

FCC MAIL SECTION

DOCKET FILE COPY ORIGINAL  
2 16 PM '95

DISPATCHED BY

FCC 95-406

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

In the Matter of )  
 )  
 )  
Price Cap Performance Review ) CC Docket No. 94-1  
for Local Exchange Carriers )

**FOURTH FURTHER NOTICE OF PROPOSED RULEMAKING**

Adopted: September 27, 1995; Released: September 27, 1995

**Comment Date: November 27, 1995**

**Reply Date: December 27, 1995**

By the Commission:

**TABLE OF CONTENTS**

<u>Topic</u>	<u>Paragraph No.</u>
I. Introduction .....	1
II. Background .....	2
A. Original Price Cap Plan .....	2
B. Results of Performance Review .....	6
III. Discussion .....	13
A. Productivity .....	13
1. Background .....	13
2. General Criteria .....	16
3. Total Factor Productivity Method .....	22
a. Background .....	22
b. Output Index Issues .....	26
c. Input Index Issues .....	29
(1) Capital Services .....	29

(2)	Labor and Materials .....	50
d.	Input Price Adjustment .....	54
e.	Calculation of a TFP Index and an Input Price Index on a Less-Than-Total Company Basis .....	62
f.	Effect of Universal Service and Other Subsidy Programs on LEC Industry TFP .....	71
g.	Inclusion of Other Firms in Study .....	73
h.	Alternative Methods for Calculating TFP .....	75
4.	Other X-Factor Calculation Methods .....	77
a.	Historical Revenue Method .....	77
b.	Historical Price Method .....	84
c.	Other Options .....	91
d.	Consumer Productivity Dividend .....	94
5.	Updating of X-Factor .....	96
6.	Number of X-Factors .....	108
B.	Sharing Requirements and Alternatives .....	112
1.	Background .....	112
2.	Issues .....	117
C.	Common Line Formula .....	130
1.	Background .....	130
2.	Issues .....	133
D.	Exogenous Costs .....	138
1.	Background .....	138
2.	Issues .....	139
E.	Rescheduling of Performance Review .....	142
F.	Paperwork Reduction Act .....	144
IV.	Procedural Matters .....	146
A.	Regulatory Flexibility Act .....	149
B.	<i>Ex Parte</i> Rules - Non-Restricted Proceeding .....	150
V.	Ordering Clauses .....	151

## I. INTRODUCTION

1. In 1990, we replaced rate-of-return regulation for the Bell Operating Companies (BOCs) and GTE Operating Companies with price cap regulation, effective January 1, 1991,<sup>1</sup> and made price cap regulation optional for other local exchange carriers (LECs).<sup>2</sup> In the *LEC Price Cap Order*, we scheduled a performance review to evaluate the price cap system as implemented and LEC performance under that system.<sup>3</sup> We completed the first phase of this performance review in March 1995.<sup>4</sup> In the *First Report and Order* in this docket, the Commission revised several aspects of the price cap plan on an interim basis. We stated that we expected to make additional, long-term changes to the price cap plan after further proceedings. In this Fourth Further Notice of Proposed Rulemaking, we solicit comment on a number of issues regarding methods for establishing the price caps, such as productivity measurements, sharing, the common line formula, and exogenous costs.

---

<sup>1</sup> Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313, 5 FCC Rcd 6786 (1990) (*LEC Price Cap Order*); *recon.*, 6 FCC Rcd 2637 (1991) (*LEC Price Cap Reconsideration Order*), *aff'd sub nom. National Rural Telephone Ass'n v. FCC*, 988 F.2d 174 (D.C. Cir. 1993).

<sup>2</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6818 (para. 260).

<sup>3</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6834.

<sup>4</sup> Price Cap Performance Review for Local Exchange Carriers, CC Docket No. 94-1, FCC 95-132 (released Apr. 7, 1995) (*First Report and Order*). In the *Further Notice* in this docket, we solicited comment on whether to establish a separate price cap basket for video dialtone services, and whether to establish separate price cap rules governing that basket. Price Cap Performance Review for Local Exchange Carriers; Treatment of Video Dialtone Services Under Price Cap Regulation, CC Docket No. 94-1, 10 FCC 3141 (1995) (*Further Notice*). In the *Second Further Notice*, we consider specific changes to interstate access price regulation to respond to changes in the market for those services. Price Cap Performance Review for Local Exchange Carriers, CC Docket No. 94-1, FCC 95-393 (released Sept. 20, 1995) (*Second Further Notice*). In the *Third Further Notice*, we adopt a separate basket for video dialtone services as we proposed in the *Further Notice*, and seek further comment on the sharing requirements applicable to that basket. Price Cap Performance Review for Local Exchange Carriers; Treatment of Video Dialtone Services Under Price Cap Regulation, Second Report and Order and Third Further Notice of Proposed Rulemaking, CC Docket No. 94-1, FCC 95-394 (released Sept. 21, 1995) (*Third Further Notice*).

## II. BACKGROUND

### A. Original Price Cap Plan

2. The plan established in the *LEC Price Cap Order* established a price cap index (PCI) for each of several different categories of LEC access services. The PCI is the maximum price level that LECs may charge for services covered by the index.<sup>5</sup> The PCI is adjusted each year based on a formula which offsets inflation by a "productivity" offset or "X-Factor." The X-Factor reflects the fact that changes in telephone companies' costs per unit of output (unit costs) have historically been below that of the economy as a whole due to greater productivity gains and lower input price changes enjoyed by the telecommunications sector. The original minimum X-Factor of 3.3 percent reflected both the amount by which changes in LECs' unit costs historically had been below inflation plus a consumer productivity dividend (CPD) of 0.5 percent. We set the X-Factor for access service baskets at 3.3 percent in the *LEC Price Cap Order*, based on the average of two studies of carriers' historical unit cost changes conducted by the Commission. We also established an optional higher X-Factor of 4.3 percent. The PCI could be adjusted up or down to account for cost changes that were caused by changes in administrative, legislative, or judicial action beyond the control of the carrier, and not otherwise reflected in the price cap formula.<sup>6</sup>

3. LECs calculate a separate PCI for each of four price cap baskets. Each basket is designed to include similar services that have been grouped together to limit a LEC's ability to cross-subsidize different services.<sup>7</sup> The four baskets are: (1) common line, (2) traffic sensitive, (3) trunking, and (4) interexchange. In addition, the traffic sensitive and trunking baskets are subdivided into service categories, and we have established service band indices (SBIs) and SBI upper and lower limits (bands) for each service category, which further limit the LEC's ability to price anti-competitively the services in those baskets.

---

<sup>5</sup> The *LEC Price Cap Order* stated that it would allow above-cap tariff filings, but only in the unlikely event that the price cap rules have the effect of denying the LEC the opportunity to attract capital and continue to operate, despite the low-end adjustment mechanism and the opportunity afforded LECs to increase earnings through greater efficiency. *LEC Price Cap Order*, 5 FCC Rcd at 6823-24 (para. 304).

<sup>6</sup> The categories of cost changes that may be permitted exogenous treatment are listed in Section 61.45(d) of the Commission's Rules, 47 C.F.R. § 61.45(d).

<sup>7</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6811. See also Policy and Rules Concerning Local Exchange Carrier Validation and Billing Information for Joint Use Calling Cards, CC Docket No. 91-115, 8 FCC Rcd 4478, 4483 (1993) (*BNA Order*); *modified on recon.* 8 FCC Rcd 6393 (1993); *further modified on recon.* 8 FCC Rcd 8798 (1993); *petition for recon. pending.*

4. Rate changes that conform to the limits set by a LEC's PCI and SBI bands are presumed lawful and permitted to take effect under streamlined review, on 14 days' notice. If a LEC files rates outside the PCI or SBI limits, the price cap rules require the filing of more extensive documentation, eliminate the presumption of lawfulness, and apply longer notice periods. Above-cap and above-band filings carry a heavy burden of justification and a strong likelihood of suspension and investigation.

5. The original LEC price cap plan also included sharing and low-end adjustment mechanisms, which are automatic adjustments to the PCI that are triggered by an individual LEC's rate-of-return performance. The sharing and low-end adjustment mechanisms were intended to compensate for the possibility of an error in the establishment of the X-Factor and for variations in economic circumstance and performance among the different LECs.<sup>8</sup> Under the original plan, LECs electing the 3.3 percent X-Factor returned, or shared, half of their earnings between 12.25 percent and 16.25 percent to their ratepayers and returned all of their earnings over 16.25 percent to their ratepayers by reducing rates in the subsequent period. To encourage LECs with greater productivity growth to elect the 4.3 percent productivity factor, we established more lenient sharing requirements for LECs electing 4.3 percent: 50 percent sharing for earnings between 13.25 percent and 17.25 percent rate of return, and 100 percent sharing for earnings above 17.25 percent. The original LEC price cap plan also provided for an upward adjustment, or the low-end adjustment, to the PCI if a LEC's earnings fell below 10.25 percent.<sup>9</sup>

## **B. Results of Performance Review**

6. In the *First Report and Order*, we adopted several interim revisions to the LEC price cap plan pending adoption of long-term revisions to the plan. First, we increased the productivity offset in the price cap formula. In the original plan, we based the 3.3 percent X-Factor on the average of two historical LEC productivity studies: the Spavins-Lande Study, which examined long-term pricing trends, and the Frentrup-Uretsky Study, which focused on revenue and demand trends since 1984. The access price data in the Frentrup-Uretsky Study from the 1984-85 tariff year (the "1984 data point"), however, did not fit the trend described by the 1985-90 data.<sup>10</sup> In the *First Report and Order*, we concluded that the Commission erred in including the 1984 data point in the Frentrup-Uretsky Study. Accordingly, we recalculated the X-Factor excluding the 1984 data point, and established a minimum X-Factor of 4.0

---

<sup>8</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6801.

<sup>9</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6801-02.

<sup>10</sup> *LEC Price Cap Order*, Appendix C, 5 FCC Rcd at 6892-94.

percent.<sup>11</sup> We decided that, on a going-forward basis, the corrected minimum X-Factor of 4.0 percent, rather than a 3.3 percent X-Factor, should be used for the interim plan. We also increased the number of X-Factor options from two to three options. The optional X-Factors were set at 4.7 percent and 5.3 percent.<sup>12</sup>

7. In addition, we revised the rules governing sharing obligations for the interim plan. First, we narrowed the 50-50 sharing zone for the 4.0 percent X-Factor option to a range from 12.25 to 13.25 percent rate of return. The 100 percent sharing zone for this option begins at 13.25 percent.<sup>13</sup> Second, the sharing obligation for the 4.7 percent X-Factor remains the same as it was for the 3.3 percent X-Factor under the original plan: 50-50 sharing for LECs with rates of return between 12.25 and 16.25 percent, and 100 percent sharing for LECs with rates of return above 16.25 percent.<sup>14</sup> Finally, we eliminated sharing obligations and the low-end adjustment mechanism for LECs electing the 5.3 percent X-Factor.<sup>15</sup>

8. The price cap LECs filed their 1995 annual access tariffs on May 9, 1995.<sup>16</sup> Three price cap carriers, NYNEX, SNET, and US West, elected the 4.0 percent X-Factor. Eight other carriers elected 5.3 percent.<sup>17</sup> GTE elected 4.0 percent for eight of its study areas, and 5.3 percent for its other 38 study areas.

9. In the *First Report and Order*, we reached a final conclusion that for the long-term plan we should replace the method of calculating the X-Factor with a new method. Based on

---

<sup>11</sup> *First Report and Order*, paras. 205-09. We also required LECs to recalculate their PCIs, to approximate what the PCIs would have been if we had excluded the 1984 data point from the Frentrup-Uretsky Study in the *LEC Price Cap Order*. *Id.* at paras. 245-56.

<sup>12</sup> *First Report and Order*, paras. 213-15.

<sup>13</sup> *First Report and Order*, para. 222.

<sup>14</sup> *First Report and Order*, para. 221.

<sup>15</sup> *First Report and Order*, para. 220.

<sup>16</sup> The annual access tariff filings for price cap LECs are usually filed to take effect on July 1, on at least 90 days' notice. Section 69.3(a) of the Commission's Rules, 47 C.F.R. § 69.3(a). The Common Carrier Bureau (Bureau) waived this rule to permit price cap LECs to file their 1995 annual access tariffs 30 days following the release of the *First Report and Order*, to take effect on August 1, 1995, so that those tariff filings could reflect any rule revisions adopted in the *First Report and Order*. 1995 Annual Access Filings, United States Telephone Association Application for Waiver, 10 FCC Rcd 4332 (Com. Car. Bur., 1995).

<sup>17</sup> The carriers electing the 5.3 percent X-Factor are Ameritech, Bell Atlantic, BellSouth, PacTel, Southwestern Bell, United, Rochester, and Lincoln.

the record in that proceeding, however, we were able to decide only on the broadest features of that new method. In particular, we concluded that the X-Factor should be based on an industry-wide measure of performance and include changes in unit costs that have occurred since the adoption of the price cap plan.<sup>18</sup> We tentatively decided that the X-Factor should be based on a moving average rather than fixed for a number of years.<sup>19</sup> We also tentatively decided to base the X-Factor on a total factor productivity (TFP) method, and to include more than one possible X-Factor in the plan.<sup>20</sup> TFP is the ratio of an index of total outputs to an index of total inputs.<sup>21</sup> This output index represents the quantities of goods or services produced, and the input index represents the quantities of goods or services consumed. In order to develop these indices, it is also necessary to develop output and input price indices. We discuss the development of all these indices in detail below. In addition, we tentatively concluded that the long-term price cap plan should have two or more X-Factors.<sup>22</sup> Furthermore, we reached a number of conclusions regarding sharing obligations. Specifically, we established a long-term goal of eliminating sharing.<sup>23</sup> We also decided that, if we adopt a long-term plan with multiple X-Factors, at least one of those X-Factors should have no sharing obligations associated with it.<sup>24</sup>

10. We also revised our exogenous cost rules by establishing an additional requirement for LECs seeking to treat cost changes resulting from modifications of our accounting rules as exogenous. In addition to showing that the cost change is beyond the control of the carrier and not otherwise reflected in the price cap formula, LECs must show that the accounting rule modifications results in an economic cost change, *i.e.*, affects the carrier's discounted cash flow.<sup>25</sup> In addition, we required LECs seeking exogenous treatment for any cost change to do so in a petition for rulemaking, declaratory ruling, or waiver.<sup>26</sup>

---

<sup>18</sup> *First Report and Order*, para. 145.

<sup>19</sup> *Id.*

<sup>20</sup> *Id.*

<sup>21</sup> *Id.* at para. 106.

<sup>22</sup> *First Report and Order*, para. 165.

<sup>23</sup> *First Report and Order*, para. 193.

<sup>24</sup> *First Report and Order*, para. 197.

<sup>25</sup> *First Report and Order*, paras. 293-96.

<sup>26</sup> *First Report and Order*, paras. 312-18.

11. We also adopted a number of minor revisions to the LEC price cap plan. We required cost reductions resulting from sales or swaps of exchanges to be treated exogenously as a condition placed on the grant of any waiver of the study area boundary rules, to reduce the potentially perverse incentive for price cap LECs to sell high-cost exchanges in order to reduce their unit costs without actually improving productivity or lowering input prices.<sup>27</sup> We changed the inflation measure in the price cap index formula from Gross National Product Price Index (GNP-PI) to Gross Domestic Product Price Index (GDP-PI).<sup>28</sup> We decided not to adopt other revisions at this time. Specifically, we determined that revising the common line formula in the interim plan might create excessive rate churn, without any countervailing public benefit sufficient to outweigh that concern.<sup>29</sup> We declined to treat changes in Competitive Access Providers' (CAP) access rates the same as changes in LEC access rates for purposes of the AT&T price cap plan because the record did not show that unequal regulation creates any actual bias in the access services market at this time.<sup>30</sup> We also declined to create any new service quality reporting requirements, noting that we are considering this issue in other proceedings.<sup>31</sup>

12. As discussed in detail below, we now seek comment on a number of specific issues regarding our long-term price cap plan. In particular, we seek comment on the following: (a) the X-Factor, including calculation of the X-Factor, and whether the X-Factor should be reviewed and modified periodically or set on a permanent basis; (b) the number of X-Factors

---

<sup>27</sup> *First Report and Order*, paras. 328-31. A study area is a geographical segment of a carrier's telephone operations. For jurisdictional separations purposes, the Commission adopted a rule freezing study area boundaries effective November 15, 1984. Part 36 of the Commission's Rules, 47 C.F.R. Part 36, Appendix-Glossary, definition of "Study Area;" see also MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, 49 Fed. Reg. 48325 (Dec. 12, 1984) (*1984 Joint Board Recommendation*), adopted by the Commission, 50 Fed. Reg. 939 (Jan. 8, 1985) (*1985 Order Adopting Recommendations*); Amendment of Part 36 of the Commission's Rules and Establishment of a Joint Board, CC Docket No. 80-286, Notice of Proposed Rulemaking, 5 FCC Rcd 5974 (1990) (*Study Area Notice*); *First Report and Order*, para. 329 n.615. The Commission took that action, in part, to ensure that LECs do not create high-cost exchanges within their existing service territories as separate study areas to maximize high-cost support. See *1985 Order Adopting Recommendations*, 50 Fed. Reg. 939, 940; *1984 Joint Board Recommendation*, 49 Fed. Reg. 48325, 48337. The study area freeze also prevents LECs from decomposing, and recombining, study areas to increase interstate revenue requirements and exchange carrier compensation.

<sup>28</sup> *First Report and Order*, paras. 347-51.

<sup>29</sup> *First Report and Order*, paras. 271-73.

<sup>30</sup> *First Report and Order*, paras. 343-46.

<sup>31</sup> *First Report and Order*, paras. 365-66.

to be included in the price cap plan, and the sharing requirements, if any, to be associated with each X-Factor; (c) the common line formula; and (d) the exogenous cost rules. Our decision in this phase of the LEC price cap performance review proceeding will be based on the comments received in response to this further notice. We will also consider relevant information that was submitted in the initial phase, either in the comments and reply comments or the numerous *ex parte* filings, provided that a party incorporates by reference such information in its pleadings in this phase of the proceeding. In reaching our decision, we may take into account information and ideas not contained in the comments, provided that such information or a writing containing the nature and source of such information is placed in the public file, and provided that our reliance on such information is noted in the Order.

### III. DISCUSSION

#### A. Productivity

##### 1. Background

13. In the formula used to establish the PCI, the productivity offset or "X-Factor" reflects the fact that changes in unit costs in the telecommunications industry historically have been below the level of inflation.<sup>32</sup> This lower growth in unit costs has resulted in lower-than-average telephone prices, relative to inflation.<sup>33</sup> To ensure that rates continued to decline, we set the level of the X-Factor to reflect this historical experience.<sup>34</sup> The price cap plan encourages LECs to increase their productivity and thereby reduce unit costs, because LECs can increase their profits if the changes in their unit costs are below the level reflected in the X-Factor.<sup>35</sup>

14. In this section, we first solicit comment on issues related to calculating the X-Factor using the total factor productivity (TFP) method. Then we solicit comment on other methods for calculating the X-Factor. Finally, we solicit comment on other X-Factor issues, such as the means of updating the X-Factor, the number of X-Factors in the plan, and the relationship of X-Factor levels to sharing requirements. In addition to the specific issues we discuss below, we also invite comment on whether there are other considerations that might weigh for or against adopting an X-Factor method based on TFP or any other model.

15. In the *First Report and Order*, several parties supported their positions on the X-Factor with one or more statistical studies purporting to measure trends in LEC productivity or

---

<sup>32</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6796 (para. 75).

<sup>33</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6796 (para. 75).

<sup>34</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6796 (para. 75).

<sup>35</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6796 (para. 76).

unit costs. In this phase of this proceeding, any party submitting studies, proposed methods for calculating an X-Factor, or other empirical information must furnish promptly upon request by Commission staff or any party to this proceeding workpapers and any other data necessary to replicate the results submitted in this proceeding. If a party fails to do so, we will accord no weight to those studies, methods, or empirical information in our deliberations.

## 2. General Criteria

16. Our experience with the initial four years of price cap regulation and our review of the record compiled during the first phase of this proceeding convinces us that the X-Factor adopted in our long-term price cap plan should have three essential characteristics. First, the X-Factor should be economically meaningful. That is, it should provide a reliable measure of the extent to which changes in LECs' unit costs have been less than the level of inflation. Second, the X-Factor should ensure that ongoing gains by the LECs in reducing unit costs are passed through to consumers. Third, calculation of the productivity offset should be reasonably simple and based on accessible and verifiable data. In recommending specific proposals or commenting on proposals of others, we urge parties to comment on the extent to which a proposal meets each of these criteria.

17. We are concerned that the data required to calculate the X-Factor in our long-term price cap plan be publicly available in a timely fashion. In the first phase of this proceeding, AT&T criticized USTA's TFP proposal in part because the data necessary to calculate TFP allegedly would not meet such requirements.<sup>36</sup> One of the reasons we cited for adopting price caps was that it would reduce the administrative burdens of regulation.<sup>37</sup> If an X-Factor method depends in part on data that are not publicly available in a timely fashion, are likely to be subject to challenge, are difficult or unreasonably expensive to collect, or are likely to be outdated before becoming available, then adoption of that method would increase rather than decrease administrative burdens. Also, a method that relied on such data would be more likely than other methods to produce a faulty calculation of the X-Factor. Thus, the availability and timeliness of the data required to develop the X-Factor will be an important consideration in our decision whether to adopt a particular method for the long-term price cap plan.

18. In particular, we are concerned that certain proposals to compute the X-Factor may rely on proprietary information. In such cases, it is possible that data which are critical to the calculation of the X-Factor would not be accessible to public scrutiny. The Commission relies significantly on public comment in the process of reviewing economic information provided in support of tariff filings. If data used to calculate the X-Factor were not available to participants to the proceeding, the Commission's decision-making could be hampered.

---

<sup>36</sup> See *First Report and Order*, para. 126.

<sup>37</sup> *LEC Price Cap Order*, 5 FCC Rcd at 6791 (para. 37).

19. Section 0.457(d) of the Commission's Rules permits withholding from public inspection any "trade secrets and commercial or confidential information obtained from any person and privileged or confidential," as defined by FOIA Exception 4 and the Trade Secrets Act.<sup>38</sup> Although Section 0.455(b)(11) of the Commission's Rules states that information submitted pursuant to tariff filings is "routinely available for public inspection," that Section is expressly limited by Section 0.457.<sup>39</sup> We have interpreted these rules to establish high standards for obtaining proprietary treatment for tariff cost support information.<sup>40</sup> We invite parties to discuss whether the data required by any of the methods for calculating the X-Factor proposed in this proceeding may raise the issue of proprietary treatment. If so, parties should discuss how best to balance the LECs' interests in keeping the data proprietary in this case with the parties' abilities to participate effectively in the proceeding.

20. In addressing this concern, commenting parties should describe in detail the data sources required for particular X-Factor methods. Parties should indicate whether the data are currently collected by the Commission, by the LECs, by other Governmental agencies, or by industry or other organizations. If the data are not currently collected, parties should explain how the data would be collected. Parties should address any issues regarding the public availability and timeliness of the data as well. Parties should also discuss any associated costs and administrative burdens associated with the collection of the data.

21. As part of our concern regarding the accuracy and public availability of data used to calculate the X-Factor, we need to consider the level of aggregation of data required for various proposals for calculating the X-Factor. We encourage commenting parties to specify the manner in which data should be aggregated for each proposed method of calculating the X-Factor and to explain how this aggregation would affect the ability of the Commission and interested parties to verify the data and replicate the results of studies for the different X-Factor methods. For instance, although we have tentatively concluded that we should base the X-Factor on an industry-wide measure of performance, it may be necessary to have available company or study area specific data to ensure auditability.

### 3. Total Factor Productivity Method

#### a. Background

22. In the *First Report and Order*, the United States Telephone Association (USTA) recommended using the total factor productivity (TFP) method to calculate the X-Factor. USTA

---

<sup>38</sup> Section 0.457(d) of the Commission's Rules, 47 C.F.R. § 0.457(d).

<sup>39</sup> Section 0.455 of the Commission's Rules, 47 C.F.R. § 0.455.

<sup>40</sup> See *Western Union Telegraph Company and American Satellite Company*, FOIA Control Nos. 85-29 and 85-37, FCC 85-378 (released July 23, 1985); *MCI Telecommunications Corp.*, FOIA Control No. 84-144, FCC 85-266 (released May 17, 1985).

placed its original TFP proposal in its initial round of pleadings submitted in CC Docket No. 94-1.<sup>41</sup> USTA revised its proposal in an *ex parte* statement submitted on January 18, 1995.<sup>42</sup> USTA based its original TFP proposal on two studies it commissioned, one performed by Christensen, Schoech, and Meitzen (Christensen Study) and the other by the National Economics Research Associates, Inc. (NERA Study).<sup>43</sup> While both studies advocate use of the TFP method,<sup>44</sup> the Christensen study describes the TFP method in detail and calculates the LECs' TFP for the post-divestiture period. Therefore, we will focus on the Christensen Study here.

23. The Christensen Study measured the TFP of price cap LECs from 1984 to 1992, based primarily on Form M data<sup>45</sup> submitted to the Commission.<sup>46</sup> The study computes TFP as the ratio of an index of the LECs' output to an index of the LECs' input. The output index reflects quantities of provided services, and the input index reflects quantities of labor, capital, and materials used in the production of these services. The outputs used in the study are composed of all the services provided by the LEC: local service, interstate end user access, interstate switched access, interstate special access, intrastate access, long distance service, and miscellaneous services, including some unregulated services. The revenue data for each category of output are divided by a price index (reflecting average rates for the relevant category) to calculate an output quantity index for each category. Growth rates of quantity indexes and average revenue shares<sup>47</sup> are calculated for each service category. A category's weighted growth rate is constructed as the product of the rate of growth of the quantity index

---

<sup>41</sup> *First Report and Order*, para. 101.

<sup>42</sup> *First Report and Order*, para. 103. In that proposal, USTA also recommended eliminating the sharing and low-end adjustment mechanisms, narrowing the exogenous cost rules, and replacing Part 69 of the Commission's Rules with more flexible rate structure requirements. *Id.* at para. 120. We invite comment on sharing and exogenous cost issues below. We consider rate structure flexibility issues in the *Second Further Notice*.

<sup>43</sup> *First Report and Order*, paras. 105-11.

<sup>44</sup> *First Report and Order*, para. 106.

<sup>45</sup> Section 43.21 of the Commission's Rules, 47 C.F.R. § 43.21, requires carriers to file certain financial, corporate and statistical data on an annual basis. Form M is the form required for such filings. See Revision of Annual Report Form M, 4 FCC Rcd 4879 (Com. Car. Bur. 1989).

<sup>46</sup> *First Report and Order*, para. 105. Included in Christensen's study were Form M data from Ameritech, Bell Atlantic, BellSouth, GTE, NYNEX, PacTel, SNET, Southwestern Bell, and US West. USTA Comments, Attachment 6 at i.

<sup>47</sup> An average revenue share is the arithmetic average of revenue shares from two consecutive time periods.

and the category's average share of total revenue. The rate of growth of the (aggregate) output index is the sum of the weighted growth rates of the categories.

24. The inputs used in the study are composed of the firms' factors of production, divided into three categories: labor, materials, and capital services (services provided by plant and equipment). The input index is developed from a weighted average of growth rates of indices measuring the quantities of capital, labor, and materials. In the sections below, we solicit comments on various issues regarding the proper calculation of these indices and weights. Under the TFP method, the term "productivity" denotes the level of the TFP index, and the change in productivity is measured as the change in the level of the TFP from one period to another. USTA advocated setting the X-Factor to reflect the percentage change in the TFP. An example of a simplified TFP calculation is included in this Notice as Attachment A.

25. We tentatively concluded in the *First Report and Order* that a TFP approach should be used to compute the X-Factor in the future.<sup>48</sup> Specifically, we found that, because TFP studies actually measure productivity growth rates, a TFP approach appeared ideally suited to determining the X-Factor.<sup>49</sup> We were also concerned, however, that using a moving average to update a TFP-based X-Factor might require substantial resources to review the calculation of the X-Factor, or otherwise present formidable implementation problems.<sup>50</sup> Therefore, we stated that we would also invite comment on alternative methods of calculating the X-Factor.<sup>51</sup> We designate for comment issues related to those alternative methods in Section III.A.4. of this Further Notice.

#### b. Output Index Issues

**Issue 1a:** What is the most reasonable method to develop output price indices for TFP calculation purposes? What data sources should be used to develop output price indices?

26. As mentioned above, TFP is the ratio of an index of total outputs to an index of total inputs. In order to derive output quantity indices, output price indices were used to deflate output revenues in the Christensen Study. Thus output price indices are critical parameters in the derivation of output growth. The Christensen Study used various methods to construct price indices for the various categories of outputs. The construction of these indices does not follow

---

<sup>48</sup> *First Report and Order*, para. 155.

<sup>49</sup> *First Report and Order*, para. 157.

<sup>50</sup> *First Report and Order*, para. 162.

<sup>51</sup> *First Report and Order*, paras. 163-64.

any conventional economic formulas.<sup>52</sup> In particular, price indices for local services, intrastate access, and long distance service appear to be based on an *ad hoc* method that we find difficult to replicate. We invite parties to comment on whether the construction of output price indices in the Christensen Study is reasonable. More generally, we invite parties to comment on the appropriate methods for calculating output price indices for a TFP study.

27. In addition, we seek comment on whether the categorization of outputs in the Christensen Study is appropriate. The Christensen Study developed separate indices for local service, interstate end user access, interstate switched access, interstate special access, intrastate access, long distance service, and miscellaneous services. Are these the appropriate categories? Is there a better way to categorize LEC services for purposes of developing output indices? Would it be preferable to combine any of these categories, or to divide any of these categories into subcategories?

28. Proper weighting of the output quantity indices is an issue which must be addressed as well. The Christensen Study relied on revenue shares to weight each distinct service. A weighting scheme based on revenue shares is generally undertaken on the theory that the revenue for a service is a reasonable measure of the value of the output as well as the value of the inputs required to produce the output. Were all rates determined in fully competitive markets, this assumption would be reasonable. All LEC services are not equally competitive, however, and rates diverge to varying degrees from the costs of producing those services.<sup>53</sup> A cost-based weighting scheme may be more appropriate in the application of the TFP method to the LEC industry. Commenters are requested to address the appropriateness of alternative weighting schemes in developing the output indices.

### c. Input Index Issues

#### (1) Capital Services

29. In the Christensen Study, the capital index is based on six types of assets. The construction of the index begins with the measurement of capital stocks. For each asset class and period of time, capital stock quantities are measured using the "perpetual inventory method." This method measures capital stock quantities for each period in constant dollars by reducing

---

<sup>52</sup> By "conventional economic formulas," we mean, *e.g.*, Laspeyres Price Index, Chained Laspeyres Index, Paasche Price Index, Fisher's Ideal Index, and Hedonic Index. *See, e.g.*, K.S. Banerjee, *Cost of Living Index Numbers - Practice, Precision, and Theory* (1975).

<sup>53</sup> For example, the transport residual interconnection charge (RIC) is not based on costs, but is priced to be "revenue-neutral" relative to transport services prior to the establishment of the trunking basket. Transport Rate Structure and Pricing, CC Docket No. 91-213, Report and Order and Further Notice of Proposed Rulemaking, 7 FCC Rcd 7006, 7038 (para. 60) (1992) (*Transport Order*).

capital stock by a factor to account for the loss in efficiency over time and adding deflated investment (plant additions).

30. Next, capital input quantities for each asset class and year are determined. These input quantities are the capital services provided by or "flowing from" the capital stock. Because, under Christensen's method, capital services are considered to be proportional to capital stock from the previous period, in practice only capital stocks need to be considered in measuring capital input quantities. For a specific period and asset, the capital input quantity index is the ratio of the capital stock quantity in the preceding period to the capital stock quantity in 1983.

31. The final step in calculating the capital index is to create a weighted average of the growth rates of capital services provided by the various asset classes. The weighting is based on the value of capital services provided by each asset. The value of capital services (*i.e.*, capital costs) for each asset class is the current value, in dollars, of capital services provided by each asset class (*i.e.*, the rental value of these assets in a competitive market). Calculating this value requires a complex formula which includes as variables the cost of capital, the depreciation rate (the loss in efficiency of plant), various tax rates, Telephone Plant Indexes or TPIs (which measures the change in price levels for telephone plant), and capital stock quantities. As calculated in the Christensen Study, the value of capital services bears only a distant resemblance to capital costs as calculated under rate of return regulation.

32. The calculation of a capital index raises especially difficult issues due to the fact that it is based on a number of complex judgments. They include estimating the percentage cost of capital; estimating the life of embedded plant, estimating the replacement cost of embedded plant, and using these parameters to estimate the value of capital services or capital costs. The difficulty of these judgments is compounded by the fact that tremendous technological innovation is occurring in the telecommunications industry and is reducing the replacement cost of embedded plant as well as providing improved capabilities that render embedded plant obsolete or obsolescent.

33. Accordingly, we request comment on the following issues:

**Issue 1b:** What is the most appropriate measure of the cost of capital for a TFP study?

34. The Christensen Study adopted Moody's Yield on Public Utility Bonds as the cost of capital.<sup>54</sup> We seek comment from the parties on whether reliance on such a measure of the cost of capital is appropriate for a TFP study. We also invite the parties to offer alternative measures that they believe are superior. In particular, we seek comment on whether the cost of capital should be based solely on the cost of debt, as in the Christensen Study, or on the cost

---

<sup>54</sup> See *First Report and Order*, para. 116 n.191.

of equity, or on a combination of the two, as has been traditional in public utility regulation, including regulation by this Commission. Commenters should explain how the cost of debt and the cost of equity should be calculated. Commenters favoring a composite calculation should describe how the debt and equity components should be weighted.

35. Under the Communications Act, the Commission has the authority to prescribe the authorized rate of return for carriers.<sup>55</sup> For part of the time period analyzed by the Christensen Study (1984-1990), all LECs were subject to rate-of-return regulation under which the Commission had prescribed an authorized rate of return. We seek comment on whether the rates prescribed by the Commission for those time periods would be more appropriate for use in a TFP study than the rates selected by Christensen. Commenters also should discuss whether it would be reasonable to use as the cost of capital for the price cap period anything other than the 11.25 percent rate of return that was prescribed for the price cap LECs for the purpose of initializing their rates under price caps and that is currently prescribed by the Commission for LECs subject to rate of return regulation.<sup>56</sup>

36. We also seek comment on how often, and by what method, the cost of capital should be updated for use in a TFP study. In the event that we represcribe a rate of return for LECs subject to rate of return regulation, should we require use of the new rate of return in calculation of TFP for price cap LECs?

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

37. The Christensen Study employed what USTA characterizes as "economic" depreciation rates, rather than the depreciation rates prescribed by the Commission. The rates, taken from Jorgenson,<sup>57</sup> were applied to six classes of capital assets: a depreciation rate of 11.00 percent was applied to investment in central office equipment (including operator systems), transmission equipment, and information origination/termination equipment; a rate of 15.46 percent was applied to investment in general support equipment; and a rate of 2.25 percent was applied to investment in buildings and cable and wire.<sup>58</sup>

---

<sup>55</sup> Section 205(a) of the Communications Act, 47 U.S.C. § 205(a); *Nader v. FCC*, 520 F.2d 182, 200-04 (D.C. Cir., 1975).

<sup>56</sup> Both the current 11.25 percent rate of return prescription and LEC price cap regulation took effect on January 1, 1991. The Commission required price cap LECs to reflect this represcription as an exogenous cost adjustment to their PCIs. *LEC Price Cap Order*, 5 FCC Rcd at 6816 (paras. 245-47).

<sup>57</sup> D.W. Jorgenson, *Productivity and Economic Growth*, in *Fifty Years of Economic Measurement* (E.R. Berndt and J.E. Triplett, eds., 1990), at 19-118 (*Jorgenson*).

<sup>58</sup> USTA Comments, Attachment 6 at 5-6.

38. Under Section 220(b) of the Communications Act, 47 U.S.C. § 220(b), the Commission prescribes depreciation rates for communications common carriers. Accordingly, depreciation rates prescribed by the Commission were in effect for the LECs during the time period analyzed by the Christensen Study. We seek comment on whether the rates prescribed by the Commission for those time periods would be more appropriate for use in a TFP study than the rates selected by Christensen.<sup>59</sup>

39. The Commission prescribes depreciation rates for over 30 capital accounts<sup>60</sup> under our Part 32 Rules.<sup>61</sup> Because the aggregation of capital accounts and depreciation rates affects the measurement of TFP, we seek comment on the appropriate level of aggregation of capital accounts for the purpose of calculating depreciation rates for use in a TFP study. Are the six classes of assets used in the Christensen Study the most appropriate classification scheme for measuring and applying depreciation rates or is there a better classification scheme?

40. The Commission has recently established streamlined procedures for determining whether depreciation rates proposed by the LECs are reasonable.<sup>62</sup> Under this procedure, proposed depreciation rates are considered reasonable if the rates fall within specific bands established for each asset class by the Commission. We seek 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. Alternatively, would it be reasonable to rely on estimates of "economic" depreciation rates made by the LECs or some other party for future updates?

---

<sup>59</sup> Based on the depreciation rates prescribed by the Commission for the period from 1984 to 1992, the average composite depreciation rate of the BOCs, GTE, and SNET was 7.1 percent. For that period, the average composite depreciation rate in USTA's February 1, 1995 TFP study for those LECs was 5.7 percent.

<sup>60</sup> All Class A companies are required to keep their accounts at this level of detail. Section 32.2000(j) of the Commission's Rules, 47 C.F.R. § 32.2000(j). Class A companies are companies with annual revenues from regulated telecommunications operations of \$100 million or more. Section 32.11(a)(1) of the Commission's Rules, 47 C.F.R. § 32.11(a)(1). Class B companies are permitted to keep less detailed accounts. Section 32.2000(j) of the Commission's Rules, 47 C.F.R. § 32.2000(j).

<sup>61</sup> 47 C.F.R. § 32.2000(g).

<sup>62</sup> See Simplification of the Depreciation Prescription Process, Report and Order, CC Docket No. 92-296, 8 FCC Rcd 8025 (1993) (*Depreciation Simplification Order*) (*petitions for reconsideration pending*).

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

41. Replacement Values. The Christensen Study used the perpetual inventory method to calculate the annual level of capital stock.<sup>63</sup> The method begins with an amount of capital stock for the benchmark year. The benchmark capital stock is based, in part, on the value of the replacement cost of plant and equipment embedded in the carriers' network. The Christensen Study used 1984 as its benchmark year, and used current replacement values of capital stock for that year instead of "original cost," *i.e.*, the purchase price of equipment at the time of purchase and as entered on the company's books of account. Original cost is the means by which capital stock is measured under traditional public utility regulation. This Commission requires carriers to use original cost of capital stock in calculating historical earnings for purposes of determining sharing obligations and low-end adjustments under price caps. We seek comment on the reasonableness of using replacement values instead of original cost for benchmark values. In particular, we seek comment regarding the most appropriate methods and data sources for determining replacement values.

42. We also seek comment on the reliability of the method and the data used in the Christensen Study to compute replacement values. In the first phase of this proceeding, USTA identified a number of errors in the original version of the Christensen Study, which USTA submitted as an attachment to its comments in this proceeding and, consequently, submitted several *ex parte* statements to correct or explain those errors during the pendency of the *First Report and Order*. Some of the revisions were very large. For instance, one of those *ex parte* statements revised NYNEX's replacement costs downward by \$13.5 billion, from \$37.9 billion to \$24.4 billion.<sup>64</sup> Furthermore, USTA's response to the Common Carrier Bureau's January 18, 1995 data request showed that reduction of the replacement values results in a reduced rate of productivity growth, as measured by TFP.

43. The Economic Stock Adjustment Factor. As explained above, the Christensen Study calculates capital stock quantities using the perpetual inventory method. For each asset class, the benchmark capital stock value is calculated based on 1984 replacement costs. To accomplish this, capital stocks of different vintages are repriced to provide a common basis of valuation. In any period, however, the quantity of capital stock is based on the relative efficiency of assets as they age, and, therefore, the Christensen Study adjusted the replacement cost of assets for the relative ages of those assets.<sup>65</sup> This adjustment is accomplished through an application of an "economic stock adjustment factor" to the 1984 replacement cost.<sup>66</sup> The economic stock

---

<sup>63</sup> L.R. Christensen and Dale W. Jorgenson, *The Measure of U.S. Real Capital Input, 1929-1967*, 15 *Rev. of Income and Wealth* 294 (December 1969) (*Christensen and Jorgenson*).

<sup>64</sup> USTA *Ex Parte* Statement, February 3, 1995.

<sup>65</sup> USTA *Ex Parte* Statement, December 29, 1994, at 5.

adjustment factors used in the Christensen Study are 0.5641 for communications equipment, 0.5168 for other equipment, and 0.8036 for structures. The Christensen Study derived the economic stock adjustment factors by comparing the United States Bureau of Economic Analysis's (BEA) replacement cost measures to the BEA's quantity of capital stock measures. We note that the results of the Christensen Study are sensitive to the choice of economic stock adjustment factors. We seek further comment on validity of the economic stock adjustment factor method and on the validity of the data on which it relies. We also seek comment on whether the information needed to revise the economic stock adjustment factors is available on a timely basis, should a TFP study be reinitialized to another base year in the future.

44. Investment. USTA also corrected errors in the levels of current dollar investment (plant additions) used in the original Christensen Study. According to USTA, this data is obtained from Form M reports that carriers file with the Commission on an annual basis. Data in this report are derived from the regulatory books of account of the carriers. We direct USTA to explain in more detail the sources of these errors. In particular, USTA should address how closely the data were audited internally by the LECs in the normal course of business. We also request USTA to explain whether there were any sources other than Form M data which were used to determine current dollar investment and, if so, why these sources were employed instead of Form M.

45. Telephone Plant Indices. In order to calculate capital stock quantities, Christensen uses Telephone Plant Indices (TPIs) to deflate dollar investments in plant and equipment. These indices also play an important role in the calculation of the value of capital services, discussed below. As we understand it, these indices are calculated by the LECs themselves and not subject to external controls or validation. We ask the LECs in commenting to provide more information regarding the calculation of these indices, including a detailed description of data sources and methods employed. We also ask the LECs to explain how the accuracy of the indices is ensured. We seek comment on whether the method of calculating TPIs currently employed by the LECs is adequate for use in a TFP study, should the Commission rely on such a study for calculating the X-Factor. If not, what method of calculation should be used in its place? We are especially interested in determining whether the index could be calculated in a timely manner and from publicly available data.

46. Perpetual Inventory Method. Finally, we seek comment on the validity of the perpetual inventory method of measuring capital stock. We also seek comment on whether there are methods that can be used to construct quantity indices of capital stock that are preferable to the perpetual inventory method.

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

47. For each asset class, the quantity index of capital service inputs in the Christensen Study is a measurement of the annual flow of real capital services resulting from the utilization of capital stock rather than the level of capital stock itself. The TFP method of measuring real

capital services assumes that for any period such services are proportional to the amount of capital stock at the end of the previous period and that the factor of proportionality does not change over time. Thus the growth rate of real capital services is simply the growth rate of capital stock, lagged by one year. We seek comment on whether it is reasonable to assume that real capital services are proportional to the level of capital stock. Alternative assumptions are that real capital services are proportional to the "consumption" of capital, *i.e.*, the loss of capital efficiency over time; or some combination of the amount of capital consumption and the level of capital stock. We seek comment on whether such alternative assumptions result in more reasonable measurements of productivity and, if so, whether it is practical to make such measurements.

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

48. As described above, the value of capital services is assumed to be the rental value in a competitive market of the capital stock providing these services. The value of capital services is actually calculated by multiplying the capital stock by the hypothetical price of "renting" the capital stock in a competitive market. This hypothetical price is termed the "implicit rental price" and is an important variable in the Christensen Study.<sup>67</sup> In order to calculate the value of capital services for any period, the implicit rental price must be derived. Christensen and Jorgenson indicate that for property with an active rental market, the price of capital services may be observed directly as the rental price for the use of the asset. A rental market does not exist, however, for much of the capital utilized by the LECs. Thus, in order to determine the rental price for such capital property, it is necessary to derive the implicit rental price. The construction of the implicit rental price includes as variables the cost of capital, the depreciation rate, various tax rates and tax rate components, and the TPI.

49. We invite comment on the validity of the implicit rental price formula in the Christensen Study and the validity of the data used in the formula. We also seek comment on whether the data required to calculate the implicit rental price in future TFP updates would be publicly available in a timely fashion. We seek comment on whether there are preferable alternatives to Christensen's method for calculating the implicit rental price of capital.

## (2) Labor and Materials

50. Labor consists of two categories: management and nonmanagement. A labor index is constructed as a weighted average of growth rates of hours worked for each category of labor. The weights are each category's average share of total labor costs.

51. The cost of materials is used to construct the materials index. The cost of materials is derived from the books of the company by subtracting depreciation expense and payments to

---

<sup>67</sup> *Christensen and Jorgenson* at 302.

labor from operating expense. Adjustments to the cost of materials are made for some nonregulated activities and changes in USOA accounting rules. The quantity index of materials is the result of dividing adjusted materials cost by GDP-PI.<sup>68</sup>

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

52. The Christensen Study divided labor into two categories: management and nonmanagement labor. We seek comment on whether the labor categories should be further subdivided in order to increase the accuracy of the labor index. As both a theoretical and practical matter, we seek comment on whether adjustments for "human capital" (*i.e.*, adjustments to reflect the varying levels of educational and vocational experience in the work force) would be desirable. We also seek comment on whether any adjustments should be made to total labor compensation prior to forming average shares of total labor costs. We are particularly concerned, for instance, about how other post-employment benefits (OPEB) costs, and other accounting rule changes, might affect the aggregated labor index; and whether the treatment of such accounting rule changes is consistent with our decision in the *First Report and Order* that such accounting rules changes should not be reflected in LECs' PCIs without a finding by the Commission that the present discounted value of a firm's earnings will be affected.<sup>69</sup> We also seek comment on whether adjustments should be made to the labor index or to total labor compensation in regard to carriers' "outsourcing," *i.e.*, replacing the services of workers employed by carriers with services provided by outside firms.

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

53. The Christensen Study deflated materials costs by the GDP-PI in order to construct a materials index. We seek comment on whether, as a theoretical and practical matter, it would be preferable to construct a price index for materials instead of relying on GDP-PI.

---

<sup>68</sup> *First Report and Order*, para. 107 n.172.

<sup>69</sup> OPEBs are post-employment benefits such as severance pay and other benefits for separated workers, and employee post-retirement liabilities other than pensions, such as retirees' life insurance and medical and dental care benefits. Southwestern Bell Corporation, GTE Service Corporation, Notification of Intent to Adopt Statement of Financial Accounting Standards No. 106, Employers' Accounting for Post-retirement Benefits Other Than Pensions, 6 FCC Rcd 7560 (Com. Car. Bur. 1991) (*SFAS-106 Order*); *RAO Letter 22*, 8 FCC Rcd 4111 (Com. Car. Bur., Accounting and Audits Div. 1993); *First Report and Order*, para. 276.

#### d. Input Price Adjustment

54. As we explained in the *First Report and Order*, changes in a firm's unit cost of output come from two general sources: (1) changes in the way a firm uses resources in the production process, *i.e.*, changes in productivity; and (2) changes in the price of those resources, *i.e.*, input price changes. Changes in either productivity or input prices can have a significant effect on the unit cost of output. Accordingly, in the *First Report and Order*, we examined whether an X-Factor based on the TFP method should include an adjustment to reflect changes in LECs' input prices. We tentatively found that the X-Factor should include such an adjustment. Accordingly, we tentatively found that the X-Factor, as an offset to inflation, should be set equal to the difference between total factor productivity for the LEC industry and the economy as a whole (TFP differential) plus the difference between input price changes for the economy as a whole and the LEC industry (input price differential).<sup>70</sup>

55. In the *First Report and Order*, we found that the record was not sufficiently developed to enable us to adopt a specific method for incorporating an input price differential into a TFP-based X-Factor.<sup>71</sup> Accordingly, we seek comment on the most reasonable way to account for changes in LECs' input prices for use in a TFP approach to calculating the X-Factor. Generally, we seek comment on all our analyses and conclusions regarding the estimation and use of the input price differential, as presented in Appendix F of the *First Report and Order*.<sup>72</sup>

56. More specifically, we seek comment on the following issue:

**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?

57. Trends in LEC Input Prices. In the first phase of this proceeding, Ad Hoc argued that an X-Factor based on the TFP method should incorporate an input price differential reflecting the same time period as that used for the TFP study. (For the original Christensen Study, the time period would be 1984-1992.) In contrast, USTA recommended reliance on a long-term trend of the input price differential as a better estimator of future trends and claimed that the long-term trend was zero. Ad Hoc replied that reliance on an input price differential based on LEC input price data for the 1984-1992 period was preferable to reliance on a long-term trend because the trend in LEC input prices had changed after AT&T's divestiture of the Bell Operating Companies in 1984. A study by Commission staff found that there was evidence

---

<sup>70</sup> *First Report and Order*, paras. 160-61 and Appendix F. The exact formula and its derivation is contained in Appendix F.

<sup>71</sup> *First Report and Order*, para. 161.

<sup>72</sup> *First Report and Order*, Appendix F.

that the long-term trend in LEC input prices had, in fact, changed after divestiture.<sup>73</sup> The staff study concluded that this was one reason to rely on post-divestiture data rather than long-term data for calculating the input price differential. We seek further comment on whether, in fact, the long-term trend of the input price differential is zero, as USTA alleges. We also seek further comment on whether, in fact, the trend in LEC input prices has changed since divestiture.

58. In this Notice, the Commission is considering calculation of a moving average X-Factor based on the TFP method. Alternatively, the Commission may decide to prescribe an X-Factor, also based on the TFP method, that would remain unchanged for several years. We seek comment on whether an X-Factor under either of these alternatives should be based on input price differential data from the same period as the TFP study.

59. Sources of LEC Input Price Data. Ad Hoc argued in the first phase of this proceeding that the LEC input price data should be derived from data used in the Christensen Study. USTA argued that input price data from the Christensen Study are too volatile for use in calculating the input price differential and also are not comparable to input price data available for the U.S. economy as a whole. USTA argued that these problems were particularly severe with regard to measurement of the price of capital services for the LECs (*i.e.*, the implicit rental price, discussed above). The staff study found that these problems were not serious enough to preclude use of data from the Christensen Study in calculating an X-Factor. We seek further comment on whether the input price differential should be calculated using data from the Christensen Study. In particular, we seek further comment on problems regarding the measurement of the price of capital services.

60. We also invite comment on whether there are other sources of LEC input price data that would be preferable to the Christensen Study. Consistent with the criteria discussed under the heading "General Criteria," above, we invite parties to suggest appropriate methods and data sources for a telecommunications-specific input price index. We also invite comment on whether the Commission, USTA, or some other entity should construct this index. We note in this regard that the Interstate Commerce Commission (ICC) requires the Association of American Railroads (AAR) to develop certain indices, based on data supplied by the ICC.<sup>74</sup>

61. Direct Measurement of LECs' Unit Costs. Under price cap regulation, the purpose of calculating the X-Factor as an offset to inflation is to establish a price cap as a benchmark

---

<sup>73</sup> *First Report and Order*, Appendix F at 12-14.

<sup>74</sup> *See Ex Parte* No. 290 (Sub. No. 4), *Railroad Cost Recovery Procedures - Productivity Adjustment*, 5 ICC 2d 434, 437 (1989). In December 1994, USTA submitted into the record in this docket a study of railway productivity to illustrate its TFP analysis. In that railway study, a railway-specific input price index operates in conjunction with railway TFP in order to determine the boundaries for the railway price index.

of LEC unit costs. Under a TFP approach, the X-Factor would be set to the sum of the TFP differential and the input price differential. The staff study in Appendix F of the *First Report and Order* showed that the price cap index (PCI) that results from offsetting inflation by such an X-Factor would be equal to a PCI set directly by subtracting from the percentage growth in LEC input prices the percentage growth in LEC TFP.<sup>75</sup> Under the direct approach, it would not be necessary to use GDP-PI (or any other measure of economy-wide inflation), U.S. TFP indices, or U.S. input price indices; nor would it be necessary to calculate an X-Factor as an offset to GDP-PI. Because there can be a two-year lag in the production of U.S. TFP statistics by the Bureau of Labor Statistics (BLS), reliance on economy-wide statistics introduces a significant lag into the calculation of the X-Factor. The direct approach would reduce, if not eliminate, this lag. We invite comments on the desirability of measuring LEC unit cost growth directly, rather than by offsetting inflation by an X-Factor.<sup>76</sup>

e. Calculation of a TFP Index and an Input Price Index on a Less-Than-Total-Company Basis

62. In its TFP proposal in this docket, USTA based its analysis on total company productivity, rather than productivity growth in the provision of interstate access services or services subject to regulation.<sup>77</sup> AT&T objected to the use of total company data in deriving total factor productivity on the grounds that demand volumes for interstate access had grown more rapidly than other LEC services, and that interstate access was more profitable than the intrastate services provided by LECs. AT&T, accordingly, claimed that the appropriate X-Factor for interstate access must be higher than TFP for the entire company.<sup>78</sup>

63. We found that interstate and intrastate services are largely provided over common facilities, and that the record contained no evidence that there was an economically meaningful way to divide and measure the facilities used for the provision of interstate service from facilities used for provision of intrastate services. We, therefore, tentatively concluded that TFP should be calculated on a total company basis.<sup>79</sup> Our tentative conclusion reflects a recognition that costs and demand that are "separated" between the state and interstate jurisdictions pursuant to

---

<sup>75</sup> *First Report and Order*, Appendix F at 4 (equation 7).

<sup>76</sup> *First Report and Order*, Appendix F at 4.

<sup>77</sup> *First Report and Order*, para. 106. See also USTA Comments in CC Docket No. 94-1, submitted May 9, 1994, at Attachment 6.

<sup>78</sup> *First Report and Order*, para. 114. See also AT&T Reply in CC Docket No. 94-1, submitted June 29, 1994, at 28-30.

<sup>79</sup> *First Report and Order*, para. 159.

Part 36 of the Commission's Rules may not be optimal benchmarks for setting interstate rates.<sup>80</sup> Relinquishing our reliance on separated costs and demand would represent a further step toward pure price cap regulation and away from rate-of-return regulation. On the other hand, the Commission's jurisdiction is limited by Section 2(b) of the Act, which states in relevant part that "nothing in this Act shall be construed to apply or to give the Commission jurisdiction with respect to (1) charges, classifications, services, facilities, or regulations, for or in connection with intrastate communication service by wire or radio of any carrier."<sup>81</sup> If a LEC's productivity for interstate services differs significantly from its productivity for intrastate services, it may be necessary to rely on separated costs to ensure that interstate rates remain just and reasonable. We seek further comment on these issues.

**Issue 1j:** Is there a valid distinction between intrastate and interstate productivity for the purposes of calculating a TFP index and an input price index and, if so, does a satisfactory method exist to account for such differences?

64. We seek comment whether calculation of an interstate TFP number or an interstate input price index is economically meaningful, and if so, how such numbers would be calculated. In particular, parties are invited to discuss whether it is possible to create separate "production functions" for interstate and intrastate services, and if so, to discuss in detail their proposed methods for doing so. We request that parties provide econometric or other evidence regarding whether an interstate TFP is a meaningful economic measure. Parties are also invited to submit studies of interstate TFP, including the data on which those studies rely. We ask parties to comment on whether the cost and demand allocation system contained in Part 36 of the Commission's Rules, governing interstate and intrastate jurisdictional separations, is a valid and practical way to distinguish interstate and intrastate costs and demand for purposes of calculating an interstate TFP number.

65. We seek information to support or refute AT&T's claim that interstate access demand has grown more rapidly than demand for other LEC services. We ask whether adjustments should be made to total company TFP growth in order to reflect the specific demand characteristics of interstate access, and if so, how such adjustments should be made.

66. Furthermore, as explained below, demand growth is one of the key components in the current common line formula.<sup>82</sup> If we find that we can adjust TFP to account for differences between interstate access demand and demand for other LEC services, would such an adjustment lead to double-counting of demand in the common line formula? Commenters should explain the relationship between their responses to this issue and their responses to the common line formula issues we discuss below.

---

<sup>80</sup> See Part 36 of the Commission's Rules, 47 C.F.R. Part 36.

<sup>81</sup> Section 2(b) of the Communications Act, 47 U.S.C. § 152(b).

<sup>82</sup> See *LEC Price Cap Order*, 5 FCC Rcd at 6793-95.