first time on or after July 1, 1994 shall also file FCC Form 1210 at the time it files FCC Forms 1200, 1205 and 1215.

(B) A cable system will not incur refund liability under the Commission's rules governing regulated cable rates on and after May 15, 1994 if: (1) between March 31, 1994 and July 14, 1994, the system does not change the rate for, or restructure in any fashion, any program service or equipment offering that is subject to regulation under the 1992 Cable Act; and (2) the system establishes a permitted rate defined in paragraph (b) of this rule by July 14, 1994. The deferral of refund liability permitted by this subsection will terminate if, after March 31, 1994, the system changes any rate for, or restructures, any program service or equipment offering subject to regulation, and in all events will expire on July 14, 1994. Moreover, the deferral of refund liability permitted by this subsection does not apply to refund liability that occurs because the system's March 31, 1994 rates for program services and equipment subject to regulation are higher than the levels permitted under the Commission's rules in effect before May 15, 1994.

(7) For purposes of this section, the initial date of regulation for the basic service tier shall be the date on which notice is given pursuant to § 76.910 of our rules, that the provision of the basic service tier is subject to regulation. For a cable programming services tier, the initial date of regulation shall be the first date on which a complaint on the appropriate form is filed with the Commission concerning rates charged for the cable programming services tier.

(8) For purposes of this section, rates in effect on the initial date of regulation or on September 30, 1992 shall be the rates charged to subscribers for service received on that date.

(c) Subsequent permitted charge. The permitted charge for a tier after May 15, 1994 shall be, at the election of the cable system, either (1) a rate determined pursuant to a cost-of-service showing, or (2) a rate determined by application of the Commission's price cap requirements set forth in paragraph (d) below to a permitted rate determined in accordance with paragraph (b) above.

(d) Price cap requirements. The Commission's price cap requirements allow a system to adjust its permitted charges for inflation and changes in external costs. After May 15, 1994, adjustments for changes in external costs shall be calculated by subtracting external costs from the system's permitted charge and making changes to that "external cost component" as necessary. The remaining charge, referred to as the "residual component," will be adjusted annually for inflation. Cable systems shall use

FCC Form 1210 (or FCC Form 1211, where applicable) to justify changes in permitted rates made pursuant to the price cap requirements.

(1) Calendar year quarters. All systems must use a calendar year quarter when adjusting rates under the price cap requirements. The first quarter shall run from January 1 through March 31 of the relevant year; the second quarter shall run from April 1 through June 30; the third quarter shall run from July 1 through September 30; and the fourth quarter shall run from October 1 through December 31.

(2) Inflation adjustments. The residual component of a system's permitted charge may be adjusted annually for inflation. The annual inflation adjustment shall be based on inflation occurring from June 30 of the previous year to June 30 of the year in which the inflation adjustment is made, except that the first annual inflation adjustment shall cover inflation from September 30, 1993 until June 30 of the year in which the inflation adjustment is made. The adjustment may be made after September 30, but no later than August 31 of the next calendar year. Adjustments shall be based on changes in the Gross National Product Price Index as published by the Bureau of Economic Analysis of the United States Department of Commerce. Cable systems that establish a transition rate pursuant to paragraph (b)(4) above shall not be permitted to adjust rates on account of inflation until the transition rate adjusted for external costs and changes in numbers of regulated channels is less than, or equal to, the system's full reduction rate adjusted for inflation, external costs and changes in numbers of regulated channels.

(3) External costs.

(i) Permitted charges for a tier may be adjusted up to quarterly to reflect changes in external costs experienced by the cable system. In all events, a system must adjust its rates annually to reflect any decreases in external costs that have not previously been accounted for in the system's rates. A system must also adjust its rates annually to reflect any changes in external costs, inflation and the number of channels on regulated tiers that occurred during the year if the system wishes to have such changes reflected in its regulated rates. A system that does not adjust its permitted rates annually to account for these changes will not be permitted to increase its rates subsequently to reflect the changes.

(ii) A system must adjust its rates in the next calendar year quarter for any decrease in programming costs that results from the deletion of a channel or channels from a regulated tier.

(iii) Any rate increase made to reflect an increase in external costs must also fully account for all other changes in external costs, inflation and the number of channels on regulated tiers that occurred during the same period. Rate adjustments made to reflect changes in external costs shall be based on any changes in those external costs that occurred from the end of the last quarter for which an adjustment was previously made through the end of the quarter that has most recently closed preceding the filing of the FCC Form 1210 (or FCC Form 1211, where applicable). A system may adjust its rates after the close of a quarter to reflect changes in external costs that occurred during that quarter as soon as it has sufficient information to calculate the rate change.

(iv) External costs shall consist of costs in the following categories: (1) state and local taxes applicable to the provision of cable television service; (2) franchise fees; (3) costs of complying with franchise requirements, including costs of providing public, educational, and governmental access channels as required by the franchising authority; (4) retransmission consent fees and copyright fees incurred for the carriage of broadcast signals; and (5) other programming costs.

(v) The permitted charge for a regulated tier shall be adjusted on account of programming costs, copyright fees and retransmission consent fees only for the program channels or broadcast signals offered on that tier.

(vi) The permitted charge shall not be adjusted for costs of retransmission consent fees or changes in those fees incurred prior to October 6, 1994.

(vii) The starting date for adjustments on account of external costs for a tier of regulated programming service shall be the earlier of the initial date of regulation for any basic or cable service tier or February 28, 1994.

(viii) Changes in franchise fees shall not result in an adjustment to permitted charges, but rather shall be calculated separately as part of the maximum monthly charge per subscriber for a tier of regulated programming service.

(ix) Adjustments to permitted charges to reflect changes in the costs of programming purchased from affiliated programmers, as defined in Section 76.901 of these rules, shall be permitted as long as the price charged to the affiliated system reflects either prevailing company prices offered in the marketplace to third parties (where the affiliated program supplier has established such prices) or the fair market value of the programming.

(x) Adjustments to permitted charges on account

of increases in costs of programming shall be further adjusted to reflect any revenues received by the operator from the programmer.

(xi) In calculating programming expense, operators may add add a mark-up of 7.5% for new programming added after May 15, 1994 and shall reduce rates by decreases in programming expense plus an additional 7.5% for decreases occurring after May 15, 1994.

(e) Changes in the number of channels on regulated tiers. A system may adjust the residual component of its permitted rate for a tier to reflect changes in the number of channels offered on the tier on a quarterly basis. Cable systems shall use FCC Form 1210 (or FCC Form 1211, where applicable) to justify rate changes made on account on changes in the number of channels on a regulated tier. Such rate adjustments shall be based on any changes in the number of regulated channels that occurred from the end of the last quarter for which an adjustment was previously made through the end of the quarter that has most recently closed preceding the filing of the FCC Form 1210 (or FCC Form 1211, where applicable). However, when it deletes channels in a calendar quarter, a system must adjust the residual component of the tier charge in the next calendar quarter to reflect that deletion. The following table shall be used to adjust permitted rates for a tier for changes in the number of channels offered on the tier. The entries in the table provide the cents per channel per subscriber per month by which cable operators will adjust the residual component using FCC Form 1210 (or FCC Form 1211, where applicable).

Average Number of Regulated Channels	Per-Channel Adjustment Factor	Average Number of Regulated Channels	Per-Channel Adjustment Factor
7	$0.52	14	0.14
7.5	0.45	14.5	0.13
8	0.40	15-15.5	0.12
8.5	0.36	16	0.11
9	0.33	16.5-17	0.10
9.5	0.29	17.5-18	0.09
10	0.27	18.5-19	0.08
10.5	0.24	19.5-21.5	0.07
11	0.22	22-23.5	0.06

11.5	0.20	24-26	0.05
12	0.19	26.5-29.5	0.04
12.5	0.17	30-35.5	0.03
13	0.16	36-46	0.02
13.5	0.15	46.5 and above	0.01

In order to adjust the residual component of the tier charge when there is a change in the number of channels on a tier, the operator shall perform the following calculations: (1) take the sum of the old total number of channels on tiers subject to regulation (i.e., tiers that are, or could be, regulated) and the new total number of channels and divide the resulting number by two; (2) consult the above table to find the applicable per channel adjustment factor for the number of channels produced by the calculations in step (1). For each tier for which there has been a change in the number of channels multiply the per-channel adjustment factor times the change in the number of channels on that tier. The result is the total adjustment for that tier. It is positive if the number of channels on the tier has increased and negative if the number of channels has decreased.

(f) Permitted charges for a tier shall be determined in accordance with forms and associated instructions established by the Commission.

4. Section 76.923 is amended to add paragraph (l) to read as follows:

Section 76.923 Rates for equipment and installation used to receive the basic service tier

* * * * *

(l) Company-wide averaging of equipment costs. For the purpose of developing unbundled equipment charges as required by Section 76.923(b), a cable operator may average the equipment costs of its small systems at any level, or several levels, within its operations. This company-wide averaging applies only to an operator's small systems as defined in Section 76.901(c) above; is permitted only for equipment charges, not installation charges; and may be established only for similar types of equipment. When submitting its equipment costs based on average charges to the local franchising authority or the Commission, an operator that elects company-wide averaging of equipment costs must provide a general description of the averaging methodology employed and a justification that its averaging methodology produces reasonable equipment rates. The local authority or the

Commission may require the operator to set equipment rates based on the operator's level of averaging in effect on April 3, 1993, as required by Section 76.924(d).

5. Section 76.934 is amended to redesignate current Section 76.934 as paragraph (a) and to add new paragraphs (b) and (c).

Section 76.934 Small Systems

(a) A franchising authority that has been certified, pursuant to § 76.910, to regulate rates for basic service and associated equipment may permit a small system as defined in § 76.901 to certify that the small system's rates for basic service and associated equipment comply with § 76.922, the Commission's substantive rate regulations.

(b) Initial regulation of small systems

(1) If certified by the Commission, a local franchising authority may provide an initial notice of regulation to a small system, as defined by Section 76.901(c), on May 15, 1994. Any initial notice of regulation issued by a certified local franchising authority prior to May 15, 1994 shall be considered as having been issued on May 15, 1994.

(2) The Commission will accept complaints concerning the rates for cable programming service tiers provided by small systems on or after May 15, 1994. Any complaints filed with the Commission about the rates for a cable programming service tier provided by a small system prior to May 15, 1994 shall be considered as having been filed on May 15, 1994.

(3) A small system that receives an initial notice of regulation from its local franchising authority, or a complaint filed with the Commission for its cable programming service tier, must respond within the time periods prescribed in Sections 76.930 and 76.956.

(c) Statutory period for filing initial complaint. A complaint concerning a rate for cable programming service or associated equipment provided by a small system that was in effect on May 15, 1994 must be filed within 180 days from May 15, 1994.

(d) Petitions for extension of time. Small systems may obtain an extension of time to establish compliance with rate regulations provided they can demonstrate that timely compliance would result in severe economic hardship. Requests for extension of time should be addressed to the local franchising authority concerning basic service and equipment rates and to the Commission concerning rates for a cable programming service tier and associated equipment. The filing of a request for an extension of time to comply with the rate regulations will not

toll the effective date of rate regulation for small systems or alter refund liability for rates that exceed permitted levels after May 15, 1994.

6. Section 76.952(a) is amended to revise paragraph (a) to read as follows:

Section 76.952 Information to be provided by cable operator on monthly subscriber bills.

(a) The name, mailing address and phone number of the local franchising authority and the Cable Services Bureau of this Commission.

* * * * *

7. Section 76.953(a) is amended to revise paragraph (a) to read as follows:

(a) Complaint regarding a rate in effect on September 1, 1993.

Notwithstanding paragraph (b) of this section, a complaint regarding a rate for cable programming service or associated equipment in effect on September 1, 1993, must be filed by February 28, 1994, except as provided in Section 76.934(c) with respect to small systems.

* * * * *

8. Section 76.958 is added to Subpart N to read as follows:

Section 76.958 Notice to Commission of rate change while complaint pending

A regulated cable operator that proposes to change any rate while a cable service tier complaint is pending before the Commission shall provide the Commission at least 30 days notice of the proposed change.

9. Section 76.964 is amended to redesignate current Section 76.964 as paragraph (a) and to add new paragraph (b).

Section 76.964 Notices to subscribers

(a) In addition to the requirement of Section 76.309(c)(3)(i)(B) regarding advance notification to customers of any changes in rates, programming services or channel positions, a cable operator shall give the relevant franchising authority a minimum of 30 days advance written notification of any changes in rates for cable programming services or associated equipment.

(b) Cable systems shall give 30 days written notice to both subscribers and local franchising authorities before implementing

any rate or service change. Such notice shall state the precise amount of any rate change and briefly explain in readily understandable fashion the cause of the rate change (e.g., inflation, changes in external costs or the addition/deletion of channels). When the change involves the addition or deletion of channels, each channel added or deleted must be separately identified. Notices to subscribers shall inform them of their right to file complaints about changes in cable programming service tier rates and services with this Commission within 45 days of the rate or service change being reflected in their bill, and shall provide the address and phone number of both the local franchising authority and the Cable Services Bureau of this Commission.

10. A new Section 76.986 is added to Subpart N to read as follows:

Section 76.986 "A la carte" offerings

(a) Collective offerings of unregulated per-channel or per-program ("a la carte") video programming shall not be regulated if: (1) the price for the combined package does not exceed the sum of the individual charges for each component of service, and (2) the cable operator continues to provide the component parts of the package to subscribers separately in addition to the collective offering. The second condition will be met only when the per channel offering provides consumers with a realistic service choice. Collective offerings available on April 1, 1993 shall not be regulated if subsequently offered on the same terms and conditions as were in effect on that date.

(b) In reviewing a basic service rate filing, local franchising authorities may make an initial decision addressing whether a collective offering of "a la carte" channels will be treated as an unregulated service or a regulated tier. The franchising authority must make this initial decision within the 30 day period established for review of basic cable rates and equipment costs in Section 76.933(a), or within the first 60 days of an extended 120 day period (if the franchise authority has requested an additional 90 days) pursuant to Section 76.933(b). The franchising authority shall provide notice of its decision to the cable system and shall provide public notice of its initial decision within seven days pursuant to local procedural rules for public notice. Operators or consumers may make an interlocutory appeal of the initial decision to the Commission within 14 days of the initial decision. Operators shall provide notice to franchise authorities of their decision whether or not to appeal to the Commission within this period. Consumers shall provide notice to franchise authorities of their decision to appeal to the Commission within this period.

(c) A limited initial decision under paragraph (b) shall

toll the time periods under Section 76.933 within which local authorities must decide local rate cases. The time period shall resume running seven days after the Commission decides the interlocutory appeal, or seven days following the expiration of the period in which an interlocutory appeal pursuant to paragraph (b) may be filed.

(d) A local franchising authority alternatively may decide whether a collective offering of "a la carte" channels will be treated as an unregulated service or a cable programming services tier as part of its final decision setting rates for the basic service tier. That decision may then be appealed to the Commission as provided for under Section 76.945.

APPENDIX C -- TECHNICAL APPENDIX

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TECHNICAL APPENDIX

Since the original benchmark was adopted in the Report and Order, we have made substantial improvements in the methodology for determining competitive cable rates and adjusting to reasonable levels the rates of cable systems subject to regulation. The Commission has improved both the quality of the survey data base and the approach to estimation of the competitive differential. These revisions are based on additional staff analysis, as well as suggestions from commenters. This Appendix reports on data collection and statistical activities that have occurred since the Report and Order.[1]

Data Adjustments

Several commenters identified missing data and errors in the Cable Rate Survey data base that potentially affected the results of the analysis.[2] The staff attempted to improve the quality of the data base by incorporating additional information received after the original data base was constructed. The National Cable Television Association (NCTA) submitted a data diskette with corrections to the data base, based on phone inquiries to cable systems. The staff randomly checked the changes and determined that the original data were faulty and that the new values fell

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[1]Copies of our revised data base used in this analysis are available on request. Interested parties should contact the Commission's copy service, International Transcription Service, Inc. (ITS) at (202) 857-3800. It is available in fixed ASCII format or in dBase IV format. Documentation on the data base is also available. Questions about the documentation of the structure of the data base should be addressed to the Office of Plans and Policy, FCC, at (202) 653-5940.

[2] Commenters pointing out the sensitivity of the results to data inaccuracies include Stanley M. Besen and John R. Woodbury, "An Analysis of the FCC's Cable Television Benchmark Rates," Charles River Associates, attachment to Comments of TCI, June 17, 1993, pp. 18-19; James N. Dertouzos and Steven S. Wildman, "Regulatory Benchmarks for Cable Rates: A Review of FCC Methodology," attachment to Comments of Viacom , June 21, 1993, pp. 6, 17; and Declaration of William Shew, Arthur Andersen Associates, attachment to comments of Harron Communications Corporation, p. 9; and Lewis J. Perl, Linda McLaughlin, and Jonathan Falk, "Econometric Analysis of the FCC's Proposed Competitive Benchmarks," National Economic Research Associates, Inc. (NERA), submitted with Comments of Time Warner Entertainment Company, L.P., June 16, 1993, p. 5.

within a plausible range. The means of variables that contained changes were compared with their original values to confirm that no major changes in the data resulted. Then the NCTA revisions were incorporated into the data base.

Other commenters pointed out specific errors in the data, and some cable systems sent in amended forms. The staff also detected numerous errors in the data. Checks were made to see that values of important variables lay within possible ranges (e.g., that the number of homes passed was greater than or equal to the number of subscribers). For important variables, data points that appeared to be either implausibly high or implausibly low were pinpointed. The variables given particular scrutiny included monthly charge, total number of channels, total number of satellite channels, rate per channel, and number of tier subscribers. Cases that were outliers in the benchmark regressions were also examined. The classification of competitive systems was examined with particular care. Where evidence of data errors appeared from any of these sources, the staff called the cable system to obtain the correct information, which was then incorporated into the data base.[3]

Some of the data amendments made it necessary to change the sample used in the analysis. Survey forms that were received after the initial deadline were edited, coded, and entered into the data base. Eleven new cases were added. Systems that had been in the original data base but that carried only broadcast signals were removed from the data base because they did not meet the statutory definition of a cable system. Five such records were deleted. One record was deleted because the system had just begun operation and had only part-year data. One record was deleted because the system served only commercial accounts.

Three groups of cable systems--low penetration systems, overbuilds, and municipals--are subject to "effective competition" as defined in Section 623(l)(1) of the

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[3] After correcting the data, we tested the sensitivity of the final regression results to individual observations in the sample by examining Cook's distance. The maximum value of Cook's distance for any observation in the sample was .08, where the critical value at the .005 confidence level is .29. (At higher confidence levels, the critical value is higher.) If the four observations with Cook's distances of greater than .05 are dropped, the competitive differential for overbuild systems including municipal overbuilds (the coefficient of OVL, defined below) remains unchanged to 3 decimal places. R. Dennis Cook, "Detection of Influential Observation in Linear Regression," Technometrics 19 (February 1977), pp. 15-18. Thus our results show very little sensitivity to the presence of any particular observation, which supports reliance on those results.

Communications Act of 1934, 47 U.S.C. 543(l)(1). The staff determined membership in the low-penetration portion of the competitive sample by calculating penetration as a percentage of homes in the franchise area (the statutory definition) rather than depending on the systems' reporting of their penetration. Recalculating this variable resulted in the addition of 134 franchise areas to the low-penetration sample and the removal of 4 franchise areas. We believe that much of the increase in the number of franchise areas reported as having low penetration occurred because many systems reported penetration as a percentage of homes passed (the industry convention) rather than of franchise area homes (the statutory definition). We believe that the new sample definition is a more accurate embodiment of the statutory definition than is the old one. Franchise areas that belonged to the overbuild and municipal samples were also included in the low-penetration sample if they met the statutory criterion. Thus the coefficient of the low-penetration dummy variable is interpreted as the effect of low penetration on revenue per subscriber separately from any effect of overbuild competition or municipal status.[4]

In the overbuild sample, 4 franchises were found to have been coded into the wrong competitive classification. Multichannel competitors existed in these franchise areas but failed to meet 1 of the 2 statutory criteria for overbuild competition--50 percent of franchise area homes passed and 15 percent aggregate franchise area penetration by multichannel competitors other than the largest one.[5] Two of these franchise areas were reclassified as low-penetration systems; the other 2 were reclassified as noncompetitive. One new overbuild system was added to the data base. In the municipal sample, the competitive status of 4 franchise areas was misreported. Two of them were reclassified as overbuilds and 2 were reclassified as noncompetitive. The systems reclassified as noncompetitive were retained in the sample if they belonged in the randomly-chosen noncompetitive sample; otherwise they were dropped from the analysis.[6] The net result was 1 less overbuild system and 4

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[4] As described in the Regression Results section below use of the new sample leaves unchanged the result that the competitive differential dummy variable is never statistically significant for the low-penetration sample. Including the new low-penetration sample in a single competitive dummy results in smaller and less statistically significant estimates of the overall competitive differential.

[5] See 47 U.S.C. 543(l)(1)(B).

[6] The sample to which the survey questionnaires were sent consisted of a 1 percent random sample of cable franchise areas, plus all systems identified as facing multichannel competition,

fewer municipal systems.

As in the original benchmark analysis, not all of the observations collected were used in the analysis. Data for all systems whose responses to the questionnaires and telephone inquiries established that they met the statutory definition of effective competition were included. Data from a noncompetitive sample consisting of first franchise areas of systems in the random sample that did not face effective competition also were included. Data for systems that were sent questionnaires only because they were believed likely to face effective competition, but subsequently proved noncompetitive, were excluded; data for second franchise areas of systems in the random sample were excluded because they were not independent observations; and data from the sample of 100 largest cable systems were not used unless they also belonged to the random noncompetitive sample or faced effective competition.[7]

The sample used in current analyses consists of 496 records, including 253 noncompetitive franchise areas, 205 in the low-penetration sample, 45 in the overbuild sample and 12 in the municipal sample.[8] Of the low-penetration franchise areas, 14 also belong to the overbuild sample and 4 belong to the municipal sample. Some observations dropped out of the analysis sample in the regression analysis because of missing data. The sample used in the final regression consists of 420 records, of which 237 were in the noncompetitive sample, 148 in the low-penetration sample, 39 in the overbuild sample, and 11 in the municipal

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all systems believed to have less than 30 percent penetration, and the 100 largest cable systems. The questionnaires collected information about the system as a whole and, for 2 franchise areas, information specific to the franchise area. One of these franchise areas was the one to which the questionnaire was addressed (first franchise area); the other was the remaining franchise area that faced competition and had the largest number of subscribers or, if no other franchise area faced competition, the remaining franchise area with the largest number of subscribers (second franchise area). The noncompetitive sample used in the analysis consists of all first franchise areas in the random sample except those determined to face effective competition.

[7] Twenty-three franchise areas in the sample used for analysis and 16 in the final regression belonged to the top 100.

[8] The overbuild numbers here pertain to the original overbuild sample, not including systems in the municipal sample. See below.

sample.[9] Of the low-penetration franchise areas in this sample, 11 belong to the overbuild sample and 4 belong to the municipal sample. This sample includes 74 more low-penetration franchise areas and 8 more overbuilds, but 4 fewer municipal systems, than the sample in the original benchmark regression. There were more overbuilds in the regression sample despite a net reduction in the total number of overbuilds because corrections in the data caused fewer observations to be unusable because of missing data.

Disaggregation of the Competitive Sample

In the Report and Order, we noted that the three competitive samples that we identified based on the statute--overbuilds, municipals, and low penetration--had very different price behavior. In the benchmark regression, using a single dummy variable for all three samples produced a coefficient of -0.094, but when the low penetration systems were excluded from the sample, the differential increased in magnitude to -.28. When we used separate dummy variables for each of the three competitive samples, we found that the coefficient of the variable for the low penetration sample was positive, albeit small, and statistically insignificant, while the other 2 competitive dummy variables had negative and statistically significant coefficients. Because the differences among the coefficients of the dummies for the three separate competitive samples were statistically significant, we concluded that it was inappropriate to lump them together and represent them with a single variable in the regression analysis.[10] Therefore, it was decided early on to estimate separate coefficients for each of the three groups. Hazlett argued that the low penetration observations should be dropped because they would distort the analysis.[11] However, our disaggregated approach to estimating the competitive differential

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[9] Some intermediate regressions contain different numbers of observations because they use different variables with different missing data for different observations.

[10] An F test applied to the variables representing the 3 competitive samples showed that they were statistically significantly different at much better than the 1 percent confidence level. Arthur S. Goldberger, Econometric Theory (New York: John Wiley & Sons, Inc., 1964), pp. 173-176; Potluri Rao and Roger LeRoy Miller, Applied Econometrics (Belmont, California: Wadsworth Publishing Company, Inc., 1971), pp. 145-148.

[11] Affidavit of Thomas W. Hazlett, attachment to Joint Comments of Bell Atlantic, GTE, and the NYNEX Telephone Companies, pp. 11-12.

is robust to their inclusion or exclusion.[12]

We examined carefully each of the three samples defined as "effectively competitive."[13] In some cases the variables were refined to improve their ability to represent actual economic competition.

Low penetration sample. While low penetration may be associated with sharing a market with a competitor, it may also result from other conditions unrelated to competition. A system that has just begun operation or a system that serves a low-income neighborhood may have low franchise area penetration as a consequence. Low penetration may also result from high prices or poor service.[14]

Further, the statutory definition of low penetration is based on homes in the franchise area, not homes passed by the system. Yet cable systems frequently offer service only to a portion of the franchise area, often because the remainder of the franchise area is sparsely populated or for some other reason too costly to serve. Thus low penetration may reflect the geographic limits of the system rather than competition or anything related to system service or choices of potential subscribers. In fact, of the low-penetration systems in our analysis sample, 37 percent have more than 30 percent penetration of homes passed. For these reasons, low penetration, as defined in the statute, appears unlikely to be a useful indicator of competitive behavior.

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[12]After a model was selected, it was also estimated by dropping the low penetration data from the database and dropping the dummy variable that identifies those cases. This was done because the coefficient of the low penetration dummy variable was not significantly different from zero, but dropping that variable would have the effect of including the low penetration cases in the baseline (noncompetitive) data unless the low penetration cases were eliminated from the sample. The resulting estimates of the coefficients of the competitive effects for the overbuild and municipal samples were almost indistinguishable from the estimates reported here; the coefficients differed by less than .01.

[13] Kelley recommends a comprehensive analysis of all the effectively competitive systems to determine whether their inclusion is appropriate. Daniel Kelley, "Economic Issues Raised by the Further Notice," Hatfield Associates, Inc., submitted with the Comments of Time Warner Entertainment Company, L.P., June 17, 1993, pp. 5-6.

[14] Hazlett (pp. 5-11) presents evidence suggesting that low demand, high prices, or poor service are commonly associated with low penetration.

Low-penetration systems might have higher prices than equally competitive systems if they faced systematically higher costs. One cause of high costs per subscriber might be low demand, requiring systems to spread fixed costs over a smaller number of subscribers. As described below, we estimated a variety of equations including several cost and demand proxies.[15] The low-penetration coefficient remained statistically insignificant.

Overbuild sample. Next we attempted to refine the measurement of competition for the augmented overbuild sample. Many systems face competition in only a portion of their service areas.[16] We hypothesized that the intensity of competition a system faces in a franchise area varies with the amount of actual overlap with a competitor, that is, the fraction of households the system passes that are actually passed by a competitor. While the data do not permit us to calculate this proportion precisely, we constructed a variable that forms a lower bound for it.[17] This overlap variable takes on a value between zero and

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[15] Commenters arguing in favor of including additional variables in the equation to estimate precisely the effects of variables representing competition, rather than excluding low-penetration observations from the sample, include Stanley M. Besen and John R. Woodbury, "A Further Analysis of the FCC's Cable Television Benchmark Rates," Charles River Associates, July 2, 1993, p. 7; Lewis J. Perl, Linda McLaughlin, and Jonathan Falk, "Econometric Issues Raised by the Further Notice," NERA, July 1, 1993, p. 3; and Daniel Kelley, "Economic Issues Raised by the Further Notice: Evidence from Low Penetration Systems," Hatfield Associates, Inc., July 2, 1993, pp. 1, 3.

[16] Of the systems in our full analysis sample that face competitors, only 31 percent face competition in their whole service area. Forty-seven percent face competition in between 50 and 100 percent of the service area, and 22 percent face competition in less than 50 percent of the service area.

[17] For each overbuild observation, the overlap variable constructed is:

$$O_1 = (HP_1 + HP_2 - H_t)/HP_1,$$

where HP_1 is homes passed by the system in the franchise area, HP_2 is homes passed by the competing system in the franchise area, and H_t is total homes in the franchise area. The data on homes passed by competing systems were not originally entered in the data base, but were obtained from the questionnaires. The variable cannot be less than zero because in every case at least 2 systems in the franchise area pass at least 50 percent of

one for all observations in the augmented overbuild sample and takes on a value of zero for all other observations.

The overlap variable described above measures overlap within a franchise area. Many systems, however, charge uniform prices in all franchise areas. In these cases, the appropriate geographic area for the measurement of competitive overlap is the system service area, not the franchise area. The distinction is empirically important in cases where a system with many franchise areas faces competition in only one or a few franchise areas. In these cases, if the degree of overlap in franchise areas with competition is taken as the measure of competition, the extent of competition to the system will be overstated because the diluting effects of franchise areas without competition will not be taken into account. This mismeasurement will cause the effect of competition on price to be understated, since the observed price response will have been caused by a smaller proportion of homes with competition than the measured proportion. This effect is likely to be greater in large than in small systems because if only one or a few of many franchise areas is competitive it is likely to constitute a smaller proportion of the whole system. Understating the effect of competition on price for large systems might introduce an erroneous appearance that the effect varies with system size.

To account for this effect, for overbuild systems (including municipal ones) we estimated the percentage of homes passed in the entire system service area that are also passed by a competitor. Again, the data permit only an estimate, not an exact calculation.[18] We constructed a combined overlap variable

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homes, as required by the statutory definition of effective competition in overbuild situations. Economic competition, however, may well be created by systems passing less than 50 percent of homes in a franchise area, which would tend to bias the coefficient toward zero.

[18] As noted above, for systems with more than 1 franchise area the questionnaires collected detailed franchise-level data for only 2 franchise areas. For these 2 franchise areas, data are available on homes passed and franchise area households. We know the number of other franchise areas, and for every franchise area where a competitor passes more than 50 percent of homes, we have the percentage of homes passed by the competitor. We estimated the actual percentage overlap, as described above, for the 2 franchise areas with information on homes passed. For other franchise areas, we assumed no overlap where no competitor was reported and 100 percent overlap where a competitor was reported. We assumed that all franchise areas after the first 2 have the same number of homes passed. System overlap was

(designated OVL) that uses the system overlap measure for overbuild systems that report that they charge the same prices in all franchise areas, and uses the franchise area overlap measure for other overbuild systems. The variable takes on the value of zero for non-overbuild systems.

If any two of the three overbuild variables (i.e., franchise overlap, OVL, and B) were included in the regression, none had a significant coefficient due to multicollinearity between the variables. The system overlap variable OVL resulted in a better fit than the franchise area overlap variable. Of the three taken individually, the franchise overlap variable resulted in the worst fit.[19] When B was included and OVL was excluded, the regression had as good a fit as the one where OVL was included and B was excluded.[20] Thus it appears that statistically either B or OVL is an equally good measure of the competitive effect. We chose OVL because we believe it captures the effect of head-to-head competition better than a simple zero-one dummy variable. Therefore, we selected OVL as the best measure of competition.

OVL is generally positive for both the B (overbuild) and C (municipal) samples, but not the A1 (low penetration) sample. Therefore, when OVL is included along with B and/or C, the coefficients of B and C reflect the price deviation from the level estimated for the degree of competition measured by OVL. When OVL is excluded from the regression, the coefficients of B and C reflect the price deviation from the level estimated for no competition.[21]

Municipal sample. The effects of municipal ownership on the pricing behavior of cable systems is unclear a priori. City

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calculated as follows:

$$O_S = O_1 (HP_1/HP_S) + O_2 (HP_2/HP_S) + O_3 (HP_S - HP_1 - HP_2) / HP_S$$

where O_1 is percentage overlap in franchise area 1, O_2 is percentage overlap in franchise area 2, O_3 is percentage of franchise areas after the first 2 with more than 50 percent of homes passed by a competitor, HP_1 is homes passed in franchise area 1, HP_2 is homes passed in franchise area 2, and HP_S is homes passed by the system.

[19] I.e., the R^2 value was lower. However, the coefficient was statistically significant.

[20] I.e., the R^2 value was identical to 4 decimal places.

[21] In either case, since OVL is usually zero for the A1 sample, the coefficient of A1 measures the deviation from the level estimated for no competition.

governments might choose to subsidize cable service, directly or indirectly, as a service to residents, causing municipal systems to have low costs and prices relative to private ones; municipal governments might view cable service as a source of revenues to subsidize other services; or, finally, municipal governments might view cable systems as neither a source of subsidies nor as a service to subsidize.

The municipal sample in the survey consists of pairs of systems, a municipally-owned system and a privately-owned competitor, serving the same area. In order to test the possibility that municipally-owned systems have lower costs or different objectives than their private rivals, we constructed separate dummy variables for the 2 municipal subsamples. The difference between their coefficients was not statistically significant, so we retained a single municipal dummy variable.

All but 2 of the systems in our municipal sample met the overbuild criterion as well.[22] Consequently we included the overbuild municipal systems in the overbuild sample, creating an augmented overbuild dummy variable. This variable had a value of 1 for franchises in the augmented overbuild sample and 0 otherwise. In subsequent analyses, we used a variable representing overbuild status and a separate variable representing the additional effect of belonging to the municipal sample.

Equations Estimated for Our New Model

Using the random sample and the samples of overbuilds, municipals, and low penetration franchises, we estimated various equations using ordinary least squares multiple regression analysis. The use of multiple regression analysis permits the estimation of the separate impact of each variable included in the regression, holding the other variables constant. The main purpose of the regressions was to estimate the impact of competition on rates. Therefore, the variables that were of primary concern were those designed to measure the competitive effect. However, many other characteristics of systems and their markets affect rates. If the effects of these factors are not accounted for, and if they differ between competitive and non-competitive systems, they may bias the estimates of the variables

[22] The other 2 municipal systems also consist of a public-private pair, but the private system has far less than the 15 percent penetration required for overbuild competition. See 47 U.S.C. 543(l)(1)(B)(ii).

measuring the effects of competition.[23] Accordingly, an attempt was made to include in the model as many other variables as one could reasonably argue to be relevant and were found to have coefficients that were statistically significantly different from zero.

Functional Form

Both linear and logarithmic forms of the dependent variable were tried. The choices of the independent variables that resulted in the best fit were the same regardless of which form of the dependent variable was used. In terms of overall statistical fit, there was little to choose between a linear and logarithmic dependent variable; the difference between the fits was insignificant.[24] In light of this statistical insignificance, we considered the underlying economic situation being analyzed. The logarithmic form assumes constant percentage effects of changes in the independent variables, which can be estimated using the coefficients. This implies that the competitive effect is a constant percentage reduction in rates. On the other hand, the linear form implies that the competitive effect is a constant dollars and cents reduction in rates.[25] We were not aware of a plausible economic model that would produce price-margins with constant absolute markups across systems. To the extent that higher rates are indicative of higher price-cost margins, the constant percentage differential is more appropriate. Accordingly, we chose the logarithmic form for conducting most of the analysis.

In the logarithmic form that was used, we took natural logarithms of only some of those variables whose values were always positive. The size variables, measuring the number of system subscribers and the number of channels, were found to give

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[23] Comments arguing that omitted variables may have biased the estimate of the effect of competition include Dertouzos and Wildman, pp. 8-13, 24; Shew, p. 16; Ernst & Young, "A Review of the FCC's Benchmark Formula and Proposed Revisions," attachment to Supplemental Comments of the Medium Sized Operators Group, August 4, 1993, pp. 6-16; Besen and Woodbury, July 2, 1993, p.7; and NERA, June 16, 1993, pp. 6-7.

[24]For the full sample, the linear version of the dependent variable had a slightly better fit. However, when the low penetration franchises were dropped from the sample, the logarithmic version of the dependent variable had a slightly better fit.

[25]Using the linear model with the full sample, the estimated coefficients of the competitive variables (described below) were -$0.22 for A1, -$3.26 for OVL, and -$3.72 for C.

a better fit as reciprocals (which have values of between 0 and 1). In addition, logarithms were not taken of dummy variables (whose value is either 0 or 1) or proportions (whose value could be 0).

Thus the general form that was used was

$$\ln y = a + b_1 \ln x_1 + b_2 \ln x_2 + \ldots + c_1 p_1 + c_2 p_2 + \ldots + u$$

where ln denotes the natural logarithm, y is the dependent variable, the x's are the positive independent variables, the p's are the dummy variables, proportions, and reciprocals, and u is the random error term.[26] The estimated coefficients are a, which is the intercept, the b's, which can be interpreted as elasticities for the x's (the percentage change in y associated with a one percent increase in the x value),[27] and the c's, from which we can compute the proportionate impact d_i of a change in p_i from 0 to 1 using the formula $d_i = e^{c_i} - 1$, where e is the base of the natural logarithms.[28]

Variables Used

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[26]In non-logarithmic format, the equation corresponds to $y = e^a x_1^{b_1} x_2^{b_2} \ldots e^{c_1 p_1} e^{c_2 p_2} \ldots e^u$.

[27]The relationship between elasticities and percentage changes is only approximate. The approximation is better, especially for large percentage changes, if the percentage change is computed on the basis of the average (of the before and the after) level rather than the beginning level. For example, if a value increases from 10 to 20, this is a 100 percent increase from the beginning level, while a decrease from 20 to 10 is a 50 percent decrease from the beginning level. If the average level of 15 is used as the basis of computing the percentage change, both the increase and the decrease are 67 percent changes from this average level.

[28]Changes in the independent variable that are smaller than from 0 to 1 have an impact that is exponentially smaller. In general, a change in p_i from f to g would imply a change in the dependent variable of $e^{c_i(g-f)} - 1$. The smaller the change, the closer the coefficient c_i approximates an elasticity.

The dependent variable used in the regression analysis was the average franchise area revenues from regulated services per subscriber per month, expressed in logarithmic form. This was used, instead of a quoted rate for basic service, because there may have been different amounts and directions of cross-subsidies among services for different cable companies.[29]

The dependent variable was recalculated to improve the measurement of equipment and installation revenue and franchise fees. The estimates in cases of missing data were carefully checked.[30] The staff had information suggesting that cable systems rarely charge full list price for installations, which would cause the calculated value of installation revenue to overstate the true value.[31] To correct for this bias, franchise area installation revenue was estimated from system installation revenue, multiplied by the proportion of system subscribers in the franchise area.[32] The franchise fee calculation was also made slightly more precise by including equipment revenue in the base on which franchise fees are calculated when franchise fees are based on total subscriber revenue and not itemized. The revenue variable was then recalculated on a per-subscriber,

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[29]For example, some cable companies may have charged a low basic service price to entice people to become subscribers and then charged high prices for optional services to subsidize the cost of basic service. Other companies may have charged a high basic service price and low prices for optional services to entice customers to get the optional services.

[30] The structure of the questionnaire caused data on quantities of equipment and installations not to be reported for some franchise areas. As in the calculations for the original benchmark, we estimated franchise area equipment revenues from system equipment revenues in some cases where franchise area data were missing. If no prices were reported for equipment, we assumed that the franchise bundled all equipment charges, and we made no adjustment. If the franchise reported any equipment prices, but no quantities, we estimated equipment revenue assuming the same proportion of equipment revenue to revenue from tier charges in the franchise area as in the system as a whole. Besen and Woodbury (June 17, 1993, pp. 18-19, 26-28) note the problems of adjusting for incomplete equipment information.

[31] NERA, June 16, 1993 (p. 6) points out that installations may have been discounted or even free.

[32] The variable was not calculated for 15 cases where the revenue data were obviously incorrect. These cases were excluded from the analysis.

rather than subscriber-channel, basis.[33]

The independent variables in the regression can be grouped into the following categories: competitive variables, size variables, product mix variables, and other cost variables. Various different variables were tested for inclusion in each of these categories. The ones that were included in our final equation are discussed here. Others that were tried and eliminated (generally because their estimated coefficients were not significantly different from zero) are discussed in the next section.

The key variable used to measure the effect of competition is overlap, the proportion of the service area that is also served by a competitor. This variable can take any value from 0 to 1, with 0 representing no competition and 1 representing competition in the entire service area. The version of this variable that gave the best fit, labeled OVL, uses the system area as the service area for those franchises that reported that the same rates were charged for all franchises of their system, and uses the franchise area as the service area if the rates differ among the franchises of their system (or if there is only 1 franchise in the system). The coefficient of this variable is the primary basis for the measure used to determine the price differential that is deemed to be due to competition, other things being equal.

A second variable reflecting membership in a group defined by the statute as competitive is a dummy variable for low penetration.[34] This variable is identified as A1.[35]

There are three other variables that might be considered to be a hybrid of competitive and other cost variables. One of these is C, which is a dummy variable which is 1 for municipally owned franchises or privately owned franchises competing against municipally owned franchises. It could be argued that municipally owned franchises have lower costs due to direct or

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[33] Dertouzos and Wildman (pp. 5, 10) point out the difficulties of interpretation caused by having similar measures of channels on both sides of the equation.

[34] There were 11 franchises that were classified as both low penetration and overbuilds and 4 franchises that were classified as both low penetration and municipals.

[35] As noted above, when this variable was dropped from the regression because its coefficient was not significantly different from zero, the low penetration observations that were not also overbuilds or municipals were dropped from the regression estimation.

indirect government subsidies or other factors. On the other hand, as noted below, it appears that the privately owned franchises may be charging rates that are even lower than the model would otherwise predict compared to the municipally owned ones they compete against, which would tend to support the argument that the coefficient of this variable measures the impact of more intense price competition than is picked up by the overlap variable. As an indication of this, the length of time that the municipals have been subject to competition has on average been less than that of the overbuild sample,[36] and it is generally accepted economic theory that price competition tends to be more intense in the early years of competition.

The other 2 hybrid variables are related to whether the system is connected to a multiple system operator (MSO). One, identified as MSO, is a dummy variable, which is 1 if the system is connected to a multiple system operator and 0 if it is not. The other is the number of systems connected to the multiple system operator; in log form it is identified as LMS.[37] These variables could measure cost differences between MSO and non-MSO systems, which could result from monopsony power or differences in the quality of service (or other nonprice dimensions of the product offering) not reflected in the other variables included in the regression.[38] It may also reflect other behavioral differences between MSO and non-MSO systems.

There are 2 dimensions of size reflected in our model. As noted above, these are both entered in our model in reciprocal form. One is the total number of channels,[39] which is

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[36]For the municipal sample the average length of time that there has been competition is 3.3 years, while for the overbuild sample (excluding municipals) it is 8.9 years. The range is 1 to 8 years for the municipal sample and 1 to 26 years for the overbuild sample.

[37]This variable takes the value of 0 (the log of 1) for non-MSO systems.

[38] For example, Ernst & Young argues that the cost of rebuilds should be considered. "A Review of the FCC's Benchmark Formula and Proposed Revisions," Ernst & Young, submitted with Supplemental Comments of the Medium-Sized Operators Group, August 4, 1993, pp. 11-13. Although we do not have data on such costs, it may be that MSOs are more likely to engage in rebuilding their systems.

[39]For companies with more than 1 tier of service, the numbers of channels are a weighted average of the channels for all tiers, with the number of subscribers to each tier being used as the weights.