Competition in Networking: Research Results and Implications for Further Reform

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1. Introduction

The 1984 breakup of AT&T was based on the theory that local telecommunications[1] was a natural monopoly and that markets for other elements of telecommunications could be competitive, namely long distance, equipment manufacturing, and information services. Believing that AT&T had historically used its control of local telephone lines to hinder competition in equipment and long distance markets, the US Department of Justice concluded that the appropriate remedy was to force AT&T to give up its ownership of the Bell Operating Companies (BOCs), the AT&T subsidiaries that owned and operated AT&T's local telephone lines. To ensure that the BOCs did not use their local monopolies to hinder competition in other markets, the divestiture agreement restricted the BOCs from manufacturing telephone equipment and from providing information services and interLATA long distance.[2] In a separate antitrust settlement, the government imposed interLATA long distance restrictions on GTE, too.

Interestingly, concomitant with this breakup of the Bell System, business events were unfolding that refuted the breakup's underlying theory. The development of the competitive access providers (CAPs) -- companies that provided high-speed telecommunications services in competition with BOCs and other incumbents -- called into question the belief that local telecommunications was a natural monopoly. In the late 1970s, the Port Authority of New York City developed the concept of a high-speed telecommunications network that would compete

[1] Telecommunications has traditionally been divided between long distance service and local exchange service. Local exchange service in the US consists of a telephone line and calling within a local calling area, which is typically a city or town. Long distance is calling between local exchange areas.

[2] The AT&T divestiture agreement of 1982 restricted the BOCs from providing long distance service, except in limited areas (called Local Access Transport Areas, or LATAs). LATAs were typically the size of an area code region that would have existed in 1982. The BOCs were prohibited from carrying long distance calls across LATA boundaries.

with New York Telephone, the New York BOC. In partnership with Merrill Lynch and Western Union, the Port Authority formed Teleport Communications Group (TCG) in 1983 and began signing up customers in 1984. CAPs' influence grew quickly. By 1988 there were eleven CAPs operating in ten US cities and by 1993 there were thirty CAPs. In 1994 TCG became the first Competitive Local Exchange Carrier (CLEC) by offering switched[3] local telecommunications service in New York, Boston, and Chicago in competition to the BOCs serving those cities. (Tomlinson, 2000, pp. 7, 88, 241-247)

In addition to refuting the belief that local telecommunications was a natural monopoly, business events were challenging the notion that local and long distance were separate and distinct markets. The distinction between local and long distance telecommunications was created in the late 1800s, based upon city franchises for telephone companies and on 1800s telephone technology, which could not provide long distance. (Brock, 1981, pp. 99-176) During the 1900s, cities lost much of their control over telecommunications companies, making the franchise boundaries irrelevant, and technological advances erased the technical distinction between local and long distance. However, state and federal telecommunications regulations kept the local-long distance boundaries in place and the break-up of AT&T embedded these boundaries further into the industry structure.

Problems with the separation of local and long distance became evident soon after the breakup. Long distance companies were heavily dependent on incumbent local exchange companies. Almost 99 percent of long distance companies' calls passed through incumbent local exchange companies' networks and long distance companies' payments (called long distance access) to local exchange companies for completing long distance calls constituted nearly 50

[3] In this context "switched" means that customers can call one another by dialing (or pressing) telephone numbers.

percent of the long distance companies' costs. (Jamison, 1995) To relieve the resulting strategic tension and to lower their costs, long distance companies encouraged the development of CAPs and bypassed portions of the incumbents local exchange companies' networks.

The BOCs had a strong interest in competing with long distance companies. The long distance restriction prevented the BOCs from competing for large customers who wanted seamless, end-to-end services across LATA boundaries. The BOCs knew that long distance companies and CAPs would eventually take the most profitable customers. Also, BOC provision of long distance could stimulate growth in telecommunications by eliminating the demand suppression caused by long distance access prices being above marginal cost (Weisman, 1995).

In the early 1990s, regulatory policy began catching up with business and technology changes that had occurred throughout the century. Some states began allowing competition for local telephone service and in 1996 Congress passed the 1996 Act. Among other things, the 1996 Act made allowing competition in almost all telecommunications markets a national policy.

In this paper I examine the results of government policies that open telecommunications markets to competition, focusing primarily on the US, and draw conclusions for future directions. I find that the policies adopted to implement the 1996 Act appear have generally facilitated the development of competition and that there is insufficient evidence to determine whether the policies have unduly favored incumbents or entrants. I also find that competition is most viable where there is unmet demand. I conclude that policymakers should focus less on developing competition for traditional local telephone service because this is at best a well-served, narrow market and may not be a separately identifiable market at all. Policymakers should instead focus on competition for integrated services that cross traditional market boundaries. In following such a policy direction, policymakers should continue to ensure access

to incumbents' essential facilities. They should also discontinue use of structural restrictions on telecommunications companies and develop mechanisms that allow pricing flexibility for interconnection, essential facilities, and retail services and that allow service offerings that are not confined by jurisdictional boundaries.

This paper proceeds as follows. In next section I summarize how the 1996 Act opens markets to competition. In Section 3, I explain the policies that US regulators have adopted to implement the 1996 Act and the theories upon which these policies are based. In Section 4, I review recent research on telecommunications competition. In the next section I draw policy conclusions from the research and make recommendations. Section 6 is the conclusion.

2. The US Telecommunications Act of 1996

The 1996 Act provides three methods of entry for local telephone service (illustrated in Figure 1). Some entrants use more than one method. Entrants can build their own facility-based network, lease portions of an incumbent local exchange company's (incumbent) network, or buy an incumbent's services and resell them.[4] The 1996 Act requires incumbents and entrants to interconnect their networks to exchange calls. Exchanging calls between competing networks is necessary for customers of one company to be able to call customers of another company. Payment for exchanging calls is called reciprocal compensation in the US.[5]

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[4] Traditional voice telecommunications networks consist of lines and switches. Lines either connect customers to the network or connect switches in the network. Switches route calls between customers. Switches are of two types: local switches (also called central offices) that customers connect to and that switch local calls, and long distance switches (also called tandem or toll offices) that route long distance calls from one local switch to another.

[5] "Reciprocal" means that both companies involved in an interconnection are obligated to make payments. "Symmetric" reciprocal compensation means the companies charge the same prices to each other. Reciprocal compensation prices are generally symmetric in the US, so I assume symmetry in my models.

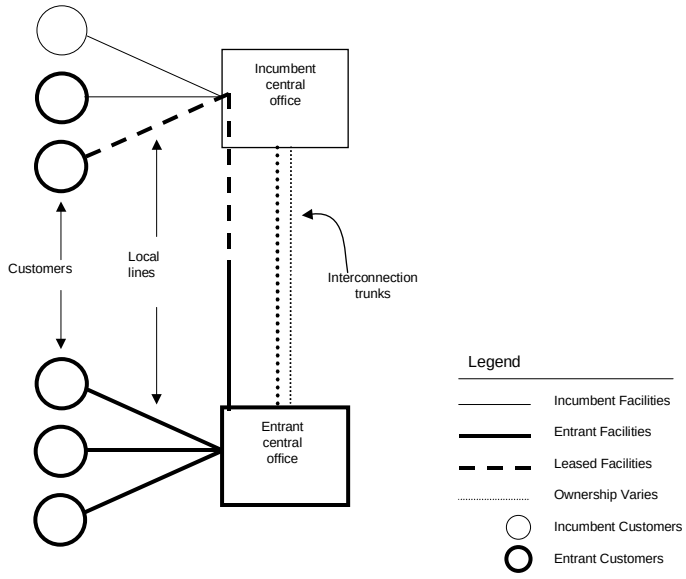

Figure 1. Interconnection Arrangements

Leasing portions of an incumbent's network is called purchasing unbundled network elements (UNEs). Figure 1 shows how an entrant would lease a local telephone line from the incumbent. The line would connect to the incumbent's building. It could then connect to the incumbent's switch or the entrant's switch, depending on how the entrant wishes to use the incumbent's facilities. Entrants that have their own switches must interconnect their switches with those of an incumbent and pay reciprocal compensation for terminating telephone calls on the incumbent's network. Figure 1 shows how lines, called trunks, would connect the incumbent and entrant central offices. Likewise, an incumbent must pay reciprocal compensation for terminating calls to an entrant. The 1996 Act states that prices for UNEs and for reciprocal compensation are to be cost-based, which regulators have generally concluded mean that they

should be based on incremental cost.[6] Regarding resale, Figure 1 shows an entrant's customer using a resold service. In a sense, reselling is little more than rebranding the incumbent's service. The 1996 Act says that wholesale prices must be based upon retail prices minus the portion attributable to marketing, billing, collection, and other costs avoided by the incumbent when it does not provide the retail service.

The essential trade-off in the 1996 Act is that the BOCs and GTE are permitted to offer long distance service in exchange for giving up their local monopolies. GTE was permitted to offer long distance immediately upon passage of the Act, as were the BOCs with respect to long distance outside their regions. With respect to long distance within their regions, the key market for BOCs because of their traditional customer bases, the BOCs are to be permitted into the market once they have satisfied certain preconditions. Tomlinson (2000, pp. 320-321) provides details on these preconditions.

3. Policies Implementing the 1996 Act

Shepherd (1997), Noll (1995), Katz (1997), and Gulati et al. (2000) describe competitive issues in network industries with an incumbent monopoly or a dominant firm. Shepherd (1997) explains that a dominant firm may be able to hinder competition by controlling key inputs or using strategic pricing, or by virtue of its information advantage relative to customers, regulators,

[6] This is based on a review of state commission interconnection decisions located on the National Regulatory Research Institute's web site (NRRI, 1998) for 1998, the time period for my study, the FCC and all state regulators but Arkansas determined that incumbents' prices for UNEs should be based upon incremental cost. Arkansas chose an accounting cost allocation approach called fully distributed cost as its method. Twenty-nine percent of the states also chose to base reciprocal compensation prices on incremental cost and the rest chose bill and keep. The FCC's policies allow for bill and keep, but do not mandate it. Some states that adopted bill and keep applied the policy only as long as the traffic exchange is relatively balanced.

and rivals. Noll (1995) explains that incumbents may hinder entrants by refusing or hindering interconnection and delaying regulatory proceedings on entry policies. Because retail prices are generally regulated in telecommunications, he concludes that an incumbent's ability to hinder entry may be the best available indicator of market power. Katz (1997) shows that a dominant firm has a greater incentive to hinder entry than an entrant has to successfully enter a market because the dominant firm receives monopoly profits if it succeeds while the entrant's profits are less than that if it succeeds. Gulati et al. (2000) explain that when firms form a network of companies, the dominant firm sets the boundaries of the firms in the network. The dominant firm sells inputs to rivals only if selling the inputs is more profitable for the dominant firm than using the inputs itself to provide downstream products.

An extensive literature has developed on pricing inputs sold to rivals. One of the first methods proposed was the Baumol-Willig Rule, which is now known as the Efficient Component Pricing Rule (ECPR). (Baumol and Sidak, 1994a, 1994b, and 1995; Kahn and Taylor, 1994; Hausman and Tardiff, 1995; Larson and Parsons, 1994; and Larson, 1997) Developed by Willig (1979) and Baumol (1983), the ECPR emphasizes developing prices that ensure that the entrant survives only if it is more efficient than the incumbent is. The ECPR ensures that an incumbent makes the same profit from selling the input as it does from selling the final product, thus making the incumbent indifferent as to which it sells. Ordover et al. (1985) explain that, if the incumbent's profits on the input are less than its profits on the final product, then the incumbent could be expected to protect its retail market. Examples of incumbents' efforts to protect markets might include providing poor quality to entrants, delaying collocation, delaying negotiations, and aggressive marketing.

The pricing method favored by regulators is to set the input price equal to the incumbent's incremental cost with only a small mark-up for covering common costs. The underlying theory is that entrants would have difficulty competing if input prices were set according to the ECPR because entrants would be denied the opportunity to take retail profits from the incumbent. Furthermore, the ECPR is efficient only under strict assumptions, which do not apply in telecommunications. (Mitchell et al., 1995; Albon, 1994; Economides and White, 1995; Tye and Lapuerta, 1996; and Tye, 1994.)

A third method, which applies only to reciprocal compensation, is called bill and keep or sender keeps all. The underlying theory is that the number of calls exchanged between two networks should be about equal in both directions, so charging is unnecessary. (Brock, 1995)

Laffont et al. (1998a, 1998b) show that reciprocal compensation can lead to collusive market results. When two firms interconnect for exchanging calls, each firm's reciprocal compensation price is a marginal cost to its rival. Therefore, a higher reciprocal compensation price can both increase a firm's revenues and raise its rival's costs. An incumbent can preclude entry by fledgling rivals by increasing reciprocal compensation prices.

The US Federal Communications Commission (FCC) began implementation of the local competition provisions of the 1996 Act by adopting rules in August 1996 that incumbents and entrants are to follow to be in compliance with the 1996 Act.[7] As of 1999, the FCC had issued 231 orders or similar actions related to its implementation of the 1996 Act.[8]

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[7] FCC 96-325, The First Report & Order In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98 and CC Docket No. 95-185, August 8, 1996.

[8] It became clear during these proceedings that some items are more controversial than are others. Consensus quickly emerged on items such as white pages, dialing parity, and access to signaling and databases. On other issues, such as prices that incumbents would charge to entrants and collocation there is disagreement among stakeholders. (Harris and Kraft, 1997; Kennard, 1998)

The FCC determined that incumbents' prices should be based upon a measure of incremental cost, which the FCC created and calls Total Element Long Run Incremental Cost (TELRIC). TELRIC incorporates specific assumptions about the incumbents' technology and input prices, which cause TELRIC to understate incremental cost (Jamison, 1999b; Weisman, 2000; Mandy, 2000). This decision, and the FCC's extensive unbundling requirements, caused incumbents and state public utility commissions to object to the FCC's local competition rules. Incumbents objected to the FCC's decisions because the decisions gave entrants the right to make extensive use of incumbents' networks at prices below incremental cost. The state commissions objected to the FCC's rules because states believed that the Act leaves these decisions to the states. The courts have largely upheld the FCC's rules.[9]

Prior to a 1999 United States Supreme Court ruling upholding the FCC's rules, states adopted an array of regulatory policies for implementing the Act. On relatively non-controversial issues, such as white page listings and access to signaling and databases, states were reasonably uniform. On controversial issues, such as incumbents' prices, states differed from each other and from the FCC. Based on a review of state commission interconnection decisions located on the National Regulatory Research Institute's web site (NRRI, 1998), 16 percent of the states chose an incremental cost measure called total service long run incremental cost as their basis for pricing

[9] The incumbent local exchange companies and the state commissions appealed the FCC's rules to the United States Court of Appeals for the Eighth Circuit. On July 18, 1997, the court released its decision generally agreeing with the states and the incumbents and vacating, among other things, most of the FCC's pricing and unbundling rules. The FCC, MCI, and AT&T petitioned the United States Supreme Court to review the Eighth Circuit's decision. On January 25, 1999, the Supreme Court largely reversed the lower court, holding that the FCC has general jurisdiction to implement the Act's local competition provisions and upholding almost all of the FCC's unbundling requirements. On July 18, 2000, the Eighth Circuit Court of Appeals vacated the FCC's TELRIC methodology and remanded it back to the FCC for revision. Lastly, on May 13, 2002, the Supreme Court upheld the FCC's use of TELRIC.

reciprocal compensation. Total service long run incremental cost generally gives higher estimates of incremental cost than does TELRIC (Jamison, 1999b). Thirteen percent of the state commissions chose TELRIC and the rest chose bill and keep.[10] Similarly, 77 percent of the states chose total service long run incremental cost as their cost standard for UNEs and 19 percent chose TELRIC. One state chose an accounting cost allocation approach called fully distributed cost as its method.

The 1996 Act requires a competitively neutral means for subsidizing local telephone service. Some regulators have chosen to implement this policy in part by rebalancing prices, the process by which incumbents increase some prices and decrease other prices in order to remove implicit subsidies and align prices with incremental cost. Another common method for implementing this policy is for regulators to develop a "tax" on telephone services, the monies from which are distributed to companies based on their serving customers who the regulators determine should have subsidized prices.

4. Research on Telecommunications Competition

4.1 Research Not Specific to the 1996 Act

One of the earliest contributions in this area of research is Crandall (1991). He finds that the difference between total telecommunications equipment sales and telephone company equipment purchases increased from 1984 through 1988, indicating an increase in private network investment. Tomlinson (1995) and Woroch (2000) show that competition from CAPs

[10] The FCC's policies allow for bill and keep, but do not mandate it. Some states that adopt bill and keep apply the policy only as long as the traffic exchange is relatively balanced.

prompts incumbents to invest in fiber optics. Ros (1999), Gutierrez and Berg (2000) and Gutierrez (2002) perform cross-country analyses of how regulation, privatization, and liberalization affect telecommunications development. Without distinguishing between different forms of liberalization,[11] Ros (1999) finds that competition increases teledensity (telephone lines per 1000 population) and decreases investment. Gutierrez and Berg (2000) and Gutierrez (2002) find that sound regulation (measured by independence, accountability, legal framework, and transparency), privatization, and liberalization increase teledensity. Dekimpe et al. (1998) find that increased numbers of cellular competitors increases the penetration rate and the rate of diffusion of telecommunications. Blank et al. (1998) show that entry by long distance companies, such as AT&T, into BOC intraLATA long distance markets lowers BOC intraLATA long distance prices. Hausman, Leonard, and Sidak (2002) find that BOC entry into long distance markets in New York and Texas resulted in lower long distance prices for consumers.

Cave and Prosperetti (2001, pp. 40, 60) examine Europe's experience with telecommunications competition and conclude that competition has been slow to develop in traditional fixed-line telephony and fast to develop in mobile telecommunications. One significant difference between these two markets is that traditional fixed-line telephony was dominated by state-owned monopolies prior to liberalization and mobile telecommunications markets were largely unserved prior to the mid 1990s.

In a cross-country comparison, Spiller and Cardilli (1997) use a case study approach to conclude that the absence of clear rules on interconnection and parity for long distance competitors in terms of the how customers can use their services, causes delays in entry and

[11] The markets open to competition varied across countries. Countries in the sample liberalized various combinations of local telephone service, domestic long distance, and international long distance.

disadvantages new competitors. They also find that limiting rights for entrants to use incumbents' networks encourages investment by entrants. Belt (2001) finds that, with little regulatory oversight, competition can develop quickly even in poor countries, especially in situations where there is very little service, very poor service, and high prices. Using a case study approach, he examines telecommunications competition in Guatemala and El Salvador. Both countries had very little telecommunications development before largely deregulating their markets in the mid 1990s. He shows that competition developed quickly in these countries and those customers have experienced lower prices and substantial expansion of service.

In an examination of the effects of incentive regulation on incumbent investment, Greenstein et al. (1995) find that entry by competitive access providers has no measurable affect on incumbents' investment levels, but that removal of regulatory restrictions on entry encourages incumbents' investment in fiber optics. They also show that removal of restrictions on long distance company provision of intraLATA long distance and on resale of local services decreases incumbent fiber optic investment. Ai and Sappington (2001) find that the combination of local telecommunications competition and incentive regulation encourages incumbents to use new technologies.

Regarding other interconnection arrangements, King and Gans (2000) describe the Australian experience with the calling party pays system, the system under which the customer placing the call pays the called party's service provider for completing the call.[12] Under this system, small service providers have an incentive to charge high prices for completing calls

[12] In contrast, the US uses a carrier compensation arrangement for traditional telephone calls (described in Section 2) and a called party pays system for mobile telephony. With the called party pays system, the customer receiving the call pays her service provider for completing the call.

because their own customers do not pay the high prices and customers placing the calls do not anticipate that they will be charged high prices -- because the service providers are small, customers do not pay the prices with sufficient frequency to learn which providers charge high prices.

4.2 Research Specific to the 1996 Act

Ros and McDermott (2000), Rosston and Wimmer (2000), Jamison (2001b), Mini (2001), Shiman and Rosenworcel (2001), Eisner and Lehman (2001), Lehman and Weisman (2000), and Crandall (2001) examine the effects of the 1996 Act. Ros and McDermott (2000) and Rosston and Wimmer (2000) examine find that entrants are more likely to enter local exchanges where incumbents' retail prices are above incremental cost. Ros and McDermott (2000) and Jamison (2001b) find that lower prices for UNEs are correlated with increased CLEC activity as are higher resale discounts. Jamison (2001b) also finds that low prices for reciprocal compensation increase entry. However, if UNE prices are low relative to incumbents' retail prices, then less entry occurs, presumably because incumbents hinder entry to protect profits. Higher reciprocal compensation prices increase entrants' market share, presumably because they target customers (such as Internet Service Providers) who receive more calls than they make. Eisner and Lehman (2001) find that states with low UNE prices have less facilities-based entry.

Using a case study approach, Crandall (2001) concludes that CLECs that survived or failed during the shakeout of 1999 and 2000 did so because of their choices of business strategy. CLECs that only resold incumbents' services were more likely to fail than other CLECs. Leasing facilities and reselling services provided an early jump-start, but CLECs faired better if they built at least significant portions of their own networks. Over-expansion hurt many CLECs.

Mini (2001), Shiman and Rosenworcel (2001), and Eisner and Lehman (2001) find that the 1996 Act's requirement that the BOCs open their local networks to competition before being allowed to provide long distance has a large, positive impact on entry, but Eisner and Lehman (2001) conclude that the causation is unclear.

4.3 Conclusions from Research

Potential for Competition. Belt's (2001) international research and US and European experiences in local telecommunications competition and mobile telecommunications competition show that competition develops rapidly when there is unmet demand and/or incumbents provide poor service, and competition develops slowly or not at all when the reverse is true. Based on this, it appears unlikely that significant competition will develop for wire-based (called wireline), voice telecommunications in the US.

Long Distance and Other Market Structure Restrictions. States where long distance restrictions have been lifted have more competition from CLECs than those that do not (Mini, 2001; Shiman and Rosenworcel, 2001; Eisner and Lehman, 2001), but the direction of the causation is unclear (Eisner and Lehman, 2001). The more critical issue for long distance restrictions is probably not CLEC competition, but the long-term structure of the industry. The long term market structure for telecommunications will be characterized by a mixture of technologies and only a few prominent players in each market, with players differentiated by their products, their degrees of vertical integration, and their multimarket contacts. (Jamison, 1999a; Jamison, 2001a) Numerous policy issues affect the nature of this structure, its ability to provide benefits to customers, and the cost of the transition. I will focus on the long distance

restrictions on the BOCs, mergers, interconnection policies, and universal service policies. These issues are interrelated, so I will discuss them simultaneously.

The hope of making profits incents companies to enter and compete in markets. Jamison (2001c) explains how a company that serves multiple markets in a network industry can internalize network externalities[13] and thereby improve its profits and improve consumer welfare. In essence, when a company adds a customer from one market, the value of telecommunications increases in other markets if networks are interconnected across markets. This increase in value represents increases in demand in these markets, which can benefit the company by making it possible for the company to sell more service and/or charge higher prices in these other markets, assuming the company operates in them. According to this analysis, customers and companies would benefit if companies operated in multiple markets.

Weisman (1999) shows how companies may enter markets and vertically integrate to overcome inefficient interconnection prices. For example, if long distance access prices are above marginal cost, then a company can improve its profits by vertically integrating. The vertical integration could result in lower retail prices for customers and higher output. It also gives the company the incentive to integrate into other markets.

Current BOC long distance restrictions and certain policies for reciprocal compensation and universal service limit the incentives described by Weisman (1999) and Jamison (2001c). The long distance restrictions prohibit the BOCs' from vertically integrating, so they cannot

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[13] Network externalities are the benefits that customers receive from being able to communicate with other customers of the telecommunications network. When a customer decides to purchase telecommunications service, the customer makes her decision by comparing the benefit she receives from the service to the price she would have to pay. However, other customers are affected by her decision. For example, customers that want to communicate with her benefit if she decides to purchase the telecommunications service. This benefit to other customers is an externality that she does not take into consideration when she weighs her private benefits and costs of purchasing the telecommunications service.

overcome many of the inefficiencies Weisman (1999) describes. In addition, as I explain earlier in this paper, the industry assumptions upon which this restriction is based were outdated even before the restriction was imposed. As a result, local-long distance boundaries are unlikely to be part of the long-term industry structure. The longer lifting the restrictions are delayed, the more costly and disruptive will be the transition to an industry structure that matches customer needs and industry economics. Bill and keep arrangements for reciprocal compensation also remove the incentives that Weisman (1999) identifies for entering markets and may indeed create a disincentive to enter. Universal service policies that subsidize customers who have low demand for telecommunications service may limit the entry incentives identified by Jamison (2001c) by substituting for at least a portion the demand stimulation that results when a company operates in multiple markets.

Pricing UNEs. Lower prices for UNEs encourage entry and help CLECs gain market share. (Ros and McDermott, 2000; Rosston and Wimmer, 2000; Jamison, 2001b) This shows that lower UNE prices stimulate competition, but it does not tell us whether the additional competition benefits customers. There are at least two potential negative impacts of lower UNE prices. First, they slow the building of CLEC networks (Eisner and Lehman, 2001). This may be negative or positive for customers. Slowing the development of CLEC networks is negative if it lowers the long-term financial viability of CLECs. On the other hand, UNEs are important for CLECs to establish customer bases in advance of building networks and lower UNE prices decrease the likelihood that CLECs would build out their networks too fast, resulting in financial distress. (Crandall, 2001) The second possible negative impact of lower UNE prices is that, if they are low relative the incumbent's retail prices and so provide a price umbrella for CLECs,

then incumbents might protect markets by, for example, providing poor quality to entrants, delaying negotiations, and aggressive marketing. (Jamison, 2001b).

Pricing Reciprocal Compensation. The effects of reciprocal compensation prices are more complex than the effects of UNE prices. Lower symmetric reciprocal compensation prices encourage entry, indicating that for many CLECs reciprocal compensation is a more of a cost than a source of revenue. Higher symmetric reciprocal compensation prices increase the market share of CLECs that use UNEs and build their own facilities, indicating that reciprocal compensation is an important source of revenue for the most successful of these CLECs. (Jamison, 2001b) Furthermore, situations can occur in which some entrants have an incentive to raise reciprocal compensation prices.

Pricing Retail Services. There is conflicting evidence on the effects of price rebalancing on entry. Rebalancing prices to remove implicit subsidies from business to residential customers of local exchange service stimulates competition in residential markets (Ros and McDermott, 2000). However, increasing local exchange service prices in general relative to UNE prices decreases entry by CLECs (Jamison, 2001b), indicating that incumbents have the ability to limit entry in markets where retail services are more profitable than inputs sold to CLECs.

Pricing Services for Resale. The 1996 Act's resale provisions appear to be working as intended. The option to resell incumbents' services is important for new CLECs and for CLECs who are expanding their markets (Crandall, 2001; Jamison, 2001b) and there does not appear to be evidence that resell discounts provide a price umbrella for inefficient CLECs. The financial markets seem to be rewarding CLECs who use resale options to enter and expand markets, and punishing those that use resale as their primary method of providing service.

5. Policy Conclusions

In this section I outline policy conclusions. I begin with market boundary and market structure issues and conclude with pricing issues.

Because competition is most likely to develop and flourish where there is unmet demand and/or incumbents provide poor service, regulatory policy should focus on competition for broadband telecommunications, wireless telecommunications (and between wireless and wireline), combination services that do not conform to outdated local-long distance boundaries, and combination services that add features and content to traditional telecommunications. This means that there is no reason to retain the long distance restrictions on the BOCs. Furthermore, policymakers should remove all regulatory distinctions between local and long distance telecommunications and between technologies. This would give companies the freedom to offer, and customers the freedom to choose, telecommunications packages with (1) local, regional, national, or international calling areas, or no calling areas; (2) wireline and wireless services; and (3) voice, Internet, content, and transaction services. Removing these distinctions affects numerous long-running telecommunications regulatory structures, such as Separations and dual jurisdiction.[14] These structures will be difficult to change or dismantle, whichever the case may be, so there is a need for quick but extensive investigations into how removing these distinctions can be accomplished.

The 1996 Act's resale and extensive unbundling requirements are no longer necessary, but requirements for unbundling essential facilities and for interconnection should continue.

[14] Separations are the process for allocating incumbent local exchange companies' accounting costs between the federal and state regulatory jurisdictions. Dual jurisdiction refers to the system by which the responsibilities of the FCC and the state regulators are based on the interstate or intrastate nature of the communication being regulated.

With respect to pricing of UNEs and reciprocal compensation, at least two lessons emerge from the research. First, even though the current prices appear to be below their economic costs in at least some instances, there does not appear to be a need for extensive policy reform for TELRIC. The second lesson is that price flexibility is needed to allow incumbents and CLECs to address local market conditions. I discuss this second lesson next.

Both incumbent and CLECs respond to the profit incentives created by UNE and reciprocal compensation prices. Excessive price uniformity can lead incumbents to limit entry in some areas, lead entrants to target market niches based on UNE and reciprocal compensation prices rather than on the underlying economics of the niches, and limit all companies' abilities to charge prices that reflect customer demand. Policy instruments are needed that provide price flexibility for incumbents, limit incumbent incentives and abilities to hinder competition, and limit entrants' incentives to design their businesses around the regulatory system. One such instrument might be to include incumbent UNE, reciprocal compensation, long distance access, and retail prices under a general or global price cap. (Laffont and Tirole, 1994) A global price cap could limit incumbent profits resulting from hindering competition and so would limit incentives for incumbents to engage in such conduct.[15] More generalized interconnection offerings (replacing UNEs, long distance access, and reciprocal compensation) with options for different types of traffic, different levels and patterns of traffic, and for different contracting arrangements (such as time commitments) could be a feature of this global price cap. Symmetry or similar requirements for entrants should also be included.

[15] There would be difficult jurisdictional issues to resolve with a global price cap because the cap should include both interstate and intrastate services, but these issues should not be insurmountable.

6. Conclusion

In this paper I examine policies for opening US markets for local telecommunications to competition and draw implications for the future. I find that studies of competition in US telecommunications markets show a need for pricing flexibility for leasing incumbent facilities and reciprocal compensation, lifting Bell Operating Company long distance restrictions, and relaxing rules on mergers and divestitures. More research is needed on these issues, but waiting for more complete information before moving forward on policies would seem to be a poor choice. The benefits of moving forward with greater price flexibility on UNEs and reciprocal compensation, lifting long distance restrictions, and eased merger restrictions seem to be worth risk of making missteps because of incomplete information.

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