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Retail Prices and Facility-Based Entry into the Telecommunications Market

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Abstract

There is growing sentiment that rate rebalancing to eliminate cross subsidies between local business and local residential telephone markets is necessary to induce efficient entry in the residential market. If the elasticity of supply with respect to the relative prices for business and residential local service is high in both the local business and local residential markets, then the efficiency gains from rebalancing may be large. Alternatively, other factors related to differences in characteristics between business and residential local telephone markets, such as lower costs, lower elasticity of demand, and greater willingness-to-pay for quality or redundancy in the business segment of local telephone may be more important determinants of entry. In this paper we simultaneously measure the elasticity of supply in the business market with regards to the price of business services relative to the price of residential service, using entry, economic and demographic data a the wire center level. We find that business entry is driven by market demand and cost characteristics, and that the effect of cross subsidies in prices on entry is less clear.

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1. Introduction

A persistent policy question in telecommunications is why is there so much local business competition and comparatively little competition in local residential service. The obvious answer is that the profits for local business service must be higher than for local residential service. But the reasons for this are not as obvious. If this reflects differences in willingness-to-pay and cost structure for business and residential telephone service, then the balance of competition between the markets may be an efficient outcome. Alternatively, if the history of nationalization and regulation of telephone service and rates has left a legacy of market distortions that are driving this imbalance in entry for the different segments, then correcting such imbalances may improve efficiency.

Policy debates aimed at promoting local telephone competition, and residential service competition in particular, have focused recently on rate rebalancing. In recent testimony before the United States Senate, the General Counsel of one of the nation's largest incumbent local telephone companies declared that his company's rivals go "where the money is,"[1] the business market. A number of scholars have noted that the low rates for residential services, relative to the price of business services, makes entry into the residential market less profitable than entry into the business market.[2] This implies that rate rebalancing is necessary to induce efficient entry in the residential market. Rate rebalancing will increase residential competition, and efficiency, to the extent that the elasticity of supply with respect to this ratio of retail rates for business service to residential service is high in both the local business and the local residential markets. If, however, the elasticity of supply with respect to price is low, then the effect of rate rebalancing on increased efficiency through the development of competition in residential local telephone service will be more limited. The purpose of this paper is to measure the elasticity of supply in the business market with respect to the price of business services relative to the price of residential services.

This paper begins with a discussion of the potential differences between the entry decisions for local business and residential services in the following section. In Section 3 we examine rate rebalancing and its potential role in business and residential entry. We then present a conceptual framework for modeling entry decisions in the local business and residential telephone service markets in Section 4. In Section 5 we provide an

[1] 2001 Senate proceedings: "The Telecom Act Five Years Later: Is it Promoting Competition," J-107-14, May 2, 2001, p. 44.

[2] See, for example, Agustin J. Ros and Karl McDermott, "Are Residential Local Exchange Prices Too Low?", in *Expanding Competition in Regulated Industries* (2000): 149-68; Robert W. Crandall & Thomas W. Hazlett, "Telecommunications Policy Reform in the United States and Canada," at 18, Working Paper 00-9, AEI-Brookings Joint Center for Regulatory Studies (Dec. 2000); see also generally Robert W. Crandall & Leonard Waverman, *Who Pays For Universal Service? When Subsidies Become Transparent* (2000).

econometric analysis of entry in local business markets. Finally, preliminary conclusions are drawn.

2. Business versus Residential Local Telephone Entry

It is possible that providing telephone service to local businesses is simply more profitable than providing telephone service to local residences, based on the underlying economic characteristics of the two markets. Many experts believe business costs are lower due to greater density. Also, some of the selling and administrative costs may be very different for serving business and residential customers. For example, acquisition of business customers tends to involve few fixed costs, as it involves salespeople directly contacting customers. New residential customers, however, are most often reached through mass media, which involves significant fixed costs. Similarly, retention costs may be different, as businesses and individual consumers may face different levels of switching costs. "…[U]nlike individual consumers who frequently change providers, big companies can't easily switch to a new phone company: They'd be forced to buy tons of new equipment, an expensive and time-consuming headache."[3] Marketing and administrative costs, specifically facilities installation, back office support, and customer acquisition, have been found to be a significant barrier to competition in local telephone service.[4] To the extent these costs are different for business and residential customers, this may contribute to the difference in level of competition in these markets.

It is also reasonable to believe business demand is more intense and less price elastic than residential demand, as telecommunications service is likely to be critical to business operations and sales. This is evidenced by recent attempts by some incumbent local telephone providers (incumbent local exchange companies, or ILECs) to increase their provision of business services through acquisition.[5] Also, business and residential customers may differ in how they purchase services in bundles or a la carte. This would impact the prospects of any particular entrant in a given market, based on its ability to offer the appropriate bundles for the customer base.

Business local telephone customers also may be willing to pay a premium for high quality service or even for redundancy. The first competitive local telephone company was Teleport Communications Group, a New York company that originated within Merrill Lynch to provide redundancy in the bank's telecommunications capabilities, as telecommunications is such a critical component of the bank's operations. This suggests opportunity for entrants in the local business telephone market to earn

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[3] Steve Rosenbush, "Telecom: To Buy or To Build?; Why the industry is deeply divided over the best path to growth." *Business Week*, February 21, 2005.

[4] David Gabel, 2002. "Why is there so little competition in local telephone?" Available at http://intel.si.umich.edu/tprc/papers/2002/52/LastMileDone.pdf.

[5] Ken Belson notes that "[i]n taking over AT&T's $22 billion corporate phone and data business, SBC will add a new source of revenue that will offset the decline in its residential phone business, which has been shrinking with the spread of cell phones and the Internet." "SBC Near Deal to Acquire AT&T for $16 Billion." *The New York Times*, January 31, 2005. See also, for example, Paul Travis, "And Then There Were 2 -- Consolidation will leave large companies with only two telecom choices." *Information Week*, February 21, 2005; Carol Wilson, "Will SBC-AT&T live up to its promise?" *Telephony Online*, January 31, 2005.

profits on high quality service and alternative facilities that would not exist in the local residential telephone market.

If these underlying cost and market demand factors are the reason for the difference in the amount of competition and price variation observed in residential and business local telephone markets, then we would expect to see differences in the amount of entry and this may be an efficient outcome.[6]

Alternatively, the disparity in competition activity in business and residential markets may reflect differences in opportunities for entrants to supplement partial investment in facilities with the use of the incumbent's network. This is the result of policies that require the incumbent to make certain equipment and services on its facilities available to competitors. Differences in these costs may be driven in part by policy factors. For example, often competitive entry in the local business markets is done through collocation in the incumbent's central office facilities,[7] while most residential local telephone entrants make use of the UNE platform (also known as UNE-P, a combination of the incumbent's network elements, made available on an unbundled basis – unbundled network elements - in accordance with the Telecommunications Act of 1996). This difference also may make different cost factors, including UNE rates set by regulators, of interest to entrants in business and residential markets.

Retail price regulation also may contribute to the difference in competition found in local business and residential telephone markets. The telephone industry, both prior to regulation, and in the succeeding years, has chosen to price services on the basis of value rather than cost.[8] Consequently ILEC local business prices are often significantly higher than residential prices. Such imbalance in retail pricing, if not market driven, may result in inefficient entry – over entry in business markets and under entry in residential markets. If CLECs serving business subscribers entered due to regulation-induced price distortions there will be too much entry.[9] Regulators have devoted a great deal of attention for many years to how best to allocate the shared fixed costs of local telephone service between the local business and residential markets. Where relative local business and residential prices create cross subsidization, the incentive for entry in the business market will be artificially high and the incentive for entry in the residential market

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[6] Price discrimination naturally emerges in markets with rivalry. Analytical models and industry studies have demonstrated how competition can lead to an increase in the degree of price discrimination between customer classes. See, for example, Thomas J. Holmes, "The Effects of Third-Degree Price Discrimination in Oligopoly," *American Economic Review,* 79 (march 1989): 244-50; and Severin Borenstein, and Nancy Rose, "Competition and Price Dispersion in the United States Airline Industry," *Journal of Political Economy* 102 (August 1994): 653-683.

[7] Under rules established by the Federal Communications Commission, and later codified in the 1996 Telecommunications Act, entrants may place their own facilities in buildings owned by incumbents. The entrants find that they are able to realize significant savings by collocating their line aggregation equipment with the facilities owned by the incumbents.

[8] David Gabel and David Weiman, "Historical Perspectives on Competition and Interconnection between Local Exchange Companies," *Opening Networks to Competition: The Regulation and Pricing of Access.* Coeditor David Gabel and David Weiman. Kluwer Academic Press. 1998.

[9] Mankiw and Whinston show that when retail prices exceed costs and there are significant fixed costs, in the presence of business stealing there will be more entry than is efficient. "Free Entry and Social Inefficiency," Rand Journal of Economics, vol. 17, no. 1, Spring 1986, pp. 48-58. Certainly, in markets beginning as monopoly there will be significant business stealing, as so defined. Thus, inefficient over-entry in business may be coming at the expense of entry in residential segments.

artificially low. Conventional wisdom is that such inefficiencies due to cross subsidization have distorted entry in both markets, with over-entry in local business markets and under-entry in local residential markets.

Incumbent behavior, or the potential entrant's expectation of the incumbent's response to entry, also will influence entry decisions. While incumbents remain constrained in how they can respond to entry due to regulation, it is possible that there is some degree of response by incumbents to entry, or the potential for entry, in its local telephone market. It is also possible that this reaction might be different towards entry in the local business market than it is in the local residential market. If the local business market contains the cream, then we would expect the incumbent to engage in behavior to protect this market more so than it would for the residential market, which would accordingly generate losses on its own. Incumbent strategic behavior may take the form of price reductions or lower levels of cooperation in providing use of its facilities and services to CLECs.

Based on these potential differences in the factors driving potential profitability, we propose that entry in local business and residential markets are based on different entry decision functions. We will proceed to consider the entry decisions as different functions, allowing for certain factors included in both entry decisions to be weighted differently, and for some factors to be unique to one decision or the other. Ros and McDermott (2000)[10] look at entry in local business and residential markets as different functions. However, they look exclusively at collocation arrangements, measuring potential competition with the number of lines in an ILEC wire center[11] that has an existing collocation arrangement. This assumes that a collocating CLEC could as easily serve business and residential customers being served by a given wire center where they are already collocated. However, based on the above discussion, collocation is more amenable to business entry than residential entry because of the higher price for business services. Once a CLEC is collocated at a wire center to serve one or more business customers, the additional investment required to serve residential customers with lines from the same wire center is more substantial than implied by their analysis. CLECs must still incur significant additional fixed costs that are specific to the residential market. Ros and McDermott also compare competition by looking at the state level. This paper will look at competition in local business markets as well, but will do so at the wire center level.

3. Rate Rebalancing and Potential Efficiency Gains

Rate rebalancing is becoming a target strategy for policy makers interested in promoting more competition in local residential telephone service. This is based on the conventional wisdom that artificially low rates in local residential markets are subsidized

[10] Op cit at 2.

[11] A wire center is "the location of a local switching facility containing one or more central offices." 47 C.F.R. § 54.5; *see id.* ("wire center boundaries define the area in which all customers served by a given wire center are located."); *see also Policy and Rules Concerning Rates for Dominant Carriers and Amendment of Part 61 of the Commission's Rules to Require Quality of Service Standards in Local Exchange Carrier Tariffs*, Memorandum Opinion and Order, 12 FCC Rcd 8115, ¶ 7, n.14 (1997) (A wire center "might have one or several class 5 central offices, also called public exchanges or simply switches.").

by artificially high rates in local business markets as the result of historical price regulation policies. With markets now open for entry and competition, such lingering cross subsidies create excess incentives for entry in business markets and eliminate incentives for entrants to provide local residential service. The apparent logic of this story has led to much attention to rebalancing rates between local business and residential markets in policy debates across US states and in other countries as well. Recently, in the United States, a federal appeals court concluded, based upon little empirical evidence, that entry was less likely to occur in the residential market because a substantial number of residential markets are subsidized by artificially high prices in the business market. United States Telecom Association (USTA) v. FCC, March 2, 2004, p. 25. A number of US state regulatory commissions are considering or have recently considered rate rebalancing cases, including Florida, Utah, Kansas and Virginia.

The logic of this conventional wisdom relies on a series of suppositions. First, there is the assumption that business service is subsidizing residential service. Second, the above argument presumes that the disparity in the amount of competition currently observed in local business versus local residential markets will decrease if rates are rebalanced to eliminate this presumed cross-subsidy. In other words, elasticity of supply with respect to retail price (and relative retail prices across the two markets) is high in both the local business and local residential markets. Third, the conventional wisdom assumes this increase in residential entry (and presumed decrease in business market competition) will increase efficiency. Fourth, the argument supporting rate rebalancing assumes that the markets, once subjected to entry, cannot rebalance themselves.

There is evidence to support the existence of cross subsidies between business and residential local telephone markets. Looking at the markets of one Regional Bell Operating Company (RBOC, predating the consolidation of these firms that followed the passing of the Telecommunications Act of 1996), Palmer finds significant cross-subsidization from the business to the residential market.[12] Rosston and Wimmer find variation in the extent that wire centers cover their costs, and that entry is more likely in wire centers where the ratio of average revenues to average costs is higher.[13] However, there is also evidence that suggests these cross-subsidies have been decreasing with competition, even before the Telecommunications Act of 1996 was passed.[14]

Evidence of the potential effect of rate rebalancing on competition is limited to date. Ros and McDermott find that rate rebalancing may increase residential market entry.[15] However, their model considers only collocation as the measure of competition in both business and residential markets, missing the distinctions in forms of entry discussed above. Also, the data used in that paper is at the state level, incorporating many different markets with different characteristics in each observation. Papers that show cross-subsidization between local business and residential telephone markets do not look at the relationship between demand characteristics or costs between business and residential

[12] Karen Palmer, 1992, "A Test for Cross Subsidies in Local Telephone Rates: Do Business Customers Subsidize Residential Customers?" *The Rand Journal of Economics*, Vol. 23, No. 3 (Autumn), p.415-431.
[13] Gregory L. Rosston and Bradley S. Wimmer, 2001. "From C to Shining C: Competition and Cross Subsidy in Communications." in *Communications Policy in Transition: The Internet and Beyond*. Editors Benjamin Compaine and Shane Greenstein. MIT Press. P. 241-61.
[14] See Christopher Knittel, 2004, "Regulatory Restructuring and Incumbent Price Dynamics: The Case of Local Telephone Restructuring." *The Review of Economics and Statistics*. Vol. 86, No.2 (May).
[15] Op. Cit. at 2.

customers, or how this difference impacts entry in each market. Assuming that cross-subsidies remain in the prices of business and residential local telephone markets, the ability of rebalancing to increase residential entry (and correspondingly decrease business entry) depends on the elasticity of supply with respect to the relative retail prices in these markets. We use econometric analysis to test this elasticity below. This relationship is further complicated by the existence of other sources of revenue for the ILECs that may also provide contribution to the recovery of local residential telephone costs.

What if state regulators do not rebalance their rates? Normally, if the prices are inefficiently out of balance, we would expect the market to rebalance the rates itself once competition develops. If retail local access and service rates for business are artificially high, CLECs will enter this market, driving the prices down to the efficient levels. ILECs, forced to similarly lower their rates in order to retain subscribers, will then increase the rates they charge for residential service if those prices are in fact below costs and were previously subsidized by artificially high local business revenues. Knittel finds evidence of such price movements with competitive entry in local telephone markets prior to the Telecommunications Act of 1996.[16] However, the ability of firms to fully rebalance their rates may remain limited by regulatory constraints. ILECs are constrained in their ability to reduce business and increase residential rates in local markets based on the structure of price regulation in their state. Such constraints on the response of ILECs will be considered by CLECs in their entry decisions, and may limit the ability for entry and competition to increase the efficiency of these markets.

While incumbent constraints on pricing have been reduced with the movement towards incentive regulation, the effects of decades of rate regulation remain. Prices that were established under rate-of-return regulation through the early 1990s served as the initial prices for ILECs who gained a bit more control over prices under incentive regulation such as Price Cap regulation. Recent movements away from the regulation-constructed prices have allowed firms to make only incremental movements in price. Where there were cross subsidies, there may have been limited opportunity for incumbents to correct or eliminate them given the limitation to small movements in price each year.

The increase in efficiency from rebalancing rates is also an unanswered question. When different groups of customers have different costs, it is not always possible to have different prices for each. As Kahn and Shew point out, efficient pricing often involves some aggregation, with service to some above cost and service to others below.[17] While the difference in retail prices do not reflect costs, they may in fact reflect market differences in demand.[18] It is possible that business subscribers' demand is less price elastic than residential subscribers' demand. Business telephone subscribers also may be willing to pay higher prices for redundancy in their telephone networks or for increased

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[16] Op. Cit. at 15.

[17] Alfred E. Kahn and William B. Shew, 1987. "Current Issues in Telecommunications Regulation: Pricing." Yale Journal on Regulation. (Spring).

[18] James Zolnierek, James Eisner and Ellen Burton, "An Empirical Examination of Entry Patterns in Local Telephone Markets," *Journal of Regulatory Economics*, 19:2 143-159 (2001) and Dean R. Foreman, R. Dean, "For whom the bell alternatives toll: demographics of residential facilities-based telecommunications competition in the United States," *Telecommunications Policy* 26:573-587 (2002) show that market demographics drive facilities-based entry, supporting the importance of underlying market factors over potential policy-induced distortions.

quality, as they are likely to be dependent on telecommunications capabilities as a critical resource. This would support higher prices and higher margins for business service, regardless of relative costs. This would also explain the difference in the amount of competition observed in these markets, as the market with lower price elasticity of demand will be more attractive for competitive entry. If retail rates for local business and residential access and service reflect asymmetric market characteristics, then these prices may be efficient without further rebalancing.

4. A Model of Local Telephone Entry

CLECs enter local telephone markets in response to the expectation that they will earn profits. If entry and sustained competition in local business markets exceeds that in local residential markets, it is based on their calculations that there are more profits to be earned in the business markets. Based on the discussion above, we propose two possible and competing hypotheses of why CLECs expect to earn higher profits in local business markets than in local residential markets.

Hypothesis 1: Underlying Market Characteristics

Local business telephone service is a more profitable business than local residential service based on its underlying demand and cost characteristics. This includes a lower elasticity of demand with respect to price among business customers, and a market for high quality service and redundancy, as discussed above. Entry occurs in the local business market because it is a high-margin business, independent of relative costs and regulated prices in the residential market.

Hypothesis 2: Retail Rate Distortions

The retail prices for local business and residential telephone service are distorted as a result of their long history of regulation, as per the conventional wisdom on rate rebalancing discussed above. These distortions are such that business markets offer rents while residential markets do not, causing entry in business markets to exceed the efficient level while entry in residential markets is less than efficient.

Consider a state containing a local business telephone market and a local residential telephone market, both served by a single incumbent provider (ILEC), where

Q_B = quantity of business lines, and
Q_R = quantity of residential lines.

The total cost of serving this market, which has economies of scope, is

$C(Q_B, Q_R)$, where
$C(Q_B, Q_R) = C(Q_B) + IC(Q_R)$,
$C(Q_B, Q_R) – IC(Q_B) - IC(Q_R) > 0$,
and
$C(Q_B)$ is the stand alone cost of serving the business market and

$IC(Q_R)$ is the incremental cost of serving the residential market, and
$IC(Q_B)$ is the incremental cost of serving the business market.

Restated, the incremental cost of serving the residential local telephone market is

$$IC(Q_R) = C(Q_B, Q_R) - C(Q_B).$$

As a regulated former monopolist, the incumbent local telephone company is subject to a requirement that its revenues cover its costs (zero-profit or balanced budget requirement). Thus prices must be set in such a way that the revenues collected equal the total costs incurred. This is done in two steps, where

(1) total costs are calculated in order to determine how much revenue is needed, or the Revenue Requirement (RR); and
(2) Prices for each product are then determined in order to meet the requirement that total revenues cover total costs, or the revenue recovery requirement.

For the incumbent, as a regulated multi-product firm constrained to earn zero profits, cross subsidization requires revenues for one product to exceed the stand-alone costs of that product.[19] Thus, if local business customers are subsidizing local residential customers, as according to Hypothesis 2 and the conventional wisdom on rate rebalancing, then

$P_BQ_B - C(Q_B) > 0$,[20] and
$P_RQ_R - IC(Q_R) < 0$.

According to Palmer, when there is an additional source of revenue, the cross-subsidy conditions must be adjusted. Adapting her methodology, the above conditions are adjusted for additional revenue contributions from other sources, most notably the contribution to the cost of the local network made by long-distance carriers (IXCs) for access to the local network (paid in the form of access fees), as follows:

$P_BQ_B + R_BQ_B - C(Q_B) > 0$, and (1)
$P_RQ_R + R_RQ_R - IC(Q_R) < 0$,[21] (2)

where R_BQ_B is the other revenue earned for business lines and R_RQ_R is the other revenue earned for residential lines.

[19] Gerald R. Faulhaber, "Cross-Subsidization: Pricing in Public Enterprises." *American Economic Review*, Vol. 65 (1975), p.966-77.
[20] Note that this condition in itself is consistent with Hypothesis 1 as well, as this relationship will hold for a market that is high margin due to low demand elasticity with respect to price and willingness to pay for quality and redundancy.
[21] Karen Palmer, "A Test for Cross Subsidies in Local Telephone Rates: Do Business Customers Subsidize Residential Customers?" *Rand Journal of Economics*, Vol. 23, No. 3 (Autumn, 1992), 415-431. Palmer also states that the IXC contributions to local exchange revenue cover costs that are mostly included in the total cost of the central office, namely a portion of the cost of giving long-distance callers access to the public switched network and a portion of the cost of switching these long-distance calls at the central office.

According to the revenue recovery requirement constraint:

$$RR = C(Q_B, Q_R) = P_B Q_B + P_R Q_R + R_B Q_B + R_R Q_R, \quad (3)$$

where

RR is the revenue requirement,

Substituting, and then rearranging terms, the revenue requirement can be restated as

$$C(Q_B) + IC(Q_R) = P_B Q_B + P_R Q_R + R_B Q_B + R_R Q_R,$$

The full revenue contribution from the IXCs can be restated as

$$R_C = R_B Q_B + R_R Q_R,$$

And substituting, the revenue requirement becomes

$$C(Q_B) - P_B Q_B + IC(Q_R) - P_R Q_R = R_C. \quad (4)$$

Since we know that IXC contribution to local network costs in the form of access charges do exist and are positive,

Since $R_C > 0$, then

$C(Q_B) - P_B Q_B + IC(Q_R) - P_R Q_R > 0$, and

$$IC(Q_R) - P_R Q_R > P_B Q_B - C(Q_B). \quad (5)$$

This shows that the mark-up or premium above cost of business revenues are less than the subsidy provided to cover the costs of local residential telephone service. This means that if rates were rebalanced between local business and local residential service to eliminate the cross subsidy, reducing local business prices such that local business revenues equal stand-alone cost, the revenue from residential customers would still fail to cover the costs of providing local residential access and service. Thus, entry in the business market is likely to be reduced by such a move, as the attractive margin is reduced, yet residential entry is not increased as profits are still below zero for serving this segment of the market. This implies a serious limit to any possible welfare gains from rebalancing rates between local business and local residential telephone service to eliminate the cross-subsidy in this fashion.

Further rebalancing would be needed to generate entry in local residential markets. Specifically, business prices must be reduced to bring business revenue below stand-alone cost while residential prices are increased to the point where residential revenue exceeds incremental costs in order to create incentive for CLECs to enter residential markets. If this condition requires that business local telephone revenue be reduced to below its incremental cost, then this rebalancing creates new inefficiencies by distorting the local business market and incentives for entry.

Given this relationship, how should we think about elasticity of supply with respect to incumbent retail prices? Or, put differently, how does this price relationship influence entry decisions for the local business and local residential market segments as per the common wisdom regarding rate rebalancing?

Rearranging equation (4),

$$C(Q_B) + IC(Q_R) - R_C = P_B Q_B + P_R Q_R.$$

Note that the left hand side of this relationship can be considered the remaining retail revenue requirement (RRR), or what is left of the original revenue requirement after the IXC contribution has been made. In other words, this is the portion of the costs of the local network that must be covered by revenues from local business and residential customers:

$$RRR = P_B Q_B + P_R Q_R. \qquad (6)$$

Equation (6) shows that for any fixed R_C, any subsidy to local residential customers must come at the expense of local business customers.

Imagine a local telephone market that is split evenly between business and residential lines, such that

$$Q_B = Q_R.$$

The relationship in Equation (6) thus becomes

$$RRR = P_B Q_R + P_R Q_R, \text{ or}$$

$$\frac{RRR}{P_R Q_R} - 1 = \frac{P_B}{P_R}, \text{ or}$$

$$\frac{RRR - P_R Q_R}{P_R Q_R} = \frac{P_B}{P_R} \qquad (7)$$

Equation (7) shows that when the ratio of business-to-residential retail prices is greater than one, business customers are carrying more of the burden of covering the remaining revenue requirement than residential customers. In this case, according to the conventional wisdom, we would expect to see more entry in the local business telephone market than in the local residential telephone market. The ratio of business-to-residential retail prices then serves as an indicator to how the prices for each product are determined in order to allocate the revenue requirement across the different local telephone service products, or step two of the price regulation process noted above. This ratio captures the relative share of local telephone revenue recovery requirement burden for business customers with respect to residential customers.

Looking at changes in this ratio while keeping market demand characteristics, costs, and absolute prices constant, we would expect that increases in this ratio will result in greater business entry, while decreases would reduce business entry. Note, however,

that decreases in this ratio may not result in increases in residential entry, as revenues from residential entry remain below costs as some of the cost is covered by the IXC contribution in the form of access fees for long distance calls terminating on the local network.

In our hypothetical market where lines are split equally between business and residential customers, this ratio of retail rates provides an indicator of price adjustment to rebalance the recovery of revenue. When the business market subsidizes the residential market, the condition described by equation (5) holds, and we start with business profits less than the residential shortfall in revenue. As prices change from this point, increases in the retail rate ratio indicate increased business profits and increased residential shortfall. Thus, since CLECs enter markets where expected profits are positive, we expect:

$$\frac{\partial bizentry}{\partial \frac{P_b}{P_r}} > 0, \text{ and}$$

$$\frac{\partial resentry}{\partial \frac{P_b}{P_r}} = 0.$$

The increase in business local telephone profit will increase the incentive for entry in this market. Entry in the residential market remains unchanged as the existing revenue shortfall described above increases with increases in the retail price ratio.

When rate rebalancing causes the rate ratio to decrease, entry in the business local telephone market should decrease as profits in this market decline. Changes in residential local telephone market entry will remain unchanged until the ratio declines sufficiently to eliminate the residential revenue shortfall. Further decreases in the ratio from this point should increase residential entry as profits in this segment increase:

$$\frac{\partial resentry}{\partial \frac{P_b}{P_r}} < 0, \text{ when } P_r Q_r >= IC(Q_r).$$

When more of the residual cost recovery after IXC contribution is shifted from the residential markets to business market, the retail rate ratio will increase. Thus, if Hypothesis 2 is true, and entry is based on cream in the business market generated by this cost recovery relationship, then we would expect to see business entry increase with this ratio.

We will attempt to distinguish between these hypotheses in terms of CLEC entry behavior based on the following simple model of the entry decision. Entry is in response to expected profits, which, as markets and regulation currently exist, can be represented by:

$$E(\Pi_i) = \beta_0 + \beta_1 \boldsymbol{X}_{Ri} + \beta_2 \boldsymbol{X}_{Ci} + \beta_3 \boldsymbol{X}_{Ei},$$

where $\boldsymbol{X}_{Ri}$ is a vector of factors related to local telephone revenue in market *i*, $\boldsymbol{X}_{Ci}$ is a vector of factors related to cost of local telephone service in market *i*, and $\boldsymbol{X}_{Ei}$ is a vector of other exogenous factors.

The vector $\boldsymbol{X}_{Ri}$ includes factors reflecting underlying market demand as well as policy factors that may distort retail rates in market *i*. As rates are rebalanced and markets migrate towards deregulation, the policy factors will approach zero and the demand factors will remain. If Hypothesis 2 is correct, and entry in the business segment is driven by price distortions between the business and residential markets, then the relative retail prices for business and residential connection and service will be included in the vector of revenue factors considered by CLECs when deciding if they will enter a particular market. Other revenue-related factors considered by the CLEC include those that reflect underlying demand characteristics, such as income, number of employees (each of whom needs a telephone line), and income of industries inclined to be more telecommunications-intensive.

The cost vector, $\boldsymbol{X}_{Ci}$, includes factors that reflect the costs of providing local telephone access and services in a given market. This includes the costs of infrastructure, transit, access, marketing and administration. Policy factors are included in this vector as well, though they do not necessarily reflect distortions in costs. CLEC costs of infrastructure, access and/or transport may depend on policy factors, depending on the CLEC's form of entry and use of the incumbent's facilities. Such policy factors would include collocation and UNE prices and enforceability of incumbent compliance in provision.

The vector $\boldsymbol{X}_{Ei}$ includes factors that are exogenous to the market yet may influence the entry decision in some markets. This may include factors specific to the CLEC, the ILEC, or a particular market.

The above entry decision function will be tested below using wire center data for US local telephone markets for business service. If entrants are responding to retail prices, it could be due to demand factors (and thus likely to be efficient) or it could be due to distortionary effects of regulatory policy on price. By including a variable to this vector to represent the ratio between retail business and residential prices, we can distinguish between elasticity with respect to willingness-to-pay and cross-subsidy distortions.

Hypothesis 2 will be supported if policy factors distorting retail prices (namely ratio of retail business rates to retail residential rates) are found to be significant. Such a result would suggest that rates should be rebalanced in order to increase the efficiency of supply in local telephone markets. Hypothesis 1 will be supported if those distortionary policy factors are swamped by the effects of other factors. If the distorting policy factors are not significant, then business CLECs enter based on market factors, so more likely to be efficient entry. In this case rate rebalancing can not be expected to generate significant efficiency gains by promoting greater residential competition.

5. Econometric Estimation of the Entry Process

In order to assess the impact of the rate structure on entry patterns we measure the elasticity of business entry relative to the price of retail and wholesale services. The available CLEC market share data is a high-level of aggregation—the state. While somewhat informative, we believe that aggregated data can be misleading because of the wide variation of profitable entry opportunities within a state. Entry is typically targeted to specific local markets, which are much smaller in geography than states, and therefore we believe that a better understanding of the entry process can be gained by using data that reflects the "go/no go" decision that must be made by entrants.[22]

Facility-based CLECs typically serve the business market through either some combination of constructing their own loops[23] and collocating their facilities in central offices of the ILECs, or just collocation. Collocation is used even in markets where the CLECs build their own loops because of the cost of connecting facilities to all buildings and the difficulties encountered in negotiating access to a landlord's ducts within a building. By collocating in an ILEC's central office the CLEC obtains access to all customer's served through the ILEC's central office. Thus we use collocation as evidence of business entry.

Estimate of Effect of Retail Price Ratio

Expected profits in the different local telephone markets are not observable. Therefore, we base our estimation of the effect of the incumbents' retail price ratio on entry on a basic model of business entry through collocation:

$$Collocation = \beta_0 + \beta_1 \boldsymbol{X}_{Ri} + \beta_2 \boldsymbol{X}_{Ci} + \beta_3 \boldsymbol{X}_{Ei},$$

where the vectors $\boldsymbol{X}_{Ri}$, $\boldsymbol{X}_{Ci}$, and $\boldsymbol{X}_{Ei}$ are defined as above.

As Knittel (2004) presents the possibility that entry may lead to reduced incumbent business prices and increased incumbent residential prices, our estimation treats incumbent business-to-residential price ratio as endogenous. Thus we estimate two simultaneous equations using three-stage least squares (3SLS) regression. Using 3SLS we estimate the degree of entry into the business market by simultaneously estimating the effect of economic and demographic variables on the presence of a CLEC collocated in an ILEC central office, and the incumbent price ratio for local business and residential services:

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[22] The aggregation problem can be illustrated with a simple example. Assume that state A has a constant teledensity of 1000 lines per square mile and supports one ILEC and one CLEC in all markets. State B has a teledensity of 500 lines per square mile in market one and 1500 lines in market two. Market one and two are of equal size, but together cover the same area as state A. Further assume that entry only occurs in market two. The econometrician that relied on aggregate state level data would have difficulty explaining why State B has one-half the number of CLEC customers as State A despite having the same density. But if the econometrician had wire center specific data, (s)he would observe that entry doesn't occur in low density markets. Consequently the econometrician would be able to obtain superior estimates of entry function.

[23] The loop is either a copper or fiber optic cable, or combination thereof, that runs between a customer and a telephone company central office. The central office houses switching and other electronic equipment. The switching and electronic equipment aggregates traffic and transmits the voice or data communications to its destination.

(1) collocation = f(X, local business-to-residential price ratio) + ε_{1i}

(2) local business-to-residential price ratio = g(X,Y, collocation) + ε_{2i}

Where:

X = a vector of exogenous economic and demographic variables

Y = a vector of exogenous regulatory and political factors

ε_{ji} are the stochastic disturbance terms for each of the two equations.

While the rate rebalancing debate centers on relative prices in the local business and residential markets, we believe this may not be the relative factor firms do in fact consider when making their entry decisions. The prices are for basic voice service while many other products and services are offered to both business and residential subscribers. As entry is driven by expected profits, we believe actual revenues in each market will be considered, rather than relative prices. Thus we also estimate simultaneous equations for collocation and local business-to-residential revenue ratio using 3SLS:

(1) collocation = f(X, local business-to-residential revenue ratio) + ε_{1i}

(2) local business-to-residential revenue ratio = g(X, collocation) + ε_{2i}

Where:

X = a vector of exogenous economic and demographic variables

Y = a vector of exogenous regulatory and political factors

ε_{ji} are the stochastic disturbance terms for each of the two equations.

Data

Our initial data set shows if collocation exists in 2,605 central offices located in 16 states. The anticipated profitability of entry is a latent variable and therefore we rely on the observable of actual entry to model how the retail rate structure affects entry into a market. Table One provides a list of all variables used and their definitions. The variable Collocation is a dummy variable that is equal to one in wire centers where at least one CLEC is collocated, i.e. where there is entry into the local business market. Entry has occurred in 46.4% of the central offices.

Table One: Variable Definitions and Descriptions[24]

Variable	Description
Collocation	0 = no collocation 1 = collocators present 2005
MSA_cd	0 = non-Metropolitan Statistical Area (MSA) 1 = MSA
Population	Population in a wire center
# Households	Number of households in the area served by the wire center
# Employees 2001	Number of employees working in the wire center territory in 2001
Calling Area	Calling area = households + employees in calling area (not just the wire center)
Density	(Households + employees) / wire center square mileage
Price Ratio	Business Price / Residential Price
Revenue Ratio	Business Revenue / Residential Revenue
Collocation Entry Cost	Cost of UNE-loop, collocation, switching, transport, marketing
Loop Construction Cost	Cost of constructing loop
Governor Democrat	0 = Governor not Democrat 1 = Governor is Democrat
Closed_94	Market closed for entry in 1994 (Pre 1996 Act)
P_ratio_95	Historical Business Price / Residential Price from 1995
Pricecap	0 = State does not have price cap regulation 1 = State does have price cap regulation

Economic and Demographic Variables

The anticipated size of the telecommunications market affects the opportunity for entry. As with any market, as the size of the market increases, the number of firms that can be supported increases. Firms can assess the size of the market by both identifying the number of potential telecommunication users as well as their potential spending. We use a few explanatory variables to control for the size of the market. First, we begin with the number of employees working in firms or government agencies that are located in the service territory of the central office. We also include two variables that indicate size by reflecting how urban a market is: Metropolitan Statistical Area (msa_cd), and # Households. We also use dummy variables for each state in the sample to capture fixed state effects.

Entry is also affected by the cost of entry. As described above, a CLEC likely builds its own loops and collocates in a wire center or just collocates in a wire center. The variable Collocation Entry Cost identifies the cost of collocating in a wire center. The cost of collocating varies between central offices because of variation in rental prices between wire centers as established by the state regulatory commission and because of the size of the market. Different electronic equipment and unbundled network elements are used in the central office depending upon the size of the market.[25] We also expect collocation to be most prevalent in central offices where the economic cost of building a network is lowest. This is both because of the cost of parts of the network an entrant

[24] Dummy variables for each state in the sample also are used in our analysis but not included in this table.
[25] The cost of collocation was obtained from David Gabel, Scott Kennedy, and Eric Ralph, "An Approach to Analysis of Impairment of Unbundled Switching," 2003**,** http://www.nrri.ohio-state.edu/members/markets/Impairment/index.php.

builds itself and because it may impact the rates for UNEs. Thus the variable Loop Construction Cost measures the cost of building a loop in each wire center. The cost estimate for building a loop was obtained from the FCC's Hybrid Cost Proxy Model.[26] Density is measured as the ratio of the sum of people employed or living in the area served by a wire center divided by the area covered by a wire center. This is often considered an important characteristic of a market attractive for entry, as it implies lower cost of serving a given number of subscribers. Since business entrants largely collocate, though, and are not building new fully independent networks, this may prove less important to the entry decision as it may not be a good reflection of the entrant's cost.

Our price ratio variable is calculated based on Business Price and Residential Price, the monthly recurring rates for business and local exchange service, respectively. For these prices the subscriber typically obtains access to the network and unlimited local usage. But for some of the observations the price is only for local service. We have added usage charges for those observations where flat rate service is unavailable. The prices do not include the bundled federal subscriber line charge (to be added later). We could assume these prices are exogenous because they are regulated by the state public utility commission and therefore the incumbent can not quickly modify the prices when it faces entry.[27] In order to modify the price, the incumbent would have to change its rates in all wire centers that are in the same rate bracket, regardless of the level of rivalry. Targeted rate decreases are generally not permissible under regulation because of the concern that the price reductions would act as a barrier-to-entry. However, it is also possible that the incumbents have found ways to respond to entry, or that over time the regulators have responded to entry by altering the relative prices for business and residential. To account for this possibility, we treat the local business-to-residential price ratio as endogenous to collocation in our analysis.

The variable Revenue Ratio measures the ratio of business to residential revenue in each wire center. Revenue is defined as the sum of the price of local service and call-waiting, as well as the revenue from switched access and the subscriber line charge. We include this variable to reflect the potential entrants' consideration of the relative revenues to be earned in the market, rather than relative price for basic service only. As entrants consider a market's profits, and not the price of a single product or service we consider this variable the more reliable reflection of the extent of cross-subsidization. This view has been widely expressed by the Federal Communications Commission[28] and local exchange companies.[29]

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[26] http://www.fcc.gov/wcb/tapd/hcpm/

[27] For example, Verizon can petition the Maine Public Utilities Commission to end the price freeze for the pricing of services to large businesses. Verizon may be granted additional pricing flexibility if, at "a minimum, Verizon … show[s] that one or more facilities-based CLECs have facilities in place to provide service to customers with ten or more lines, but it also must show that the CLECs are actively marketing and providing their services to such customers. Whether CLECs provide service throughout the entire wire center is another factor we will consider in determining whether competition is effective." Maine Public Utility Commission, *Investigation into Verizon Maine's Alternative Form of Regulation,* Docket No. 99-851, June 25, 2001, slip op., section III.A.

[28] ""…the… standard we adopt today [for evaluating the possibility of competitive entry] considers whether all potential revenues from entering a market exceed the costs of entry,.." Federal Communications Commission, *Triennial Review, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking in the Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers (Docket Number 01-338), Implementation of the Local Competition Provisions of*

Additional variables are included to help explain the entry process are a dummy variable indicating if state governor is a democrat, a second dummy variable indicating if local market was closed to entry in 1994 (pre-Telecommunications Act of 1996 (Act)), the pre-Act business - to – residential ratio (from 1995), and a dummy variable indicating if the market has price-cap regulation.

Descriptive Statistics

As shown in Table Two, there is very little correlation between collocation and the price ratio variables, business margin, residential margin, business monthly price for access and residential monthly price for access. Table Three shows that collocation is reasonably correlated with number of employees, number of households, and MSA. Correlation is not correlated to household incomes.

The price ratio is highly correlated with the revenue ratio (.7581).

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the Telecommunications Act of 1996 (Docket Number 96-98), and Deployment of Wireline Services Offering Advanced Telecommunications Capability (Docket Number 98-147), August 21, 2003, Paragraph 258 The Commission added that the analysis should "…consider all the revenue opportunities that a competitor can reasonably expect to gain over the facilities, from providing all possible services that an entrant could reasonably expect to sell.". Id. par. 100.

[29] *Ibid*., Paragraph 485, Footnote 1511; Reply Comments of the Verizon Telephone Companies, In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers (Docket Number 01-338), Implementation of the Local Competition Provisions of the Telecommunications Act of 1996 (Docket Number 96-98), and Deployment of Wireline Services Offering Advanced Telecommunications Capability (Docket Number 98-147), July 17, 2002, Page 43; William Taylor, a consultant who testifies for all of the RBOCs, stated in a recent proceeding in Massachusetts that entry decisions are based on the total revenues available to the entrant, and not from any one particular service: "[S]ometimes we ask the question, can a LEC make money in residential service, for example? And for that, what matters is the full panoply of services that a CLEC or ILEC can expect to provide when it attracts a customer…" Massachusetts Department of Telecommunications and Energy, Price Cap Regulation for Verizon, DTE 01-31, Phase II Order, April 11, 2003, Page 82.

Table Two : Collocation Correlation with Price and Margin Variables

	colloc~n	price_~o	price_~2	bus_ma~n	res_ma~n	bus_ac~e	res_ac~c
collocation	1.0000						
price_ratio	0.1238	1.0000					
price_ratio2	0.1032	0.7581	1.0000				
bus_margin	0.0860	0.0994	-0.0908	1.0000			
res_margin	0.1077	-0.0191	-0.2241	0.9679	1.0000		
bus_acc_n_~e	-0.0822	0.3590	-0.0127	0.6843	0.5432	1.0000	
res_access~c	-0.1771	-0.2937	-0.5877	0.5625	0.5211	0.7238	1.0000

Table Three: Collocation Correlation with Market Size Factors

	colloc~n	househ~s	medhhinc	emp~2001	msa_cd
collocation	1.0000				
households	0.6424	1.0000			
medhhinc	0.2767	0.1610	1.0000		
empl_2001	0.5599	0.7591	0.2055	1.0000	
msa_cd	0.4284	0.4574	0.4587	0.4123	1.0000

Regression Results

We simultaneously estimated business entry in the form of collocation and incumbent local - to - residential revenue ratio using 3SLS. We also estimate a variation of these equations, substituting business – to – residential price ratio for the revenue ratio. The results of this regression appear in Table Three.

Effect of Revenue Ratio and Retail Price Ratio on Collocation

The local business – to – residential revenue ratio is insignificant in the estimation of collocation. This contradicts the conventional wisdom on the reason for the disparity in local business and residential entry (hypothesis 2 from above). However, when the local business – to – residential price ratio is used in place of the revenue ratio in estimating collocation, it is found to be positive. This suggests that entry occurs when the business price exceeds the residential price by more, possibly supporting the conventional wisdom. These conflicting results occur despite the high correlation between the revenue ratio and price ratio variables (.7581). We believe the discrepancy in this result is caused by the greater variance in values for price ratio compared to revenue ratio, resulting in a smaller standard error for the price ratio coefficient which in turn raises its t-value.

Additional insight regarding this relationship may be gained from the estimations of the business – to - residential ratio equations. The collocation variable is insignificant in the estimations of both the revenue and price ratios. The variation in the relative revenue and price of local business and residential markets, then, is not influenced by business entry. Thus it appears that entry is not causing rates (or revenues) to be rebalanced, contradicting the findings of Knittel (2004).

Based on these results, the effect of the retail price ratio, and potential rate distortions resulting from cross subsidies as per the conventional wisdom, remain unclear. As these results are conflicting, there is not sufficient evidence to reject hypothesis 2 that distortions from cross subsidies are driving the disparity of entry in local business and residential markets. However, revenue ratio, which is insignificant in predicting collocation, is the more reliable reflection of the entry decision.

Effect of Economics and Demographic Characteristics

As expected, several economic and demographic variables indicative of cost and demand are significant in the estimation of business entry. The number of employees in a local market, a good indication of demand for business lines, is significant and has a positive coefficient in all estimations of collocation. Similarly, the variables reflecting the urbanness of a market, MSA, # Households, are significant with positive coefficients. Cost variables are also significant with the expected negative coefficients. These results

provide support for Hypothesis 1, the importance of underlying demand and cost characteristics to the entry decision.

Table 4: 3SLS Regression Results
2,605 Observations

	(1) Revenue Ratio		(2) Revenue Ratio & Price Cap		(3) Price Ratio		(4) Price Ratio and Price Cap	
Dependent Variable	Collocation	Revenue ratio	Collocation	Revenue ratio	Collocation	Price Ratio	Collocation	Price Ratio
Independent Variables								
msa_cd	0.105		0.105		0.1		0.1	
	(6.03)**		(6.03)**		(5.84)**		(5.84)**	
# Employees 2001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(5.67)**	(1.85)	(5.67)**	(1.85)	(5.54)**	(2.23)*	(5.54)**	(2.23)*
# Households	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000
	(17.87)**	(2.71)**	(17.87)**	(2.71)**	(17.91)**	(2.00)*	(17.91)**	(2.00)*
Revenue Ratio	0.011		0.011					
	(0.82)		(0.82)					
Loop Const. Cost	-0.003	-0.000	-0.003	-0.000	-0.003	-0.001	-0.003	-0.001
	(11.22)**	(0.56)	(11.22)**	(0.56)	(11.07)**	(0.81)	(11.07)**	(0.81)
density2	0.000		0.000		0.000		0.000	
	(1.43)		(1.43)		(1.68)		(1.68)	
total_per_line__basic_installati	-0.002		-0.002		-0.001		-0.001	
	(6.32)**		(6.32)**		(6.14)**		(6.14)**	
collocation		-0.053		-0.053		-0.278		-0.278
		(0.47)		(0.47)		(1.02)		(1.02)
population_sf2		0.000		0.000		0.000		0.000
		(2.40)*		(2.40)*		(2.05)*		(2.05)*
calling_area		0.000		0.000		0.000		0.000
		(1.36)		(1.36)		(1.97)*		(1.97)*
gov_dem		-0.067		1.619		0.743		3.149
		(0.76)		(39.09)**		(3.47)**		(31.66)**
closed_94		-0.430		-0.303		0.051		-0.743
		(5.51)**		(6.61)**		(0.27)		(6.76)**
p_ratio_95		1.160		0.538		0.702		-0.185
		(35.77)**		(21.90)**		(9.03)**		(3.13)**
		(.)		(.)		(.)		(.)
pricecap				1.437				3.904
				(34.76)**				(39.31)**
Constant	0.332	0.000	0.332	0.000	0.298	0.000	0.298	0.000
	(8.14)**	(.)	(8.14)**	(.)	(10.27)**	(.)	(10.27)**	(.)
price_ratio					0.025		0.025	
					(3.04)**		(3.04)**	
Observations	2605	2605	2605	2605	2605	2605	2605	2605

Z-Statistics in parentheses.
* indicates significant at 5% level.
** indicates significant at 1% level.

Estimation of Revenue and Price Ratios

Demographic and regulatory factors were found to be significant predictors of revenue and price ratios. The # Households variable is significant and negative, indicating more households results in relatively greater increase in residential revenue and price vs. business revenue and price. Population is significant and positive for both the revenue and price ratios. Number of employees is insignificant for revenue ratio but significant and positive for the price ratio. Calling Area is significant and positive for price ratio but insignificant for revenue ratio. Local Loop Construction Cost is insignificant for both ratios.

Regulatory variables were significant for both revenue and price ratios. Democratic Governor has a positive coefficient, indicating more cross-subsidization distortion in states with Democratic leadership. Wire centers with price cap regulation have higher revenue and price ratios, indicating the ability of incumbent firm providers to

lower prices in response to entry (or pre-emption thereof) has not resulted in rate rebalancing. Historical pre-Act price ratio (from 1995) is significant and positive for revenue ratio. It is positive for price ratio when Price Cap is excluded and negative when Price Cap is included. This could indicate that if the price ratio was high before the Act, the market may have attracted more entry, and existence of price cap regulation allowed the incumbent to lower the business price in response, resulting in a lower present ratio. Closed_94 is significant and negative for revenue and price ratio. In these markets where no entry was allowed until required by national law, the regulator probably was relatively friendly to the incumbent. We think the coefficient for this variable is negative because these regulators, once forced to open market to entry, aggressively reduced the price ratio to protect the ILECs from entry.

6. Conclusion

In this paper we have argued that even under the assumption of existing cross-subsidies between the local business and residential telephone segments, rate rebalancing may not have the desired effect of increasing entry in local residential markets. This is because differences in entry are a function not only of the relative prices and revenue recovery, but also of the differences in demand and cost characteristics in the two types of markets. Also, rate rebalancing that eliminates the cross subsidy may not be sufficient to generate profits in local residential service such that firms would enter.

We tested these relationships empirically using preliminary data from 2605 local business markets in 16 states. The preliminary results provide strong support for the importance of underlying market characteristics. Business subscribers, all else equal, are more profitable than residential subscribers, regardless of regulatory price distortions. The effect of retail prices with their lingering regulatory distortions remains unclear, based on the preliminary results. It is unclear at this point whether elasticity of supply in the local business market with respect to the relative revenues and prices in the local business and residential markets is significant. Further examination is required. We are also exploring the elasticity of supply with respect to relative retail prices and revenue in the local residential market to better understand If residential entry will increase when rates are rebalanced.