

**Increased Investment, Lower Prices --
the Fruits of Telecom Competition¹**

by

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Abstract

This paper shows that competition permanently reduces consumer prices for voice and broadband services and spurs telecom investment. This is particularly the case when competitors are able to lease unbundled network elements from incumbent local exchange carriers at regulated TELRIC rates.

A review of empirical data, an examination of market practices, and the application of a new dynamic model of telecom entry, pricing, and investment demonstrates that, over a five-year period, the emergence of competition should mean \$71 billion more telecom investment and hiring outlays than under the monopoly structure that prevailed prior to the Telecom Act of 1996. Over 20 years, competition would add \$155 billion to aggregate investment and hiring outlays. And compared with an ILEC monopoly, telecom investment and employment outlays would increase by over one fifth in counties containing the majority of the U.S. population and by over 30 percent in counties containing almost a third of the population. Thus, the study conclusively refutes assertions that competition reduces telecom investment.

The application of the model to all 3,108 counties in the continental United States also shows that consumers and businesses can, on average, save \$57 per year on each phone line, or \$15 billion a year in total, if the states follow the FCC's competitive cost-based TELRIC pricing rules. These rules, which were approved by the Supreme Court, determine how much Competitive Local Exchange Carriers (CLECs) should be charged to lease network access from the incumbent Bell Operating Companies.

Our study notes, however, that wholesale prices that exceed competitive TELRIC levels can raise the cost of retail phone service and reduce investment by discouraging competition. If prices for so-called UNE-P network access are set too high, competitors will be unable to provide service economically to customers. Thus, they will decline to enter the market – leaving the field clear for monopolists to raise prices without the restraints of rate regulation.

Executive Summary

A vibrant telecom sector is vital to our nation's economic success. Indeed, a remarkable two-thirds of U.S. economic growth is driven by innovations in information technology.² And telecom, which plays an essential role in information acquisition and dissemination, accounts for the lion's share of IT investment and innovation. Unfortunately, after booming in the second half of the 1990s, the telecom industry has fallen on hard times

What explains the state of the telecom sector? The ILECs (incumbent local exchange carriers) blame it on their competitors, known as CLECs (competing local exchange carriers). The CLECs, in turn, blame it on the ILECs and the failure of the Federal Communications Commission (FCC) to vigorously enforce the Telecommunications Act of 1996 (TA96). This act required the ILECs to lease, at wholesale rates, telephone lines and the other bottleneck facilities they control to CLECs so that they too could sell us local voice and broadband services. To provide the ILECs with an incentive to comply, the Act balanced opening local markets with opening long distance markets by offering the ILECs a reward for good behavior, namely entry into the long distance market.

While the two sides have been arguing, the FCC has made three significant decisions that will dramatically affect the telecom market in the years ahead. The first is permitting all four ILECs to enter the long distance market notwithstanding the fact that CLECs have yet to secure more than 13 percent of the local voice market.³ The second is to reaffirm the role of state public utility authorities (PUCs) in setting wholesale rates at which CLECs can lease either individual ILEC facilities or simply rent ILEC transmission service. This latter option is referred to as *UNE-P*, which stands for unbundled network element platform, because in renting transmissions, the CLECs are, in effect, leasing the entire platform of transmission network elements. In providing their final retail services under *UNE-P*, the CLECs bring to this wholesale transmission input significant customer support and product differentiation.

The rental of transmission services at wholesale rates is routine in the long distance market. The main difference is that in the long distance market there are competing carriers, whereas in the

² See Jorgenson, Dale, "Information Technology and the U.S. Economy," *American Economic Review*, vol. 91, no. 1 (March 2001), 1-32. The Commerce Department's estimate of the contribution of information technology to economic growth is smaller.

³ Federal Communications Commission, "Federal Communications Commission Releases Study on Telephone Trends," Press release, August 7, 2003.

local voice and broadband market, the ILECs have a virtual monopoly over the transmission infrastructure. And the ILEC's desire to lease out the use of their infrastructure is far outweighed by their desire to keep out competitors.

The alternative to competing under *UNE-P* is for CLECs to take physical possession of customer transmissions by collocating equipment in ILEC central offices. Leasing access to households in this manner is called *UNE-L (unbundled network element loop)* because it entails disconnecting the telephone line or *loop* from the ILEC's switch and reconnecting it to the CLEC's equipment. This physical moving of the loop is called the *hot cut* process.

Competing under *UNE-L* turns out to be very difficult, and often impossible, due to an array of very significant operational and cost impediments. The operational impediments include the very substantial time the ILECs take to implement hot cuts and the mistakes, whether intentional or not, that they make in the process. The costs CLECs face in operating under *UNE-L* include the significant expense of locating their equipment in the ILEC central offices, of renting collocation space from the ILECs, of transporting transmission signals from the ILEC central offices to their own networks, and of switching transmissions.

For CLECs to provide broadband service, they need to have physical control of the loop, which means entering the market under *UNE-L*. But given the high costs and operational impediments of *UNE-L* entry, such entry is economically difficult. Indeed, when CLECs do enter local markets under *UNE-L* to provide broadband, they invariably opt to offer voice under *UNE-P* given the major operational and cost impediments to providing voice under *UNE-L*.

The third FCC decision grants ILECs what, over the long term, could amount to exclusive use of our phone lines to provide high-speed broadband service.⁴ Specifically, the FCC has indicated that if ILECs add additional fiber to their transmission networks they are no longer required to unbundle (lease out) the use of that fiber to those CLECs seeking to market broadband under *UNE-L*.

⁴ The latter two decisions were announced on February 20, 2003 by the FCC. As we write, the FCC has just issued precise regulations that clarify its February decision. These regulations indicate that ILECs will no longer be required to unbundle facilities to CLECs for purpose of data transmission to the extent that they are either modernized or expanded to provide high-speed fiber optic capacity.

The three FCC decisions have been made against the backdrop of an intense ILEC-CLEC battle over proper pricing of UNEs. The ILECs appealed the FCC's *Total Element Long-Run Incremental Cost (TELRIC)* UNE pricing formula all the way to the Supreme Court and lost. But the ILECs continue to contest UNE pricing at the state level, particularly in states that have begun lowering their leasing rates toward TELRIC levels. Those states that have dropped their UNE rates have seen a significant increase in *UNE-P* based competition, and their residents have seen their local phone bills drop by as much as one third.⁵

A remaining major threat to competition is that the FCC, under pressure from the ILECs, will attempt to force the state PUCs to raise the leasing rates that the CLECs are required to pay ILECs to obtain access to phone lines. Indeed, the FCC's recent indication that it is going to reopen hearings on the TELRIC-pricing formula could threaten the progress that has been made to date.⁶

With the telecom market's future highly uncertain and the choice of policy so critical to the telecom industry and the economy, it's important to have a clear understanding of how the telecom sector operates and responds to government actions. This paper seeks to contribute to that understanding by developing a new dynamic model of telecom entry, pricing, and investment. The model's central message is that promoting competition, particularly TELRIC *UNE-P* based competition, is the key to permanently lowering voice and broadband prices, enhancing consumer welfare, and resurrecting telecom investment. This paper reaches its pro-competitive conclusions after considering the empirical evidence, reviewing basic lessons about monopoly behavior, and simulating our model for all 3108 counties in the continental United States.⁷

⁵ See, Braunstein, Yale M. "The Role of *UNE-P* in Vertically Integrated Telephone Networks: Ensuring Healthy and Competitive Local, Long Distance, and DSL Markets." University of California, Berkeley, May 2003; Michigan Alliance for Competitive Telecommunications press release on "study" – May 15, and 2003 "Consumer Savings from Local Telephone Service Competition in Illinois," released by Illinois Coalition for Competitive Telecommunications, February 2003.

⁶ Indeed, the FCC may have decided to increase, rather than decrease, *UNE-P* rates before reviewing the evidence. According to a story that appeared in *USA Today* on September 10, 2003, "The Federal Communications Commission has tentatively concluded that its rules governing wholesale pricing of local telephone networks should better reflect real-world conditions."

⁷ Unfortunately, critical data need to run the model are not available for either Alaska or Hawaii.

The empirical evidence connecting competition to telecom investment is striking. During 1996-2000, over a third of gross investment was done by the CLECs even though their revenue was only one fifteenth that of the ILECs.⁸ In 2000, at the peak of the investment boom, CLECs invested \$25 billion, which almost matched the \$27 billion of gross ILEC investment.

This evidence is hard to ignore, but is it a fluke or to be expected on the basis of economic theory? The answer requires modeling the telecom market in detail. Doing so is a challenge. The telecom market is characterized by imperfect competition, regulation, advanced technology, network externalities, strategic gaming, and entry. Policymakers who substitute their intuition for careful modeling of this market can miss key forces at play. The same is true for telecom economists who rely on simple static models that miss the fundamental dynamics of markets of this type.

Indeed, as discussed below, the use of static models appears to have led some telecom economists to precisely the wrong conclusion when it comes to evaluating TA96, specifically the requirement that ILECs lease (*unbundle*) our phone lines to competitors. Worse yet, they discuss ILEC investment as if the ILECs were standard competitive firms that are simply being disadvantaged to a greater or lesser extent by government regulators. Indeed, many of the papers fail to recognize the fact that the ILECs are essentially monopolists who achieved that position through their control of the public's local communications pipeline. Nor do they acknowledge that government regulators have been setting tariffs for use of that rate payer-financed pipeline since the early 1900s precisely in order to keep ILECs from manipulating telephone prices by restricting supply.

In this paper we construct and simulate a strategic equilibrium model in which ILECs, CLECs, and cable companies compete over time for market share in interrelated and partially regulated local telecom services markets. Our model can study market dynamics under a variety of potential industry structures and policy environments. In particular, it can consider the economic and welfare gains from both *UNE-P* and *UNE-L* competition.

Permitting competitors to utilize bottleneck infrastructure via *UNE-P* is the most obvious and efficient way to economize on redundant infrastructure cost. It effectively separates the local

⁸ Hall, Robert E. and William H. Lehr, "Rescuing Competition to Simulate Telecom Growth," mimeo, September 28, 2001. Revenues refers here to receipts earned from operations in the local telecom market.

pipeline telecom transmissions business – sending voice and data signals via local phone lines, conduits, telephone pole, switching facilities, and transport networks -- from the retail service of providing customer support, advanced services, and billing. The requirement that entities controlling bottleneck pipeline facilities provide transmission services at marginal cost to all interested parties is well established in a variety of markets, including electricity, natural gas, and, indeed, long distance voice service.

According to our simulation results, the key to making *UNE-P* work is for the state PUCs to set platform rental rates at true *TELRIC* levels, which, we estimate, average \$15.10 per line per month.⁹ This estimate is based on the UNE rates generated by the 1998 FCC Synthesis Model.¹⁰ Unfortunately, only a few PUCs have, thus far, set their UNE-P rates close to what we measure to be their own state-specific *TELRIC* levels. Indeed, the average state-specific actual UNE-P rate and the average state-specific *TELRIC* UNE-P rate differ by 27.9 percent.

Our model indicates that were UNE-P rates set at *TELRIC* levels throughout the country, telecom entry, investment and employment outlays, and output would increase significantly and local voice prices would fall significantly. To be precise, compared with an ILEC monopoly, telecom investment and employment outlays would increase by over one fifth in counties containing the majority of the U.S. population and by over 30 percent in counties containing almost a third of the population. The present value of telecom outlays over the next 5 years would rise by \$71 billion. And the present value of outlays over the next 20 years would rise by \$155 billion.

On average, the switch in each state from actual to *TELRIC* UNE-P rates would lower local phone rates, on average, across the country's 3108 counties by \$57.00 per year for an aggregate savings to households of \$15.0 billion dollars per year. Almost two fifths of the population would experience reductions in local phone rates of 20 percent or more. Over one fifth would experience rate reductions of 30 percent or more.

The gains from *TELRIC*-based UNE-P competition are significant across the entire spectrum of counties arrayed by income and population density. Almost a fifth of households in low income

⁹ This is a weighted average that takes the number of households per county as weights.

¹⁰ Our estimate of *TELRIC* rates starts with UNE rates calculated from the FCC's 1998 Synthesis Model and deflates them for 5 years at a 5 percent annual rate to account for reductions in input prices and unit costs.

– low density counties finally begin to enjoy local voice competition when the switch is made from actual to TELRIC UNE-P rates. And households and business in such counties experience an 8.7 percent reduction in the cost of their local phone service.

These findings concerning price reductions are based on a fairly conservative parameterization of our model with respect to the specification of true ILEC and CLEC incremental long-run production costs. With arguably more realistic parameters, the average price of local phone rates would fall by more than one third in moving from actual to TELRIC UNE-P rates. And much greater price reductions would arise in the voice market were the government to introduce *electronic loop provisioning*, under which a customer’s local voice transmissions would be switched electronically and instantaneously to CLEC facilities at the same extraordinary low cost as occurs in the long distance market.¹¹

Our simulations also show significant entry by CLECs under UNE-L in data markets. Indeed, across all counties, the average broadband price under TELRIC pricing of UNE-P ends up almost 22.9 percent lower than the regulated monopoly price.

In contrast to our findings about the gains from UNE-P with *proper* TELRIC pricing, the model indicates that actual UNE-P pricing by some state PUCs is a mixed blessing. PUCs that set UNE-P prices far above the appropriate TELRIC level (henceforth simply called the TELRIC level) can actually end up raising voice prices, lowering demand for telecom services, and reducing telecom investment and employment outlays. The reason is simple. If prices for so-called UNE-P network access are set too high, competitors will be unable to provide service economically to customers, and they will decline to enter the market. And the resulting “free market” can deliver higher prices than the prices set by regulators when there is a single monopolist. Stated differently, a regulated monopoly may be preferred to a non-regulated duopoly or oligopoly, especially when one player – the ILEC -- can have state PUC’s artificially raise the other players’ –the CLECs’-- costs. Thus, state PUCs need to realize that abandoning regulation at the first sign of competition has potentially very adverse consequences and that limited competition is quite different from full and fair competition.

A final message that comes across loud and clear in the results is that declines in ILEC market share and market valuation are likely to herald good news for the public and the industry.

¹¹ See Kotlikoff, Laurence J., “On the Broadband Mess,” *The Milken Review*, First Quarter, 2003.

Moreover, they may actually coincide with more ILEC investment and employment. The reason is that, in the presence of competition, investing less and hiring fewer workers and, thereby, withholding product from the market no longer pays off in terms of higher prices.

Our model is highly stylized and does not yet incorporate either the profits that the ILECs receive from being allowed to enter the long distance market in exchange for unbundling their networks or their apparent strategy to derail competition through product bundling. Still, the model's findings that ILEC monopoly profits from local voice service are highly sensitive to even limited competition helps explain the ILEC's sustained multi-year campaign to thwart, if not explicitly overturn, TA96. The simulations also accord closely with the empirical evidence, cited below, that TA96, when properly enforced, leads to sharp reductions in telecom prices, significant consumer savings, and major increases in telecom investment and output.