be superfluous and unfairly penalize LECs by unnecessarily setting a higher benchmark than can be achieved.

While extensive differentiation between LECs -- to the point of establishing individualized X-factors -- would undermine the economic incentives of the price cap plan, there may be LECs which face circumstances where use of the industry average X-factor would be inappropriate. However the Commission addresses this issue, the long-term price cap plan should permit all LECs to eliminate any sharing obligations.

**B. Sharing Should Be Eliminated From the Price Cap Plan**

The Commission seeks comment on several issues related to sharing and possible alternatives to sharing. FNPRM, paras. 112-119. While recognizing the drawbacks of sharing, the Commission notes that sharing may be necessary as a means of incenting LECs to select an appropriate X-factor in a multiple X-factor price cap plan. Id., para. 113.

USTA agrees with the Commission that sharing has no place in a properly crafted LEC price cap plan. USTA's position is based on its view, shared by the Commission, that substantial benefits would result if sharing were eliminated. First, a sharing mechanism severely dampens LEC incentives to operate more efficiently. This is so because sharing serves to "recapture" the efficiency gains made by the carrier and deprive the LEC of the benefits of those gains. By eliminating sharing, the Commission will provide the maximum incentives to LECs to operate in the most efficient manner possible.

The Commission has recognized that the impact of sharing on LEC efficiency incentives is significant. In the Price Cap Review Order, the Commission stated that even when using conservative estimates, the elimination of sharing would generate at a minimum a 17 percent increase in efficiency incentives for all LECs, and a 41 percent increase for LECs that were then subject to 50-50 sharing, a category which at the time included most price cap LECs. Price Cap Review Order, para. 188.

Second, the Commission has recognized that a "pure price cap plan, *without earnings sharing*, may encourage infrastructure development and the deployment of advanced equipment and technology." Price Cap Review Order, para. 189 (emphasis added). This conclusion is supported by economic logic. Because sharing caps overall return levels, and not just prices, the expected returns from all new service offerings and investment projects are lowered under sharing, and it becomes more difficult for the LEC to justify the necessary expenditures for any new service or investment project, including those that will enhance the telecommunications

infrastructure available to consumers. See Larry A. Darby, "Price Cap Reform, Financial Incentives and Exchange Carrier Investment," appended as Attachment 3 to USTA's Comments filed in this proceeding on May 9, 1994. By eliminating sharing, the Commission will ensure that infrastructure investment decisions will be based on economically meaningful criteria.

Third, the elimination of sharing will help to minimize regulatory burdens for both the Commission and for LECs. For example, because it is a rate-of-return mechanism, sharing blunts the ability of a pure price cap plan to eliminate incentives for cross-subsidization between regulated and non-regulated services. A pure price cap plan will reduce concerns regarding the cost allocation process as carriers move increasingly into non-regulated service markets in response to competition. See Robert G. Harris, "Economic Benefits of LEC Price Cap Reform," appended as Attachment 2 to USTA's Comments, May 9, 1994, pp. 20-21. The need for regulatory oversight in a price cap plan with a sharing mechanism is closely related to the fact that sharing obligations are based on regulated earnings, and these earnings are affected by accounting conventions, rate-of-return methodologies, jurisdictional separations, affiliate transaction rules, and depreciation prescriptions. The policy-driven nature of these rules and methodologies (a policy developed under a strict cost-based system of regulation) means that these rules often yield results which are not economically meaningful, and are not comparable to results achieved by firms operating in competitive markets. Such results are inimical to a price cap system that is intended to mimic competition and function as a transition to a de-regulated, market-driven system of LEC price control.

Finally, the elimination of sharing will help to facilitate the removal of services from price cap regulation as markets become more competitive. With sharing, the Commission will either have to regulate all services under price caps, or impose a burdensome and distortion-inducing cost allocation scheme. By removing sharing now, the Commission can transition to a more competitive access market in an orderly fashion consistent with the rules and policies it may adopt in the Second Further Notice in this proceeding.

The benefits of eliminating sharing are clear and obvious. Eliminating sharing will increase efficiency incentives, promote infrastructure investment, conserve Commission and LEC resources, and facilitate the transition to a competitive industry structure. The Commission has recognized that a primary reason for incorporating the sharing mechanism in the original LEC price cap plan -- to provide a "backstop" for errors in the Commission's estimates of LEC productivity -- is no longer a valid concern after five years of actual experience under price caps. See Price Cap Review Order, para. 191. This is particularly true where the Commission adopts an X-factor based on a moving average, such as the moving average TFP-based X-factor advocated by USTA in this proceeding. See FNPRM, para. 114; see also supra, Section I.C. (discussion of how a moving average can flow through productivity gains). The Commission has noted that "a price cap plan that provides for annual updates to the X-factor on the basis of a moving average would ensure that the X-factor reflects the actual performance of the LECs on a more timely basis." Price Cap Review Order, para. 191. Under these circumstances, a backstop "would be superfluous." Price Cap Review Order, para. 192.

Momentous changes are now taking place in the telecommunications industry and are having immediate and substantial impacts on all telecommunications providers, particularly the larger LECs. Sharing, a form of rate-of-return regulation, has no place in the new telecommunications world order for LECs who are subject to price cap regulation.<sup>19</sup> Accordingly, the Commission should fulfill its long-term goal of eliminating sharing. FNPRM, para. 114; see Price Cap Review Order, para.193.

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<sup>19</sup>In this Comment, USTA is not proposing changes to the Commission's regulation of LECs that remain subject to rate-of-return regulation, which is the appropriate form of regulation for many smaller telephone companies. USTA also does not suggest in this Comment any changes in the optional incentive regulation plan adopted by the Commission for small and mid-sized local exchange carriers. See Regulatory Reform for Local Exchange Carriers Subject to Rate of Return Regulation, 8 FCC Rcd 4545 (1993).

If the long-term plan utilizes more than one productivity factor, the Commission should rely on safeguards other than sharing to ensure that LECs elect the appropriate factor. Additionally, the concerns raised in the FNPRM regarding “intertemporal cost shifting,” to avoid sharing obligations are eliminated where there are no sharing options in the price cap plan. Similar concerns regarding manipulation of depreciation rates are met by eliminating sharing. See FNPRM, para. 120. Absent sharing, accounting costs become superfluous and there is no incentive to “game the system.” Moreover, there could be no intertemporal cost shifting where the long-term price cap plan utilizes a rolling average TFP factor as proposed by USTA. With a rolling average TFP factor, productivity gains of all price-cap LECs will be captured over time and the average will include all periods of productivity behavior.

**C. The Commission Should Not Establish Criteria and Procedures By Which It Would Assign A Productivity Factor To Each LEC.**

**Issue 5d: Instead of allowing LECs to choose among several X-factors, should we establish criteria and procedures by which we can assign an appropriate X-factor to each LEC?**

The Commission is correct to conclude that the extreme of developing an individually tailored X-factor for each price cap LEC would not encourage a LEC to improve its productivity. FNPRM, para. 109. The FNPRM therefore implicitly acknowledges that tailoring an individual productivity offset for each LEC is tantamount to rate of return regulation, recapturing any and all efficiencies gained since 1991 and completely gutting future efficiency incentives.<sup>20</sup> Accordingly, the Commission should not assign each company an individually tailored X-factor.

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<sup>20</sup> The Commission is correct to recognize the close analogy between assignment of productivity factors and rate-of-return represcriptions. The Commission suggests a scenario in which a LEC seeking to show that a lower X-factor would be appropriate would do so based on a showing similar to that used by rate-of-return carriers to avoid the prescribed unitary rate of return, e.g. a showing that the higher X-factor would produce confiscatory rates. FNPRM, para. 125. Among other things, this type of reasoning would incorrectly continue the practice of examining accounting earnings to determine whether a particular level of productivity offset is appropriate. This type of reasoning has no place in a meaningful pure price cap plan.