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FEDERALISM IN TELECOMMUNICATIONS REGULATION:

EFFECTIVENESS AND ACCURACY OF STATE COMMISSION IMPLEMENTATION OF TELRIC IN LOCAL TELECOMS MARKETS

Abstract: This POLICY BULLETIN makes use of regression analysis to demonstrate that differences in UNE-P prices both across States and within States are due to genuine cost differences and differences in TELRIC, and are not because of regulatory failure by the States. These findings confirm an obvious principle of Federalism: the States are clearly in a much better position than bureaucrats in Washington to ensure that any government intervention in the market has a true nexus to those consumers and businesses directly affected by such regulation. The analysis also shows that over time unbundled loop prices are converging to TELRIC and not to some other cost standard. Thus, findings presented in this POLICY BULLETIN show clearly that the States are well qualified to implement the FCC's TELRIC rules and have done so with accuracy.

I. Introduction

Justice Clarence Thomas in *AT&T v. Iowa Utilities Board* stated that “basic principles of federalism compel us to presume that States are competent” to interpret and apply federal law, arguing that in the Telecommunications Act of 1996, Congress “deemed it wise to take advantage of the policy expertise that the State commissions have developed in regulating” telecommunications service.¹ An excellent example of this complementary dual role can be found in Section 252(d)(1) of the 1996 Act, where Congress directed State regulatory commissions to set unbundled network element (“UNE”) rates “based on cost” but tasked the Federal Communications Commission (“FCC”) with defining what “cost” meant.

¹ 525 U.S. 366, 411 (1999) (J. Thomas dissenting).

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After much consideration and review, the FCC adopted the Total Element Long Run Incremental Cost standard (“TELRIC”) as the basis to price UNEs.² And, despite incumbent protestations that TELRIC produced confiscatory (*i.e.*, below cost) rates that would not result in “competition, but a sort of parasitic free-riding, leaving TELRIC incapable of stimulating the facilities-based competition intended by Congress”, the Supreme Court in *Verizon v. FCC* upheld the FCC’s pricing methodology and found that the Bells’ arguments simply “founder[ed] on fact”.³

Notwithstanding the Court’s findings in *Verizon*, the incumbents’ assault on TELRIC continued unabated. Not surprisingly, the FCC eventually buckled under the full weight of this attack and released in September 2003 a Notice of Proposed Rulemaking (“NPRM”) to re-visit the TELRIC standard. One component of this NRPM is to determine in more detail why there are “significant differences in [TELRIC] rates from State to State, and even from proceeding to proceeding within a State....”⁴ The purpose of this POLICY BULLETIN, therefore, is to provide an analytical answer to the Commission’s empirical question by using statistical analysis to estimate the relationship between UNE prices and costs.⁵

The results of our numerous empirical tests indicate that the differences in UNE rates across States are not the result of State regulatory failure or the complexity of the TELRIC rules,⁶ but

² *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, CC Docket No. 96-98, 11 FCC Rcd 15499 (1996) (“*Local Competition Order*”) (subsequent history omitted). TELRIC is, in essence, *forward-looking, long-run, average total cost*.

³ *Verizon v. FCC*, 122 S.Ct. 1646, 1669, 1675 (2002). For a full exegesis of the *Verizon* Opinion, see Lawrence J. Spiwak, PHOENIX CENTER POLICY PAPER NO. 13, *The Telecoms Twilight Zone: Navigating the Legal Morass Among the Supreme Court, the D.C. Circuit, and the Federal Communications Commission* (2002) (<http://www.phoenix-center.org/pcpp/PCPP13Final.pdf>).

⁴ *Review of the Commission’s Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers*, WC Docket No. 03-173, Notice of Proposed Rulemaking (rel. Sep. 15, 2003) at ¶¶6, 7 & 27

⁵ This analysis draws from and extends that of Drs. R. B. Ekelund Jr. and G. S. Ford, *Some Thoughts on TELRIC*, Filed on Behalf of Z-Tel Communications, Inc. in WC Docket No. 03-173 (Dec. 16, 2003) and J. A. Eisenach and J. R. Mrozek, *Do UNE Rates Reflect Underlying Costs?*, Filed on Behalf of Verizon Communications in WC Docket No. 03-173 (Dec. 16, 2003).

⁶ Strangely, given that Federalism and States’ rights are centerpieces of conservative philosophy, it is two of the FCC’s Republican Commissioners who are leading the charge that TELRIC inquiries are too complicated for State commissions to handle. *See, e.g.*, Separate Statement of FCC Chairman Michael J. Powell in WC Docket No. 03-173, *supra* n. 4 (“The hypothetical nature of the TELRIC inquiry has been difficult for States to implement and has resulted in a lack of consistency that disadvantages incumbents and competitors alike.”); Separate Statement of Commissioner Kathleen Abernathy in WC Docket No. 03-173, *id.*, (TELRIC “is a black box that permits inconsistent results among the States for reasons unrelated to actual cost differentials, and it also permits internal inconsistencies within individual rate

(Footnote Continued....)

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rather are due to genuine cost differences across States and, more importantly, genuine differences in TELRIC. Indeed, the data consistently show that there is a strong and direct relationship between UNE prices and forward-looking costs and that this relationship is best described as strictly proportional. In other words, if forward-looking costs are 10% different between two jurisdictions, then unbundled element prices will be commensurately 10% different. The hypothesis of strict proportionality cannot be rejected for the prices of unbundled loops or the combination of loops, transport and switching (*i.e.*, UNE-P). Additionally, the empirical evidence indicates that unbundled loop prices are more closely tied to TELRIC than other measures of forward-looking costs, thereby providing strong evidence of State regulatory adherence to TELRIC principles. Thus, findings presented in this POLICY BULLETIN show clearly that the States are well qualified to implement the FCC's TELRIC rules and have done so with accuracy.

II. An Empirical Test of Whether State UNE Rates Relate to Costs

By law, UNE prices are to be “based on cost.”⁷ Since costs vary considerably across States, UNE prices also should vary considerably.⁸ As a result, the critique that the TELRIC rules have resulted in significant differences in UNE rates among the States tells policymakers very little. The critical policy question, therefore, is whether or not the variation in prices is consistent with the variation in costs and, in particular, TELRIC.

This POLICY BULLETIN adopts a direct approach to answering this question by comparing how UNE prices and costs vary across States. Put simply, the empirical tests asks the following question: *if long-run incremental cost is 10% higher in State A than in State B, are UNE prices roughly 10% higher in State A than in State B?* This simple empirical test can be implemented for a sample of UNE prices using least squares regression. Specifically, a simple test of the price-cost proportionality hypotheses is to estimate the following regression:

$$\ln P_i = \alpha + \beta \ln C_i + \varepsilon_i, \quad (1)$$

where P is the UNE price for State i (at some point in time), C is an *exogenous* index or measure of long run forward-looking long-run incremental cost for State i , ε is the typical econometric disturbance term for State i , and “ln” indicates a natural logarithmic transformation.⁹ By

proceedings.”) As demonstrated by the findings in this POLICY BULLETIN, however, Chairman Powell and Commissioner Abernathy are wrong.

⁷ 47 U.S.C. 252(d)(1).

⁸ In fact, if UNE prices did not vary as much as costs do, that would be substantial evidence that the cost-based mandate of Section 252(d)(1) has been violated.

⁹ D. N. Gujarati, *BASIC ECONOMETRICS* (1995) at 5, 165-169.

“exogenous” we mean that the cost index void of State-specific non-cost factors (*e.g.*, political conditions or regulatory preferences distinct from costs) that may influence the final price for UNEs.¹⁰

By expressing price and cost in natural log form, the unknown coefficient β estimated by the regression is:

$$\beta = \frac{\% \Delta P}{\% \Delta C}, \quad (2)$$

which is the percentage change in prices divided by the percentage change in costs.¹¹ If the parameter β was estimated to be 0.50, for example, then the interpretation is that for every 10% change in cost there is a 5% change in UNE price. Or, if β is found to be 1.5, then every 10% change in cost leads to a 15% change in UNE price. The null hypothesis of our empirical test (strict proportionality) is whether $\beta = 1$, implying that when costs change by 10% prices change, in the same direction, by 10%. Note that this test is different than the typical null hypothesis on the coefficient β , which is whether $\beta = 0$. This null hypothesis we are interested in ($\beta = 1$) is tested using the Wald Test (which is distributed χ^2), whereas the standard test ($\beta = 0$) is performed using the t-test.¹²

A. State Unbundled Loops Prices (July 2003)

The first empirical test is conducted using the prices and costs for unbundled copper loops used to serve mass market customers.¹³ Loop price is measured as of July 2003 as reported by Gregg (2003).¹⁴ Two sources provide our measures of forward-looking long-run incremental costs:

¹⁰ States are allowed to consider numerous specific factors in setting TELRIC and many of these factors may not necessarily show up in the estimates of generic cost models. See *Local Competition Order*, *supra* n. 2 at ¶113 (“under the national pricing rules that we adopt for interconnection and unbundled network elements, States will retain the flexibility to consider local technological, environmental, regulatory, and economic conditions”).

¹¹ Gujarati, *supra* n. 9 at 165-169. The magnitude of β does not indicate whether the price is above or below the measure of cost.

¹² *Id.* at Ch. 8.

¹³ These loops are often called “two wire copper loops” or DS0 (“DS Zero”) loops. In general, copper loops should demonstrate significant cost-based variability between urban (where such loops may only be a few hundred feet long) and rural areas (where they may be miles long).

¹⁴ Billy Jack Gregg, *A Survey of Unbundled Network Element Prices in the United States* (Updated July 2003).

(1) the HAI Cost Model 5.0 (“HAI”); and (2) the FCC’s Hybrid Cost Proxy Model (“HCPM”).¹⁵ Given the log transformation of the variables, it is unnecessary to assume that either cost model accurately measures the *level* of costs. Rather, the assumption is that the models provide *reasonable approximations of relative costs* across the States.¹⁶ It is also necessary to assume that to the extent the absolute level of cost is incorrect, the relationship to the “true” costs is multiplicative (rather than additive) and constant across States.¹⁷ Data is available for 49 States.

The estimated regressions using the two different cost measures are

$$\text{HAI: } \ln P = 0.18 + 0.94 \ln C + \varepsilon \quad R^2 = 0.69 \quad (3a)$$

(0.32) (0.12)*

$$\text{HCPM: } \ln P = 0.21 + 0.87 \ln C + \varepsilon \quad R^2 = 0.55 \quad (3b)$$

(0.46) (0.16)*

where White’s robust standard errors are reported in parenthesis.¹⁸ The asterisk (*) indicates the estimated coefficient is statistically different from zero at the 5% level or better (*e.g.*, a rejection of the null hypothesis that either $\alpha, \beta = 0$). This hypothesis, however, is not the one of most interest.

Turning to hypothesis of interest ($\beta = 1$), the estimated coefficient on $\ln C$ is close to 1.0 for both regressions (0.94 and 0.87). The confidence intervals (95%) for the two slope parameters are [0.70, 1.18] and [0.56, 1.18], both containing 1.00. The Wald test statistics for the null hypothesis that $\beta = 1$ are 0.29 (Prob = 0.59) and 0.63 (Prob = 0.43), respectively. Thus, the null hypothesis of strict proportionality cannot be rejected at anything near standard significance levels.¹⁹

¹⁵ Because the HCPM assigns all overhead costs to the loop, we adjust overhead expenses using calculations consistent with those used by the FCC in the Pennsylvania 271 Order. *Application of Verizon Pennsylvania Inc., Verizon Long Distance, Verizon Enterprise Solutions, Verizon Global Networks Inc., and Verizon Select Services Inc. for Authorization to Provide In-Region, InterLATA Services in Pennsylvania*, FCC 01-269, CC Docket No. 01-138, ¶¶ 53-75 (rel. Sept. 19, 2001).

¹⁶ This is not an entirely trivial assumption. Neither of these models (in their generic form) account for all differences across States (*e.g.*, labor rates are identical across States). Thus, even if prices were to be perfectly correlated with true forward-looking long-run incremental costs, the correlation between the prices and our chosen measures of cost would not be perfect.

¹⁷ If the error is e and the true cost c , then the estimates of the cost studies must be $e \cdot c$ rather than $e + c$. In the log-log regression, the e component of the cost estimate is incorporated into the constant term under the assumption the error is multiplicative. Note that the constant term is not statistically different from zero in either the log-log or level-level models, suggesting that the error term e is negligible if present at all.

¹⁸ See Gujarati, *supra* n. 9 at 382-3 (“it is probably a good idea to use the WHITE option routinely”).

¹⁹ Commonly reported significance levels are 1%, 5% and 10%.

The regression shows that in general, the HAI model does a better job explaining cost-based variations in loop rates than the HCPM.²⁰ Notably, the HAI measure of costs explains nearly 70% of the variation in loop prices across States (for this particular sample/time), about 27% more variation than explained by the HCPM cost variable. Clearly, the choice of cost measure is relevant to the empirical test, at least with respect to the fit of the model.²¹ The HAI estimates are probably preferred, since the HAI model is a TELRIC model whereas the HCPM is (arguably) not.²²

We can also utilize the differences between HAI and HCPM to test whether States have more closely adhered to TELRIC standards (represented by HAI) as opposed to some other standard (like HCPM). Using the Davidson-MacKinnon J-test,²³ we add as additional explanatory variables to Equations (3a) and (3b) the predicted values from the rival regression (labeled as P_{HAI} and P_{HCPM}).²⁴ If the additional variable is statistically significant, then the hypothesis that the particular regression is the “true” model is rejected.²⁵ The results from the J-test are:

²⁰ Economists hired by the Bell Companies estimated identical regressions but used only the HCPM to measure cost. See Eisenach and Mrozel, *supra* n. 5.

²¹ While this R^2 is quite high for such a small cross section, we do not encourage the reader to place too much emphasis on the statistic. The role of regression analysis is not to closely fit a line to a particular sample; rather, the goal is to attain unbiased estimates of the population parameters. See, e.g., Gujarati, *supra* n. 9 at 211. See also J. M. Wooldridge, *INTRODUCTORY ECONOMETRICS* (2003) at 41 (“a seemingly low R-squared does not necessarily means that an OLS regression equation is useless. It is still possible that [the regression] is a good estimate of the ceteris paribus relationship between [the variables]; whether or not this is true does *not* depend directly on the size of R-squared. Students who are first learning econometrics tend to put too much weight on the size on the R-squared in evaluating regression equations”).

²² See *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Ninth Report and Order and Eighteenth Order on Reconsideration, 14 FCC Rcd 20432, 20455-56, ¶¶ 41-42 (1999); *Joint Application by SBC Communications Inc., Southwestern Bell Tel. Co., and Southwestern Bell Communications Services, Inc., d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Kansas and Oklahoma*, Memorandum Opinion and Order, FCC 01-29, CC Docket No. 00-217, ¶¶ 47-48 (rel. Jan. 22, 2001) at ¶84 (“We have previously noted that while the USF cost model should not be relied upon to set rates for UNEs, it accurately reflects the relative cost differences among States”).

²³ Gujarati, *supra* n. 9 at 490-1.

²⁴ These predicted values are in natural log form.

²⁵ Two shortcomings of the J-test are the possibility of ambiguous results (both additional variables are or are not statistically significant) and the fact that the t-test has asymptotic justification only (which may reduce the power of the test). See Gujarati, *supra* n. 9 at 491. Neither appears to be a problem with our regressions: the results are unambiguous and statistical significance never approaches what we would consider a “marginal” decision (the t-statistic on P_{HCPM} is less than 1.00 and that on P_{HAI} is 3.60).

$$\text{HAI: } \ln P = 0.39 + 1.23 \ln C - 0.35 P_{HCPM} + \varepsilon \quad R^2 = 0.70 \quad (4a)$$

(0.31) (0.35)* (0.37)

$$\text{HCPM: } \ln P = 0.04 + -0.36 \ln C - 1.37 P_{HAI} + \varepsilon \quad R^2 = 0.70 \quad (4b)$$

(0.31) (0.33) (0.38)*

These results show that States seem to have closely adhered to the TELRIC standard. Since P_{HCPM} is not statistically significant in Equation (4a) but P_{HAI} is statistically significant in Equation (4b), the test results imply that the “UNE Price is TELRIC based” model (Eq. 3a) *best* represents what State commissions have adopted. The ability to distinguish between a TELRIC model and an alternate cost-based model is powerful evidence that States have closely adhered to the TELRIC standard.

In conclusion, these regressions show that State commissions, on average, appear to have done the job entrusted to them by Congress and the FCC to set UNE rates “based on cost” and, more particularly, based on TELRIC. Variability in loop rates is accounted for by cost variability among States. Put another way, the *best guess* of the difference in loop rates between two States whose costs differ by 10% is 10%. Thus, the data indicate that the States are well qualified to implement the FCC’s TELRIC rules and have done so with accuracy.

B. *Convergence to TELRIC, or “Learning by Doing”*

We turn now to the assertion that the TELRIC rules should be changed because in recent years, UNE prices have changed from “proceeding to proceeding within a State.” It is true that, in a few cases, there have been substantial changes in prices across proceedings in the same State, but this fact does not imply *per se* that the current UNE price is not “cost based.”²⁶ Indeed, sizeable UNE price changes may reflect an improved understanding of cost estimation, the correction for past mistakes, or simply the transition from interim to permanent prices following a detailed cost proceeding. In some cases, UNE price changes between proceedings reflect adjustments required by the insincere or misleading testimony of ILEC witnesses.²⁷ Further, if UNE prices are

²⁶ Bell companies have argued that State commission actions to lower UNE rates are evidence that those rates are “below cost.” *Petition for Expedited Forbearance of the Verizon Telephone Companies*, WC Docket No. 03-157 (filed July 1, 2003); *Joint Petition of Qwest Corporation, BellSouth Telecommunications, Inc. and SBC Communications Inc. for Expedited Forbearance*, WC Docket No. 03-189 (filed July 31, 2003).

²⁷ See, e.g., *Order on Unbundled Network Element Rates, New York Public Service Commission*, Case 98-C-1357 (January 23, 2002) at 21-2. In this Order that reduced unbundled switching rates, the Commission stated that they “were unimpressed by Verizon’s belittling, as ‘inadvertent misstatement’” the facts related to Verizon’s own switching costs – statements that were used to set switching rates in 1999 (determined to be well in excess of TELRIC in 2002).

converging with TELRIC over time, then the variance of deviations from costs should decline over time.²⁸

It is possible to study empirically whether State commissions, in implementing the TELRIC rules, have been “learning by doing.” Whether or not temporal UNE price changes are a departure from or return to cost-based pricing is an empirical question, and one that can be answered. Specifically, if unbundled loop prices more accurately reflect costs over time, then the coefficient β should move closer to 1.0 over time and the fit of the regression (*e.g.*, the R^2) should improve. The opposite would be true if UNE price changes reflect a departure from a cost-based standard. Given that the TELRIC rules have been in place nearly eight years, there should be sufficient evidence to analyze variability over time.

One piece of evidence that would support the “learning by doing” thesis is if UNE rates more closely reflect costs over time. To test this hypothesis, we estimate Equation (1) using unbundled loop prices from January 2002 (Jan-02) and July 2003 (July-03).²⁹ The results are summarized as follows:

$$\text{HAI (July-03): } \ln P = 0.18 + 0.94 \ln C + \varepsilon \quad R^2 = 0.69 \quad (3a)$$

(0.32) (0.12)*

$$\text{HAI (Jan-02): } \ln P = 0.91 + 0.70 \ln C + \varepsilon \quad R^2 = 0.42 \quad (3a')$$

(0.30)* (0.11)*

$$\text{HCPM (July-03): } \ln P = 0.21 + 0.87 \ln C + \varepsilon \quad R^2 = 0.55 \quad (3b)$$

(0.46) (0.16)*

$$\text{HCPM (Jan-02): } \ln P = 1.06 + 0.61 \ln C + \varepsilon \quad R^2 = 0.29 \quad (3b')$$

(0.34)* (0.12)*

These results strongly indicate that unbundled loop prices more closely correlated to cost (and TELRIC) over time. In other words, after the first round of initial implementations by State commissions, State commissions, as a group, have generally adopted rates that are closer to TELRIC in their second or third looks at the issue. This conclusion is supported by the evidence

²⁸ H. Hotelling, *Review of the TRIUMPH OF MEDIOCRITY IN BUSINESS*, by Horace Secrist, 28 J. AMER. STATIST. ASSOC. 463-65 (1933) (“The real test of a tendency to convergence would be in showing a consistent diminution of variance”). The deviation from costs can be measured by the disturbance term of the regression (ε). Therefore, a test of convergence is the reduction in $\text{Var}(\varepsilon)$ over time.

²⁹ Billy Jack Gregg, *A Survey of Unbundled Network Element Prices in the United States* (Updated January 2002).

that over time the estimated coefficient on cost moves closer to 1.0 and the R^2 values rise sharply. For the January 2002 price data, we can reject the null hypothesis that $\beta = 1$ for both cost measures, implying that the prices were not strictly proportional to costs.³⁰ As mentioned above, we cannot reject the hypothesis that $\beta = 1$ for the July-2003 prices.

As a test of convergence, we compute the ratio of the variance of the regression disturbances (ε) for 3a and 3a'. This ratio has an F distribution with $(n - k - 1)$ and $(n - k - 1)$ degrees of freedom.³¹ The statistic is 1.70 (Prob = 0.03), so we can reject the null hypothesis that the variances are identical between the two periods. For equations 3b and 3b', the computed F-statistic is 1.45 (Prob = 0.11), so we can only marginally reject the hypothesis of equal variance for the HCPM data (at the 11% significance level). This result is consistent with the J-test result discussed earlier.

These results are not surprising. In States using various forms of price cap or rate-of-return regulation, the first TELRIC cases might have been their first experience with forward-looking cost studies thereby allowing inexperience to reveal itself in rates. However, it is reasonable to expect that mistakes or miscalculations based on inexperience would be remedied over time. Our evidence supports this hypothesis. Consequently, the attack on the current TELRIC rules based upon recent State commissions' rate revisions is unfounded: UNE loop rates are today closer to TELRIC than they were before those revisions took place.

C. UNE-Platform Prices and Costs

Whether rates for the UNE-Platform (or UNE-P) are "based on cost" is the topic of heated debate. While we are unaware of any evidence that proves conclusively that TELRIC is below the wholesale costs of providing unbundled elements, there is plenty of evidence to the contrary.³² Moreover, as noted above, the Supreme Court after careful review came to the exact same conclusion in *Verizon* when it reviewed the FCC's pricing rules, particularly in regard to claims that TELRIC produced "parasitic" competition and deters investment.³³ Nonetheless, despite

³⁰ The Wald Test statistics are 7.03 (Prob = 0.01) and 10.62 (Prob = 0.002).

³¹ The n represents sample size and k represents the number of variables in the regression.

³² See T. R. Beard and C. C. Klein, *Bell Companies as Profitable Wholesale Firms: The Financial Implications of UNE-P*, PHOENIX CENTER POLICY PAPER NO. 17 (November 2002) (<http://www.phoenix-center.org/pcpp/PCPP17Final.pdf>); T. R. Beard, G. S. Ford, and C. C. Klein, *The Financial Implications of the UNE-Platform: A Review of the Evidence*, Forthcoming in *COMMLAW CONSPECTUS* (2004); G.S. Ford, *The Myth of Below-Cost UNE-P Prices* (February 2003)(www.telepolicy.com/papers.htm).

³³ See *supra* n. 3. Equally as important, the position that TELRIC has deterred investment by incumbents or entrants is unsupported by empirical evidence. See PHOENIX CENTER POLICY BULLETIN NO. 4: *The Truth About Telecommunications Investment after the Telecommunications Act of 1996* (24 June 2003) (<http://www.phoenix-center.org>)

(Footnote Continued...)

substantial evidence to the contrary and none in support, many federal regulators and judges – not to mention the press – continue to believe that UNE prices are uncorrelated with and below costs.³⁴

As with loops, empirical analysis can shed light on this important issue and hopefully replace the conjecture and rhetoric. By adding the price and cost of the unbundled switching/transport element to the loop rate, it is possible to evaluate the relationship of the wholesale prices for the elements making up UNE-P to forward-looking costs. Gregg's (2003) reported switching prices are admittedly incomplete, so we turn to the estimates of Commerce Capital Markets (2002).³⁵ This data is not as current as that used for our loop regressions, but it is all that is publicly available. We caution the reader that the Commerce Capital Markets' estimates of switching costs are of

[center.org/PolicyBulletin/PolicyBulletin4Final.pdf](http://www.phoenix-center.org/PolicyBulletin/PolicyBulletin4Final.pdf)); PHOENIX CENTER POLICY BULLETIN NO. 5: *Competition and Bell Company Investment in Telecommunications Plant: The Effects of UNE-P* (Originally released 9 July 2003 and updated 17 September 2003)(<http://www.phoenix-center.org/PolicyBulletin/PolicyBulletin5.pdf>); PHOENIX CENTER POLICY BULLETIN NO. 6: *UNE-P Drives Bell Investment - A Synthesis Model* (17 September 2003)(<http://www.phoenix-center.org/PolicyBulletin/PolicyBulletin6Final.pdf>); G. S. Ford and M. D. Pelcovits, *Unbundling and Facilities-Based Entry by CLECs: Two Empirical Tests* (July 2002)(www.telepolicy.com); T. R. Beard, R. B. Ekelund Jr., and G.S. Ford, *Pursuing Competition in Local Telephony: The Law and Economics of Unbundling and Impairment* (November 2002) (www.telepolicy.com); T. R. Beard, G. S. Ford, and T.M. Koutsky, *Mandated Access and the Make-or-Buy Decision: The Case of Local Telecommunications Competition* (December 2002)(www.telepolicy.com); R. D. Willig, W. H. Lehr, J. P. Bigelow, and S. B. Levinson, *Stimulating Investment and the Telecommunications Act of 1996*, Unpublished Manuscript (October 2002); K A. Hassett and L. J. Kotlikoff, *The Role of Competition in Stimulating Telecom Investment*, AEI PUBLICATION (October 2, 2002) (www.aei.org/publications/pubID.14873/pub_detail.asp). Hassett *et al.* (2002) perform a simulation rather than using actual data. See also, *Does Unbundling Really Discourage Facilities-Based Entry? An Econometric Examination of the Unbundled Local Switching Restriction*, Z-TEL POLICY PAPER NO. 4 (February 2002) (www.telepolicy.com); *Competition at the Crossroads: Can Public Utility Commissions Save Local Telephone Competition?* Consumer Federation of America (October 2003) (<http://www.consumerfed.org/pr10.07.03.html>).

³⁴ See, e.g., *USTA v. FCC*, 290 F.3d 415, 422 (D.C. Cir. 2002); *Powell Expects "Triennial Review" Order To Be Released Monday*, TRDAILY (June 25, 2003) (Powell "also joked about the unbundled network element-platform (UNE-P) when discussing the popularity of wireless 'hot spots.' 'Really, these hot spots are great,' he said. 'You just walk right up and get access for next to nothing. Sort of like UNE-P.'"); Kathleen Q. Abernathy, *My View from the Doorstep of FCC Change*, 54 FED. COM. L.J. 199, 206-7 (2002) ("Excessive sharing of facilities destroys the investment incentives of both incumbents and new entrants alike: rational incumbents avoid risking capital on new facilities if rivals can get a free ride, and rational entrants will refrain from deploying their own facilities if they have unrestricted access to incumbents' networks at cost-based rates. This stifling of investment incentives is all the more problematic where supposedly "cost-based" rates are, as in some cases, based on a model that makes unrealistic economic assumptions and accordingly turn out to be below actual cost. In striving to stimulate some form of local telephone competition, by creating expansive resale and unbundling opportunities, we have adopted rules that have failed to engender, and may have actually hampered, facilities-based competition—which is the most viable strategy in the long term and the one most likely to benefit consumers.") (emphasis in original); James J. Cramer, *Wrong Guys Victorious at FCC Today*, THESTREET.COM (20 February 2003).

³⁵ Commerce Capital Markets, *Status & Implications of UNE-Platform in Regional Bell Markets* (Nov. 2002).

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questionable accuracy.³⁶ However, if the mis-measurement is random (not systematic with zero mean) and uncorrelated with our measure of costs, the estimated coefficients will be unbiased.³⁷ Mis-measurement, unfortunately, does inflate the standard errors of the estimates and, consequently, reduces the power of the hypothesis tests and reduces the R².³⁸ The estimated regression equations are:

$$\text{HAI: } \ln P' = 0.61 + 0.85 \ln C + \varepsilon \quad R^2 = 0.60 \quad (6a)$$

(0.35) (0.12)*

$$\text{HCPM: } \ln P' = 0.50 + 0.85 \ln C + \varepsilon \quad R^2 = 0.42 \quad (6b)$$

(0.46) (0.15)*

These regressions show that the HAI model (TELRIC) better explains UNE-P price (the sum of loops, switching and transport) variability between the States than the HCPM. Again, the estimated coefficient β is close to 1.0, and the null hypothesis that $\beta = 1$ cannot be rejected for either regression: the test statistics are 1.69 (Prob = 0.20) and 1.02 (Prob = 0.32), respectively. Thus, we cannot reject the hypothesis that UNE-P prices are strictly proportional with either cost measure. As with loops alone, the HAI model performs better as a measure of cost than does the HCPM model (*i.e.*, the standard error is smaller and the R² is larger). The J-test performed on Equations (6a) and (6b) also indicates that the Price-TELRIC regression is the “true” model (at least relative to the Price-HCPM regression).³⁹ As a result, this regression analysis supports our analysis made in other Phoenix Center research that UNE-P rates are, in fact, fully consistent with the TELRIC rules and are, coincidentally, above Bell company costs.⁴⁰

III. Conclusion

In the 1996 Telecommunications Act and complementary regulations, Congress and the FCC trusted State regulatory commissions to set prices for unbundled network element that are “based on cost.” In this POLICY BULLETIN we have used regression analysis to show that unbundled loop

³⁶ See Beard & Klein and Beard, Ford, & Klein, *supra* n. 32.

³⁷ If the measurement error has a non-zero mean, then the constant term (α) is biased. However, our tests are not based on the value of the constant term.

³⁸ Specifically, the inflated standard errors will lead to an *under-rejection* of both the hypotheses $\beta = 0$ and $\beta = 1$, and will deflate the R² (the disturbance term captures the noise in the dependent variable).

³⁹ The results here are not as strong as for Equations (3a) and (3b), which is probably due to mis-measurement in the price data. The t-statistic for P_{HCPM} in Equation (6a) is -1.86 (Prob = 0.07) and for P_{HAI} in Equation (6b) is 4.18 (Prob = 0.0001).

⁴⁰ See Beard & Klein and Beard, Ford & Klein, *supra* n. 32.

prices and the price for UNE-P are strictly proportional to cost and, in particular, TELRIC. This evidence confirms that State regulatory commissions have successfully performed the task delegated to them by Congress and the FCC. We also show that unbundled loop prices have over time converged to TELRIC and not some other cost standard. Thus, differences in UNE prices both across States and over-time within States do reflect genuine cost differences and, more importantly, genuine differences in TELRIC.⁴¹

Successful implementation of cost-based UNE prices by State commissions affirms the principle of Federalism in telecommunications policy. Indeed, State commissions appear fully capable of implementing competition policy and are, no doubt, in a much better position than Washington bureaucrats to ensure that government intervention in the market has a true nexus to those consumers and businesses directly affected by such regulation. As such, the State role should be both welcomed and preserved in the on-going effort to fulfill the promise of the 1996 Act.

⁴¹ It remains to be seen whether empirical evidence will trump the rhetoric at the FCC, since it appears the Commission has already pre-determined to raise UNE prices. See, e.g., M. J. Bartlett, *Wireless Telecom Regulation: The Year Ahead*, *Bank of America Securities WASHINGTON WATCH*, (Jan. 30, 2004) at 6, 17 (quoting Jeffrey Carlisle, Senior Deputy Bureau Chief of the FCC's Wireline Competition Bureau as conceding that "the [TELRIC] NPRM makes very clear that what the Commission wants to do is ... increase certain rates."); S. Levine, *FCC Starts TELRIC Proceeding*, *AMERICA'S NETWORK WEEKLY* (Sept. 12, 2003)(quoting telecom analyst Max Smetannikov's observation that "[FCC Chairman Michael Powell] is probably not opposed to basically helping the Bells raise rates and eliminate UNE-P as a mechanism for local competition.")