Does Unbundling *Really* Discourage Facilities-Based Entry?

An Econometric Examination of the Unbundled Switching Restriction

Z-Tel Public Policy Paper No. 4
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Abstract: In this paper, we examine empirically the impact of the FCC's unbundled local switching restriction on the deployment of CLEC local switching facilities across the United States. Econometric analyses suggest – contrary to the intent of the restriction -- that the restriction reduces the level of CLEC switch deployment in restricted markets. Our estimates indicate that the FCC's switching restriction has reduced CLEC switch deployment by 19%. Combined with earlier studies showing that the switching restriction reduces the overall level of competition in residential and small business markets by 36%, these findings indicate the switching restriction is detrimental to the goal of competition (of any sort) in local exchange markets.

I. Introduction

The flavor-of-the-month in FCC telecom policymaking appears to be the goal of promoting "facilities-based entry" – which the FCC seemingly interprets to include only competitive entrants that own and operate their own local circuit switch.[1] Indeed, in its pending *UNE Triennial Review Notice*, the FCC has indicated that its quest for this particular form of "facilities-based entry" will be a core component of decision regarding the national minimum list of unbundled network elements.

Incumbent local exchange carriers routinely argue that unbundling requirements provide a disincentive for competitive carriers to deploy network facilities.[2] That

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[1] *See, e.g., In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, et al.*, CC Docket Nos. 01-138, 96-98, and 98-147, Notice of Proposed Rulemaking, FCC 01-316 at paras. 3, 22-30 (rel. Dec. 20, 2001) ("*UNE Triennial Review Notice*"). Interestingly, this new FCC proposal seems contrary to FCC Section 271 precedent (urged upon the FCC by Bell operating companies applicants) that a "facilities-based competitor" under Section 271(c)(1)(A) includes entrants that purchase unbundled local switching and, in particular, carriers that provide local service by means of the UNE Platform.

[2] For example, Verizon recently argued before the FCC that "[t]he Commission should act now to eliminate, or at a minimum significantly limit, the obligation to provide unbundled local switching. . . . The continued availability of unbundled local switching under these circumstances serves to undermine and discourage investment in competing facilities by all providers. . . " Letter from Thomas J. Tauke and Michael E. Glover, Verizon, to Chairman Powell, FCC, Oct. 19, 2001, filed in FCC CC Docket No. 96-98 ("Verizon Letter"). For a complete rebuttal to In that letter, *see*

argument is, however, eminently testable through econometric analysis – although incumbents generally do not move beyond their rhetoric to sophisticated study.

Indeed, the *UNE Remand Order*[3] provides a textbook framework for analyzing whether the availability of UNEs disincents CLEC deployment of network facilities. In particular, in that proceeding, the FCC restricted access by CLECs to unbundled local switching in the largest 50 MSAs (Density Zone 1) to serve customers with more than three telephone lines. The federal restriction precludes entrants from using the UNE Platform – the combination of unbundled loops, switching and transport – to serve giant swaths of access lines in those MSAs.

If the incumbent unbundling-is-a-disincentive-to-deploy hypothesis were true, one would expect that restricting access to unbundled switching *would not adversely affect competitive entry* and would *actually promote* switch deployment by CLECs in those Top 50 MSAs. Z-Tel Public Policy Paper No. 3 utilized econometric techniques to evaluate the former concern but showed that the restriction on unbundled local switching has resulted in *substantially less competition* for residential and small business customers in states where the restriction applied. On average, the switching restriction reduced competitive entry for these customers by 54% in effected states.

This Z-Tel Public Policy Paper No. 4 addresses the latter concern and shows that the FCC's restriction has not resulted in greater switch deployment by CLECs. Indeed, this Public Policy Paper No. 4 shows that there is *the restriction has reduced CLEC switch deployment in affected states by 19%***.** Specifically, this paper utilizes an econometric model to evaluate the deployment of switching equipment by CLECs in the period following the effective date of the *UNE Remand Order* (April 2000).

In short, the FCC policy of restricting unbundled access to local switching has foisted the worst of both worlds upon states and consumers – where the

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Letter from Robert A. Curtis and Thomas M. Koutsky, Z-Tel, to Chairman Powell, FCC, Dec. 5, 2001, filed in FCC CC Docket No. 96-98.

[3] *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98, Third Report and Order and Fourth Further Notice of Proposed Rulemaking, 15 FCC Rcd 3696 (1999) ("*UNE Remand Order*").

restriction applies, there is less competition for residential and small business consumers and there are fewer CLEC-owned local switches.

II. Statistical Framework

The empirical analysis of this policy paper focuses primarily on CLEC local switch deployment between April 2000 to October 2001: the period immediately following the implementation of the restriction. In alternative regressions, however, we also will consider CLEC local switch deployment between January 1999 and April 2000. For the empirical model, we view CLEC local switch deployment as a function of market size (*SIZE*), market density (*DENSE*), and the presence or absence of the unbundled switching restriction. Market size (*SIZE*) is measured as local exchange service expenditures in the state.[4] Market density (*DENSE*) is measured as the number of access lines per square mile.

Two approaches are used to capture the effects of the switching restriction. First, the variable *RESTRICT* measures the percent of state population living in a top 50 MSA where the switching restriction applies.[5] For this specification of the restriction, the number of CLEC local switches deployed (per access line) during the period for which the restriction applies, *N*, can be written as the least squares regression

$$\ln(N) = \beta_0 + \beta 1 \cdot \ln(SIZE) + \beta_2 \cdot \ln(DENSE) + \beta_3 \cdot RESTRICT + \varepsilon \qquad (1)$$

where the βs are the estimated coefficients and ε is the econometric disturbance term. The impact of the switching restriction on CLEC local switch deployment is measured by the estimated coefficient β_3. If β_3 is positive, then the restriction increased CLEC switch deployment in the restricted markets. Alternately, if β_3 is negative, then the restriction reduced CLEC switch

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[4] This variable is constructed by multiplying billable access lines by average revenue per line. Average revenue per line data is provided by *State-by-State Telephone Revenues and Universal Service Data*, Federal Communications Commission, April 2001, Table 5.

[5] New York's local tariff and Texas's "T2A" interconnection agreement effectively superceded the FCC's switching restriction in those states during this period. Although the restriction no longer applies in Illinois because of recent state law, the FCC's restriction applied during the time period evaluated here.

deployment. Of course, the restriction may have no effect on switch deployment ($\beta_3 = 0$).

In an alternative specification of the restriction, two variables are employed. The first variable measures the percent of a state's population living in the top 50 MSA (*TOP50*), regardless of whether the restriction applies. A dummy variable that equals one for states with top 50 markets where the restriction does not apply is the second variable (*D*) capturing the influence of the switching restriction.[6] For this specification of the restriction, the least squares regression is

$$\ln(N) = \alpha_0 + \alpha_1 \cdot \ln(SIZE) + \alpha_2 \cdot \ln(DENSE) + \alpha_3 \cdot TOP50 + \alpha_4 \times D \times TOP50 + \varepsilon \quad (2)$$

where the α's are the estimated coefficients and ε is the econometric disturbance term. This alternate specification of the model allows us to measure the impact of the restriction in restricted *and unrestricted* markets (i.e., states) with top 50 MSAs. In markets with top 50 MSAs and the switching restriction, the coefficient α_3 measures the impact of the switching restriction on switch deployment. If α_3 is positive, then the restriction increased CLEC switch deployment in the restricted markets. Alternately, if α_3 is negative, then the restriction reduced CLEC switch deployment. Finally, the restriction may have no effect on switch deployment ($\alpha_3 = 0$).

In markets with top 50 MSAs but no switching restriction, the impact of the restriction is measured by ($\alpha_3 + \alpha_4$). If α_4 is positive (negative), then the markets with unrestricted top 50 MSAs have more (less) CLEC switch deployment than markets with restricted top 50 MSAs. If a joint test of statistical significance indicates that ($\alpha_3 + \alpha_4$) = 0, then the econometric model confirms that having a top 50 MSA in a market is relevant only when the restriction applies to that market.

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[6] The variable *D* has values of 1 for New York and Texas, 0 otherwise.

1. DATA

The dependent variable of the regression is defined as the number of CLEC local switches (per access line) in each state deployed between April 2000 and October 2001, or January 1999 and April 2000. The Local Exchange Routing Guide ("LERG") is used to count CLEC local switches per state.[7] Bell Company total billable access lines are provided by ARMIS Form 43-04 (year 2000; www.fcc.gov/ccb/armis). Data on squares miles (land area only) in each state is provided by the Census Bureau's *Statistical Abstract of the United States* (year 2000, www.census.gov).

The variables *SHARE* and *RESTRICT*, which account for the presence of the ULS restriction, are defined as the percentage of the state's population residing in a top 50 MSA and a restricted top 50 MSA, respectively.[8] Population data is provided by the Census Bureau.[9] The final dataset consisted of the 48 observations (i.e., the 48 contiguous states).

2. RESULTS

The results from the least squares regressions are provided in Table 1. White's standard errors are used to compute the t-statistics. Equations (1) and (2) are estimated for CLEC switches deployed between April 2000 and October 2001. Model (1) and Model (2) summarize the results of these regressions. While the switching restriction did not apply during the January 1999 to April 2000 period, we estimate the same regressions using a dependent variable constructed during the pre-restriction time period. These alternate regressions are estimated to confirm that the effect of the *RESTRICT* and *SHARE* variables are zero during this period. If statistically significant impacts were found on these variables during the period for which the restriction did not apply, then it is possible that our variables are measuring factors other than the switching restriction. These

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[7] The LERG is queried for CATEORGY of CLEC, CAP, or L_RESELLER, a COC_TYPE of "EOC," and with non-null values in the "NPA" and "NXX" fields. Not all of these switches are Class V end-office switches.

[8] The difference between *SHARE* and *RESTRICT* is that the share of top 50 MSA population in New York and Texas in included in *SHARE*, but not in *RESTRICT*. Mathematically, *RESTRICT* is equal to $D \cdot SHARE$.

[9] In the few cases where a MSA covers more than one state, the population is divided between the states using the share of populations in the major cities of the MSA.

additional regressions, the results of which are summarized as Model (3) and (4), serve only the purpose of validating the variables chosen to measure of the restriction.

Table 1. Regression Results

Dependent Variable (ln*N*)

	Model 1	Model 2	Model 3	Model 4	Descriptive Statistics
	4/00 to 10/01	4/00 to 10/01	1/99 to 4/00	1/99 to 4/00	Mean (St. Dev)
Constant	-7.56 (-3.01)*	-6.91 (-2.33)*	-6.87 (-4.61)*	-6.99 (-4.06)*	…
ln(*SIZE*)	-0.20 (-1.33)	-0.24 (-1.34)	-0.23 (-2.67)*	-0.22 (-2.17)*	1.11E+08 (1.21E+08)
ln(*DENSE*)	0.02 (0.20)	0.024 (0.27)	-0.07 (0.99)	-0.07 (-0.98)	40.26 (61.98)
RESTRICT	-0.77 (2.29)*	…	-0.41 (1.19)	…	0.263 (0.263)
TOP50	…	-0.66 (1.76)*	…	-0.44 (-1.15)	0.278 (0.26)
D×TOP50	…	1.58 (1.67)*	…	0.26 (0.35)	0.04+ (0.20)
R-Square	0.18	0.18	0.32	0.32	
Obs.	48	48	48	48	48

* Statistically significant at the 10% level or better.
+ Mean and Standard Deviation for the variable *D* only.

During the period April 2000 to October 2001, we find statistically significant evidence that the FCC switching restriction reduced the deployment of CLEC local switches. Measured at the sample mean, estimates of Equation (1) indicate that eliminating the switching restriction would increase switch deployment by 19%.[10] State-specific impacts of the switching restriction are provided in Table 2. The *RESTRICT* variable had no effect on CLEC switch deployment during the January 1999 to April 2000 time period, as expected. We are more confident that

[10] The marginal effect is computed as [(exp($\beta_3 \cdot$*RESTRICT*)-1)], or [(exp(-0.77·0.263)-1)]. This specification of the marginal effect is used to measure the marginal effect of discrete changes in the explanatory variable on the dependent variable. See George S. Ford and John D. Jackson, *Interpreting Variables in Semi-logarithmic Equations*, Unpublished Manuscript, Auburn University (1995).

our measure of the restriction (*RESTRICT*) is not capturing the influence of other factors on switch deployment.

Estimates of Equation (2) confirm this negative relationship between the switching restriction and CLEC switch deployment (Model 2). The sign of α_3 is negative and statistically significant during the April 2000 to October 2001 time period. At the sample mean, the estimates indicate that removing the switching restriction would increase CLEC switch deployment by 17%. This estimated impact is comparable to the 19% average effect from Equation (1) / Model (1).

Furthermore, α_4 is a positive and statistically significant coefficient. A test of joint significance on ($\alpha_3 + \alpha_4$) does not allow us to reject the null hypothesis that the sum of the two coefficients equals zero. In other words, in markets with top 50 MSAs where the restriction does not apply, there is no relationship between population in the top 50 MSAs and switch deployment. This results is encouraging, in that it confirms that our measures of the restriction, including *RESTRICT*, are indeed capturing the effects of the switching restriction and not other factors. The percent of population in the top 50 MSAs is relevant to switch deployment only in restricted markets.

As expected, there is no relationship between our measures of the switching restriction and switch deployment prior to the implementation of the FCC's restriction. Model 4 has statistically insignificant coefficients on both *TOP50* and *D·TOP50*. Again, the reasonableness of our measures of the switching restriction is confirmed.

Table 2 shows that if unbundled local switching were not restricted in the listed states, *there would be 19% more CLEC switch deployment in those states***,** other factors being equal. A state like Illinois, which recently implemented unlimited access to unbundled local switching pursuant to a state statute, should see a large increase (about 42%) in the levels of facilities-based switch deployment and CLEC penetration in residential and small business markets as a consequence of that action.[11]

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[11] Indeed, Z-Tel is now offering a small business product in the state of Illinois, in direct response to the legislation eliminating the switching restriction.

Table 2. Increase in CLEC Switch Deployment (per access line) from Removing ULS Restriction

[Based on Equation (1), Model (1)]

State	Percent Increase in CLEC Switch Deployment	State	Percent Increase in CLEC Switch Deployment
AZ	38%	MN	37%
CA	31%	MO	34%
CO	31%	NJ	31%
CT	24%	NC	22%
DC	54%	OH	23%
FL	32%	OR	30%
GA	32%	PA	35%
IL	42%	SC	2%
IN	18%	TN	15%
KS	18%	UT	37%
LA	21%	VA	15%
MD	28%	WA	30%
MA	36%	WI	19%
MI	29%	Avg	19%

The negative relationship between switch deployment and entry restrictions on CLECs is unsurprising. Because restricting access to unbundled local switching prevents entrants from massing customer bases that they may then seek to migrate to another network, one would expect that all other factors equal, there would be less CLEC facilities overall where the restriction applied. An analogy could be drawn to long-distance competition – if MCI was not able to build sufficient customer base and cash flow by means of reselling services over AT&T's network, would it ever have been able to finance and construct its own long-distance network? Yet this is what the FCC's restriction asks CLECs to do, and in the local telecom arena where the competitive entry conditions are far less favorable than in the long distance industry. It is little wonder that this FCC policy has failed.

Additionally, the fact that CLEC switch deployment is directly and positively correlated with unbundled switching availability strongly indicates that "a rising tide of competition raises all boats." All CLECs – even those that deploy switches only to serve large business customers with intensive bandwidth

needs[12] – benefit when there is a robust and competitive entry at all levels of the market. CLECs that focus on building fiber networks that they wholesale to CLECs that focus on retail services benefit when those retail CLECs do well – and UNE Platform may be a critical component of that retail CLEC's strategy. Also, when a CLEC focused upon mass-market services takes out television or radio advertising, the *entire* market is educated about the availability of competitive choice. In a number of ways, one CLEC's success is a *public good* shared by other CLECs.[13] The successes and failures of one affect the many.

III. Conclusion: Favoring One Form of Entry Over Another Fails

The results of Z-Tel Public Policy Papers Nos. 3 and 4 should cause policymakers that wish to put in place "granular" or market-by-market unbundling rules to take pause. Like other attempts at industrial policy, it is highly likely that a governmental agency – particularly a federal agency that cannot have complete, close-to-the-ground knowledge of actual market conditions in various cities and towns across the country – will end up with a policy that causes more harm than good.

In particular, Z-Tel Public Policy Papers Nos. 3 and 4 debunk the FCC's logic contained in the *UNE Remand Order* that limited access to unbundled local switching in certain areas of certain cities promotes local switch deployment. This research directly refutes the "substitution scenario" behind this policy – the FCC's assumption that without the ability to purchase unbundled switching, CLECs would be able to self-provide their own switching in a sufficiently timely manner. In fact, the evidence shows that without the ability to purchase

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[12] Pursuant to Section 251(d)(2), in "determining what network elements should be available" to entrants, the FCC "shall consider" whether the failure to provide access to such element would impair the ability of an entrant "to provide the services that it seeks to offer." 47 U.S.C. 251(d)(2). Under this standard, the fact that a switch may be deployed by an entrant to serve one market (such as large business users with bandwidth-intensive means) is irrelevant to any determination as to whether denial of access to unbundled switching would impair entrants in the ability to serve mass market customers that purchase analog dialtone service.

[13] Likewise, CLEC failures have had a negative effect on all CLECs, particularly those that leave customers stranded.

unbundled switching, CLECs are less likely to enter the market at all, even with their own switch or otherwise.[14]

In the end, the FCC restriction has resulted in the "worst of both worlds." Restricting access to unbundled switching has directly harmed mass-market residential and small business consumers in the affected states, because they enjoy less competitive entry than their compatriots in other states. In addition, the restriction has caused there to be *19% less* CLEC switch deployment in those states, all other things being equal.

Clearly, if the purpose of the FCC's policy was to foster a competitive market *and* promote facilities-based (switch) deployment by CLECs, the limitation on access to unbundled local switching in the Top 50 MSAs has failed. Similar proposals to limit the availability of other unbundled network elements in addition to switching (such as interoffice transport) must take into account this devastating public policy failure.

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[14] This evidence is *directly contrary* to the recent, unsupported assertion by Verizon that "requiring incumbents to unbundled local switches where competitors have already deployed their own switches undermines those competitors' ability to compete." Verizon Letter at 4. The evidence shows exactly the opposite: *restricting* access to unbundled local switching has resulted in *less entry overall* and *less switch deployment* by CLECs.

The Z-Tel Public Policy Paper Series is designed to arm policymakers and the public with a rigorous set of analytical tools and analyses regarding the development of local telecommunications competition. For more information, contact any of the following members of Z-Tel's Strategic Policy Department.

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