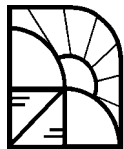


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DO HIGH CALL TERMINATION RATES DETER BROADBAND DEPLOYMENT?

Abstract: In this BULLETIN, we attempt to shed light on an important policy question: Does the current way by which providers compensate each other for the exchange of voice over Internet Protocol (VoIP), wireless, local, and long distance calls inhibit broadband deployment? This question is timely, as the Federal Communications Commission is presently considering a comprehensive intercarrier compensation reform proposal that would establish lower and more uniform rates for the transport and termination of all forms of traffic, regardless of point-of-origin and technology. Supporters of the proposal have argued that broadband deployment would be advanced if the FCC were to adopt this proposal, while detractors assert that broadband deployment would be demonstrably hurt. In this BULLETIN, we find evidence that compared to the current Byzantine intercarrier compensation system, a lower, more uniform compensation rate can promote and spur broadband deployment, especially in rural and less densely populated areas where current call termination rates are very high, by reducing arbitrage opportunities that distort investment decisions. As such, comprehensive intercarrier compensation reform would appear to make a significant contribution towards the development of a true national broadband strategy.

I. Background

For many years, comprehensive reform of the nation's Byzantine intercarrier compensation and universal service system has been considered the Holy Grail of telecom policy—cherished and long-sought, but never truly realized. Federal Communications Commission Chairman Kevin J. Martin, however, has recently circulated a comprehensive reform proposal that has sparked a debate as to whether the current system hinders or promotes the deployment of advanced broadband services in rural America. The centerpiece of the FCC's current reform

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effort is a proposal to establish—to the maximum extent practicable and legal—a lower and more uniform rate for the transport and termination of all voice telephone calls, regardless of where that point of origin and regardless of technology used to make that call.¹ Local exchange carriers that are able to show that their costs for terminating these calls are higher than these new lower rates may be able to recover these costs through a revamped federal Universal Service Fund.²

Both supporters and detractors of a lower, more uniform call termination rate claim that broadband deployment in rural areas would be affected in one way or another by this reform proposal. Supporters believe that uniform rates would eliminate investment distortions and arbitrage opportunities that the current Byzantine system fosters, thereby increasing investment in broadband technologies. For example, a broad coalition of AT&T, Verizon, Sprint, T-Mobile, the VON Coalition, along with several trade groups that represent various components of the telecommunications in VoIP industry, have asserted that “unifying and simplifying these rules will spur innovation and the deployment of these IP services as well as the broadband networks they ride over.”³ AT&T has stated that the current system “incentivizes carriers to cling to the traditional voice model, discouraging broadband adoption.”⁴ The consumer advocacy group Free Press has even noted that the current intercarrier compensation system “is inefficient and completely divorced from reality” and provides a “strong incentive for rural carriers to delay the full transition to the broadband world.”⁵

¹ F. Johnson, *FCC Mulls Rework of Phone Rates, Internet Subsidies*, DOW JONES NEWSWIRE (Oct. 14, 2008) (available at: http://news.morningstar.com/newsnet/ViewNews.aspx?article=/DJ/200810142151DOWJONESDJONLINE000710_univ.xml); see also Stifel Nicolaus, *FCC Chairman Floats Telco Reform Plan – So Little Time, So Much to Sort Out* (Oct. 16, 2008).

² According to report by Stifel Nicolaus about the proposal, “one of the key questions would be the extent to which telcos would be able to replace lost access-charge revenues.” In noting that “many of the details remain squishy at this point,” Stifel Nicolaus notes its belief that rural LECs would receive additional USF support “but not so the big Bells and other price-cap incumbents” like Embarq and Windstream. *Id.* at 2.

³ Letter from AT&T, CompTIA, CTIA, Global Crossing, The Information Technology Industry Council, National Association of Manufacturers, New Global Telecom, PointOne, Sprint Nextel Corp., The Telecommunications Industry Ass’n, T-Mobile, Verizon, and The VON Coalition to FCC Chairman Kevin J. Martin, WC Docket No. 04-36, CC Docket No. 01-92 (Aug. 6, 2008), at 3. The coalition also asserted that any delay in intercarrier compensation reform would “hinder the further development and growth of VoIP and other innovative IP-based communications services.” *Id.*

⁴ Letter from Brian Benison, AT&T, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-92 and 96-45, WC Docket Nos. 05-337, 99-68, 07-135 (Aug. 5, 2008), Attachment at 2.

⁵ Letter from Ben Scott, Free Press, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 96-45 and 01-92, WC Docket Nos. 05-337 and 06-122 (Oct. 13, 2008), at 2, 5.

In contrast, critics of the proposal like the National Telecommunications Cooperative Association (NTCA) and some mid-sized incumbent local exchange carriers insist that the current system does not inhibit broadband deployment.⁶ Windstream has argued that the proposal “will result in less, not more, broadband deployment in areas served by rural price cap carriers.”⁷ The Independent Telephone & Telecommunications Alliance, a group of mid-sized incumbent LECs, recently argued that the proposal “will retard broadband deployment, rather than promote it.”⁸

In this BULLETIN, we attempt to shed light on an important policy question: Does the current way in which providers pay for the exchange of voice over Internet Protocol (VoIP), wireless, local, and long distance calls inhibit broadband deployment? We find evidence that compared to the current system, a lower, more uniform compensation rate can promote and spur broadband deployment, especially in areas where current call termination rates are very high. Since areas where call termination rates are high tend to be less densely populated and rural, our findings suggest that broadband deployment in rural areas would be fostered if policy promoted lower and perhaps more uniform compensation rates.

This BULLETIN provides a simple economic model that demonstrates that investments in broadband may be reduced when such investments have the potential to reduce revenues from intercarrier compensation. This type of cannibalization of existing access revenue may occur when a LEC upgrades to broadband, which accordingly facilitates the migration of its customers to VoIP and other technologies that bypass higher priced access services. The analysis provides a counter to claims by rural companies that establishing low, uniform rates for intercarrier compensation “is inconsistent with the promotion of broadband” in rural America.⁹ In fact, high rates may deter investment in modern infrastructure. Combined with

⁶ Letter from Daniel Mitchell, NTCA, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-92 and 96-45, WC Docket Nos. 05-337, 04-36 (Oct. 17, 2008) (hereinafter “NTCA Oct. 17 Ex Parte”), Attachment at 2 (noting that “the existing federal/state access rate regime does not obstruct competition or broadband deployment in the communications industry”).

⁷ Letter from Eric N. Einhorn, Windstream Communications, Inc., to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-92 and 96-45, WC Docket Nos. 99-68, 06-122, 05-337, 08-152, 07-135 (Oct. 17, 2008), at 1.

⁸ Letter from Joshua Seidemann, ITTA, to Marlene Dortch, Secretary, FCC, CC Docket Nos. 01-92 and 96-45, WC Docket No. 05-337 (Oct. 20, 2008), at 1.

⁹ Letter from Gregory J. Vogt, Law Offices of Gergory J. Vogt, PLLC, to Marlene H. Dortch, Secretary, FCC, CC Docket Nos. 01-92, 99-68, 96-45, and WC Docket No. 05-337 (filed Oct. 20, 2008) (filed on behalf of Consolidated Communications, Windstream, Embarq, FairPoint, CenturyTel, Iowa Telecommunications Services, and Frontier), at 2.

other features of Chairman's Martin plan, lower compensation and more uniform rates are consistent with a move towards a sensible national broadband strategy.

We impress upon the reader the following point: our focus in this discussion is rather narrow and directed at one way the intercarrier compensation regime may affect broadband deployment. Given the sheer number of moving parts involved in intercarrier compensation and universal service reform (indeed, the FCC has no fewer than ten dockets simultaneously open on various related topics), we do not even pretend to claim that this analysis is a comprehensive assessment of Chairman Martin's reform proposal. Nor do we come out in support of this proposal or, indeed, any other intercarrier compensation reform proposal. That said, our focus is important because the deployment of broadband is an indispensable and critical national policy goal. As a result, we believe the impact on broadband deployment should be the key driver in any significant regulatory action or inaction.

II. Background

While we do not endeavor to examine the particularities or details of any particular plan for reform, the discussion of our economic model will benefit from a quick overview of the shape of the current intercarrier compensation regime and the various reform proposals that have been discussed.

Despite the heated debate that has emerged over the current proposal by FCC Chairman Martin, nearly all parties agree that technology and competition mandate substantial reform of the existing Byzantine system. When a telephone call originates on one network and ends on another network, the provider of the network on which the call originated pays the terminating network provider a regulated rate. That rate varies, depending on the type of call, the identity of the network providers, and the technology of the networks involved. These rates can vary substantially, including rates at below 7/100^{ths} of a cent per minute for ISP-bound and local calls to a whopping 12.5 cents per minute for an intrastate toll call in South Dakota. Different rates also apply for wireless traffic, VoIP traffic, intrastate long distance calls, and interstate long distance calls.

Competition and the ability of consumers and service providers to route calls dynamically across traditional wire center and LATA geographic lines have opened up a field of arbitrage possibilities and activities. Moreover, the per-minute rates that have been established for call termination have been based upon cost studies of traditional circuit switches. While circuit switches make up the lion's share of embedded switching technology in the public switched telephone network, it is not necessarily a forward-looking technology. Packet switches are

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substantially less expensive, can handle large volumes of traffic more efficiently, and are scalable so that scale economies are weak.¹⁰ As a consequence, the size of a geographic market is becoming a less important determinant of switching costs.

Traditionally, small and mid-sized LECs have relied upon relatively higher access rates in order to support their higher costs of providing services in less densely populated areas of the country. But competition, new technology, and arbitrage have slashed this funding source dramatically. According to the FCC, interLATA long-distance minutes have decreased from 792 billion minutes in 2000 to 544 billion minutes in 2006.¹¹ Rural and mid-sized LECs have long-argued that they need reformed access and universal service support mechanisms to make up these lost revenues.

So while there is near unanimity in the industry on the need for reform of this system, the precise (and oftentimes sordid) details are complicated and often get in the way of an industry consensus approach. Nevertheless, in recent years a number of comprehensive reform proposals have been circulated and discussed between the industry and state regulators, nearly all of which share a similar approach—access charges ought to be lowered where they are presently high and more or less harmonized, while allowing affected carriers the ability to raise offsetting funds directly from their customers or the federal universal funds. Indeed, this same general “reform” pattern of lowering per-minute rates and increasing monthly charges has occurred several times in the last two decades. But those prior approaches did not deal with rationalizing and unifying rates among carriers, between different types of calls, and across technology platforms—separate access rates were established by each carrier for each type of call using each type of technology.

According to trade reports, Chairman Martin’s proposal would unify these rates across technology and call type (local, interstate, and intrastate) and would substantially curtail and lower the variation that now exists between carriers. To the extent that LECs lost revenues from this approach, the proposal would make up those lost revenues with a new universal service support fund, which various parties in the proceeding have referred to as an “Access Replacement Mechanism” or ARM.

¹⁰ Letter from Henry Hultquist, Vice President, Federal Regulatory, AT&T, to Marlene H. Dortch, Secretary, Federal Communications Commission, CC Docket Nos. 01-92, and 96-45, and WC Docket Nos. 05-337, 99-68, and 07-135 (filed Oct. 13, 2008), at 2-4 (estimating conservatively that a packet switch would have investment costs per line 20% lower than current Class 5 switches and that in addition traffic sensitive investment on packet switches are lower).

¹¹ Industry Analysis & Technology Division, Wireline Competition Bureau, FCC, *Trends in Telephone Service* (Aug. 2008), at Table 10.2.

Chairman Martin's proposal attempts to unify call termination rates with perhaps a federal benchmark of \$0.0007 per minute for all calls (the current regulated rate for the termination of ISP-bound calls) has launched a firestorm of protest from some industry quarters. Small and mid-sized LECs – while simultaneously supporting the concept that they should receive higher universal service payments to replace lost access revenues – argue that they are entitled to carrier-specific, cost-based prices for terminating calls that vary from carrier to carrier. As NTCA asserts, "the prices of many goods and services – for example, gas, food, electricity, and many others – vary regionally to reflect variations in cost. The price of interconnection (access and reciprocal compensation) should not be any different."¹²

Apparently distrustful that the ARM will make them whole, small and mid-sized LECs are arguing that lower, uniform rates would inhibit broadband deployment.¹³ On the other hand, proponents of reform like AT&T and Verizon and advocacy groups like Free Press have argued that the current regime distorts investment decisions and even disincentivizes the deployment of advanced, broadband networks in those very same rural areas.¹⁴

In the following section, we examine these claims. As noted above, we are careful not to endorse or support any particular plan, because the intercarrier compensation system involves highly intricate and detailed regulatory decisions. Our economic model shows that lower and more uniform compensation rates in presently high-rate areas can spur broadband deployment by reducing arbitrage opportunities that distort investment decisions.

III. Analysis

We demonstrate the negative effects of high, non-uniform interconnection costs on broadband deployment with a simple economic model. Our discussion focuses on terminating switched access service, but the model is more general in its application. For simplicity and ease of presentation, we assume that: (i) local wireline service, and related voice services, have demands that are independent of the price of the firm's switched terminating access service, so we ignore local voice message service; (ii) the local firm's terminating access service is a negligible portion of national terminating minutes, and the price charged by the local firm therefore has no discernible effect on long distance prices nationally; (iii) the alternative to a nationally priced long distance service is a nationally priced Vonage-type product; and (iv) the proportion of local monopoly customers who would switch to a Vonage-type product is unaffected by any choices the local monopoly can make aside from their decision to introduce a

¹² NTCA Oct. 17 Ex Parte, *supra* n. 6, Attachment at 7.

¹³ See *supra* nn. 6-9 and accompanying text.

¹⁴ See *supra* nn. 3-5 and accompanying text.

broadband capable internet service in their service area. We model this issue solely in terms of the level of prices and do not consider uniformity per se, but the effect of the Chairman's proposal is principally to lower rates by making them more uniform at the lower end of the existing price range.

Given this setup, we have the following model. For a local telephone monopolist, let the quantity of switched access minutes, Q_S , be

$$Q_S = L - \eta Q_B \quad (1)$$

where L is the exogenous level of traffic to the local company with respect to the local carriers switching price, Q_B is the number of local service area broadband users, and η is the share of broadband users that sign up for a VoIP service (like Vonage). The alternative voice technology leads to a reduction in switched access minutes, as customer traffic is migrated to alternative, lower-priced interconnection services. The price of switched access is P_S , where $P_S \leq \lambda$, with λ being the maximum price allowed. The demand elasticity for switched access is assumed to be zero with respect to P_S , so the regulation is binding (the local company prefers a very high price).

The demand for broadband service, Q_B , is

$$Q_B = A - P_B \quad (2)$$

where quantity is a function of broadband price, P_B , and demand slopes downward. Notice that the demand for a broadband service offered by the local company does not depend on the switched access price, since that price is not flowed through to local users. Further, we suppress other prices that might affect the VoIP decision since they are not under the control of the local phone company. We assume the local phone company offers broadband in the relevant geographic market as a monopolist.

If the phone company adds broadband to the product mix, then its variable profits include the profit from switched access and broadband. Assuming prices are net of marginal cost, profit with broadband entry is

$$\pi_E = \lambda L + P_B(A - \eta\lambda - P_B) - \eta A \lambda . \quad (3)$$

For the moment, we ignore fixed costs of broadband entry. Profit without broadband entry is just

$$\pi_{NE}^* = \lambda L , \quad (4)$$

so the additional terms in Equation (3) not in Equation (4) measure the profit impact from selling broadband and the loss of switched access profits from VoIP substitution by share η of the Q_B customers.

Now, let the firm choose the broadband price to maximize profits. The first order condition is

$$\frac{\partial \pi_E}{\partial P_B} = (A - \eta\lambda - 2P_B) = 0. \quad (5)$$

The profit maximizing values for P_B and entry profits are then

$$P_B^* = \frac{1}{2}(A - \eta\lambda) \quad (6)$$

and

$$\pi_E^* = \lambda L + \frac{1}{4}(A - \eta\lambda)^2 - \eta A \lambda. \quad (7)$$

The policy-relevant question is whether a high price for switched access (given by λ) will discourage broadband deployment for fear of a loss of switched access profits to alternative voice technologies such as VoIP. If we let F denote the fixed costs of broadband entry, then the incentive for broadband entry can be defined as:

$$\Omega(\lambda) = \pi_E^* - \pi_{NE}^* - F = \frac{1}{4}(A - \eta\lambda)^2 - \eta A \lambda - F, \quad (8)$$

where the incentive is merely the difference in variable profits with and without broadband entry less the fixed cost of broadband entry. From Equation (8), we can see that $\partial \Omega / \partial \lambda < 0$: the incentive to deploy broadband declines as the regulated price of switched access increases. The implication is clear: A high regulated switched access rate discourages broadband investments. Likewise, a decrease in the regulated rate, λ , would increase the incentive for broadband deployment by telephone carriers.

Because the widespread deployment of broadband is a national priority, policy should endeavor to remove all disincentives to deploy broadband networks—particularly in rural areas. Our model finds that in high-cost areas, the incentive of an incumbent LEC to upgrade its network to broadband service is diminished—and perhaps even outright deterred—by the current system of high, carrier-specific call termination rates. In addition, high access prices above marginal cost may cause a social loss that also may block the deployment of broadband services, which would magnify those social losses.

IV. Conclusion

Most everyone agrees that intercarrier compensation reform is long overdue. It should therefore not surprise anyone that the debate before the FCC has now devolved into a hotly contested battle between carriers seeking to pay less to move traffic among providers and rural carriers that hope to maintain their significant inflow of revenues from other carriers and customers in other regions of the country. And on both sides, parties routinely claim with little analysis that the future of broadband in rural America hangs in the balance.

But while all sides of the debate use rhetoric in talking about broadband policy, broadband deployment is unfortunately not the priority of most involved—and the debate is the worse for it. The rapid and widespread deployment of broadband Internet service is a key national priority. FCC policies should be grounded in a rigorous examination as to whether that policy would advance or hinder broadband deployment.

In this BULLETIN, we show that high, non-uniform intercarrier compensation rates can deter broadband deployment when broadband represents a threat to existing revenue streams drawn from high termination rates. This analysis, in our opinion, forecloses any general statement about a positive relationship between high compensation rates and broadband deployment. High call termination rates may deter broadband deployment, and we have seen no evidence suggesting that high rates promote it. While our analysis may be focused at a particular problem, the results generally suggest that all claims regarding intercarrier compensation policy and broadband deployment deserve careful scrutiny.

We do not mean to minimize or trivialize the challenges in building broadband networks in high-cost, rural areas of America. Indeed, the efforts of many small providers in rural markets to bring broadband to their communities are often heroic. As we have discussed before in prior research, affirmative government policy on both the supply side (such as universal service support) and particularly the demand side (such as demand aggregation and stimulation programs like ConnectKentucky) are an important component of this national policy and ought to be national priorities. Those efforts have been proven to work. What our model shows is that hidden subsidies that transfer revenue from some regions of the country to other regions may, in fact, dis-incent broadband deployment. An effective, sensible, and proper national broadband strategy, therefore, would strengthen policies that work and reform policies that stand in the way.

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