

**Regulatory Policy Reform for the
Transition to Fully Competitive Voice Markets
White Paper #1**

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Executive Summary

This is the first in a series of policy white papers that will provide a regulatory blueprint for the transition from the current situation of ILEC market dominance to the potentially fully-competitive market of the future.

Here, in White Paper #1, we describe the revolution in residential and small business voice markets created by the rapid entry of cable companies into these markets. Cable companies are providing powerful and sustained facilities-based competition to the incumbent local exchange companies (“ILECs”), and have the potential to provide in excess of \$100 billion in consumer benefits over the five-year period 2008 through 2012. These benefits are at risk, however, unless regulatory policy is crafted to meet the needs of the transition period between the monopoly of the past and the fully-competitive market of the future. This paper provides the factual and economic foundation for the recommended transitional regulatory policy.

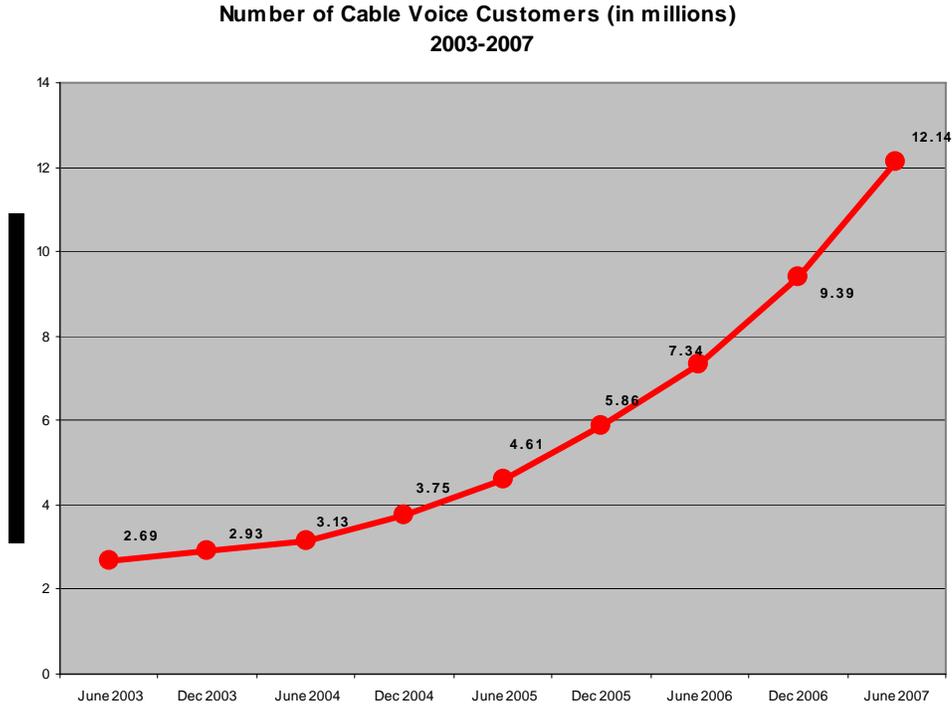
White Paper #2, which will be released in a few weeks, will provide a detailed analysis of interconnection policies and practices and explain the need for continued regulatory oversight of this linchpin of competition. White Paper #3 will expand our policy recommendations to include regulation needed to ensure smooth migration of customers among providers, and rate setting for pole attachments. Finally, White Paper #4 will present the case for deregulating the retail voice offerings of the cable companies or other competitors to the ILECs.

Cable Companies' New Voice Service

Beginning in 2003, cable companies began to deploy a new voice technology in their networks. This technology operates by converting voice calls into data packets (conforming to the established Internet Protocol), which are then carried on the managed data networks owned by the cable companies. The cable companies have invested over \$117 in their networks since 1996 and the provision of voice service is one of the many capabilities of these newly deployed advanced networks.

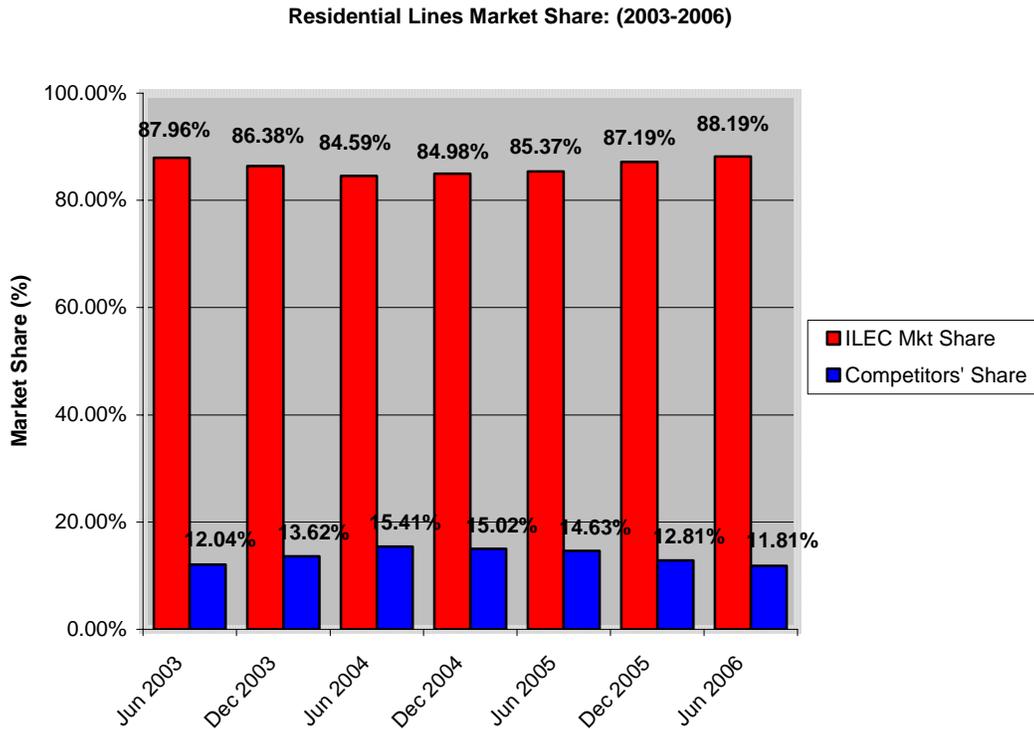
The cable companies' facilities pass 96% of households in the United States. Following several years of rapid deployment of voice services, the cable companies now offer voice service to approximately 80% of the homes passed. It has been projected that cable voice penetration will continue to increase and will reach over 90% of all households by 2011. Cable companies are rapidly becoming the only facilities-based alternative to the local telephone companies capable of providing a full suite of video, data, and voice services for almost all Americans.

Corresponding to the increased geographic reach of cable voice service, the number of cable voice customers has grown substantially, as shown in the figure below. As of the end of June 2007, cable companies provided voice service to 12.1 million homes.



ILEC Market Dominance Remains Unchanged

Even with the rapid increase in the number of subscribers to cable voice service and other competitors, however, local telephone companies, formerly monopolies in their respective markets, still maintain a dominant position in the residential and small business markets, with an 88% share of the residential market. As shown in the figure below, market shares remained virtually unchanged between 2003 and 2006.

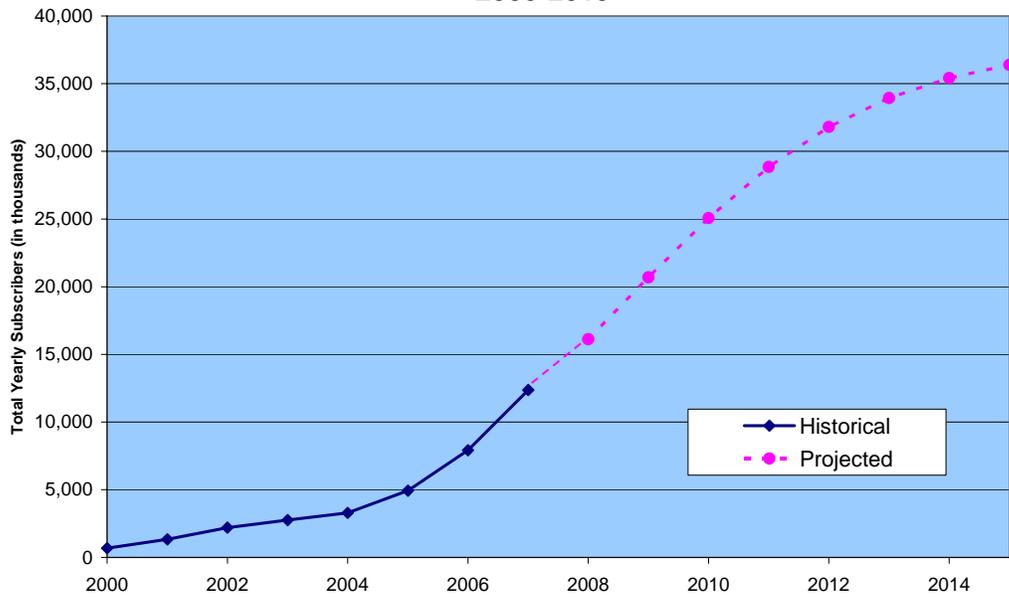


Benefits of Competition in Voice Markets

A recent study conducted by MiCRA projects total benefits from cable competition in the residential and small business voice markets of \$111 billion from 2008 through 2012.

The MiCRA report estimates that the market potential over the next fifteen years for cable voice services is 38.8 million subscribers. That estimate is based on the experience in the long distance market where facilities-based providers achieved a 35% share of the market within 15 years following the AT&T divestiture. The expected adoption curve for the entire 15-year period appears in the table below.

US Residential Cable Voice Subscribers 2000-2015



The MiCRA study projects benefits from the impact of competition in several different market segments, as shown in the table below.

Total Savings from Cable-Telco Voice Competition (in millions)

Category	Savings
Cable, Residential Market	\$17,202
Cable, Small Business Market	\$811
OTP VoIP	\$6,110
ILEC Competitive Response, Residential Market	\$71,723
ILEC Competitive Response, Small Business Market	\$15,503
Total	\$111,348

ILECs Retain the Ability to Disrupt the Transition to a Competitive Market

Even with the rapid pace of growth by these new competitors in voice markets, the ILECs will continue to dominate the market for many years. Until there is a larger and more sustained shift in market shares, the ILECs will have the incentive and ability to raise their rivals' costs and impede the competitive process. Although dominant firms in many industries have the *incentive* to raise rivals' costs, few have the *ability* to do so and are therefore unable to cause long-term damage to the market. In the case of the ILECs, however, their control over interconnection and certain other essential inputs provides them the opportunity to impose large costs on rivals.

The ILECs' market power stems from a combination of historical and economic factors:

- *Incumbency*: The ILECs started the race with 100% of the local exchange market. This means that a competitor must attract customers away from the ILEC with which they have a longstanding relationship. Consequently, the ILECs' market share is likely to remain high for several more years, even in the presence of vigorous competition from facilities-based providers. For example, AT&T's share of the long distance market remained above 50 per cent until ten years after divestiture.
- *Ubiquity*: The ILECs' networks were built to provide telephone service to all customers, regardless of where a customer is located. The ILECs' ubiquitous network, which was constructed during the era when they were immune from competition and effectively guaranteed a return on investment, provides a potential competitive advantage over rivals that cannot profitably invest in a network with the same geographic footprint.
- *Economies of scale*: The high fixed costs of constructing a ubiquitous telecommunications network cannot be justified economically, unless a firm has a large market share. Therefore, it will be costly and inefficient for competitors to replicate some key components of the ILECs' network, at least over the next several years. This is an important characteristic of the transport networks that connect geographically dispersed locations.
- *Network effects*: The telecommunications industry exhibits significant network effects, which means that the value of the network to any

individual subscriber will increase as the number of subscribers to the network increases. Since any competitor's share of the market will be much smaller than the incumbent's, its ability to attract and retain customers will be compromised if it cannot interconnect with the incumbent.

Regulatory policy must be tailored to fit present and near-term conditions in the marketplace. The next two white papers in this series will identify the essential inputs controlled by the ILECs and propose a narrowly targeted set of regulations designed specifically to prevent the ILECs from leveraging their control over these inputs.

Regulatory Policy Reform for the Transition to Fully Competitive Voice Markets White Paper #1

I. Introduction

The ways in which American consumers communicate “by phone” have changed significantly over the past several decades. A century-old “Ma Bell” monopoly over voice communications has given way to an increasingly competitive industry. At first, competition came to the customer premises equipment market. Following this development, competition developed in the long distance market. This change in market structure, along with several changes in regulatory policy led to dramatic reductions in long distance prices in the 1970s and 1980s. Following passage of the Telecommunications Act of 1996, the major long distance companies at the time, MCI and AT&T, entered the local voice market by leasing facilities from the traditional local phone companies. For a variety of reasons, this effort failed. Recently, however, there has been a resurgence of competition in the local voice market due to the entry of cable companies, using their own facilities to offer advanced voice services.

These developments have delivered huge benefits to consumers and to the economy at large. Prices for most voice services have fallen and the quality and variety of services in the market have improved markedly. The industry’s performance is now much more dependent on the state of competition than on the efforts of regulators. There is every reason to be confident that competitive forces will continue to stimulate healthy marketplace performance in the United States.

While the need for direct government involvement in the communications marketplace is greatly diminished, it is not yet eliminated. The incumbent local exchange carriers (“ILECs”) retain residual market power. They can and will (as everyday experience proves) leverage this power to disrupt competition, causing significant harm to consumers and the economy. State and Federal regulatory

agencies have the jurisdiction and tools needed to prevent this from happening, and they need to use that authority for as long as the ILECs still control access to a handful of services that are essential to their competitors.

The purpose of this series of white papers is to provide a foundation and a blueprint for the “next phase” of regulatory policy toward voice services. We focus on the regulations that are necessary – and only those that are necessary -- to prevent the ILECs from leveraging their still-dominant position in the provision of residential and small-business local voice service to impose costs and reduce the effectiveness of competition from their major facilities-based competitors in these markets – the cable companies. The potential benefits to consumers from competitive cable voice service are enormous, over \$100 billion in the next five years. These benefits are at risk, however, if the ILECs are permitted to abuse their market power.

White Paper #1 begins with a description of the new voice services offered by the cable companies and compares them to the services offered by present and past competitors to the ILECs to residential and small business customers. We explain the reasons why cable companies are capable of providing effective and sustained competition to the ILECs, and quantify the potential consumer benefits from cable voice competition. In its final section, the paper presents the economic foundation underlying our proposed approach to regulatory reform.

White Paper #2 will provide a detailed analysis of interconnection policies and practices and explain the need for continued regulatory oversight of this linchpin of competition. White Paper #3 will expand our policy recommendations to include regulation needed to ensure smooth migration of customers among providers, and rate setting for pole attachments. White Paper #4 will present the case for deregulating the retail voice offerings of the cable companies or other competitors to the ILECs.

II. Benefits of Facilities-Based Local Competition

1. UNIQUE ROLE OF CABLE COMPETITION

Cable voice service has already brought significant benefits to consumers. Until recently, cable companies provided voice service using older circuit-switched technology, which is the same technology used by traditional telephone companies.¹ This required cable companies to make large investments in telephone-specific technology and manage two separate networks – one for video services and one for voice services. Also, the technology limited the range and sophistication of services that could be provided to customers. Approximately three million households subscribed to voice services provided over the old technology.²

Over the past few years, cable providers have initiated voice service by carrying voice signals over their own data networks. These networks use the same data protocol as the public Internet, but are private networks owned and operated by the cable companies. The cable companies' voice services are therefore described as "managed-IP services," with IP standing for Internet Protocol. Managed-IP voice services can be provided by the cable companies at lower cost than comparable traditional voice services, and provide an astounding array of enhanced service features.

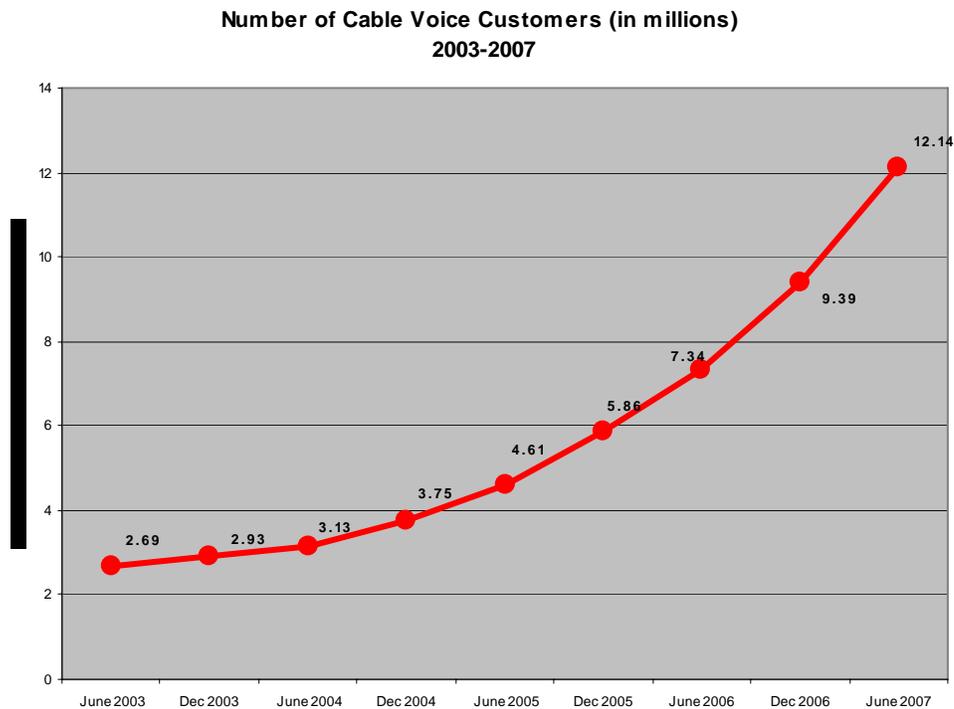
Cable television lines pass 96% of households in the United States.³ Over the past few years, the cable companies have deployed voice-capability to an increasing number of geographic areas. Presently, cable companies are able to provide voice

¹ The circuit-switched voice technology relied upon by the cable companies and the ILECs used Time Division Multiplexing ("TDM") to enable efficient use of digital switching and transmission equipment. This technology is in the processes of being replaced by packet-switched networks, which can handle data and voice traffic very efficiently.

² Kagan Research, LLC, *Broadband Technology*, February 17, 2006, at 5

³ *Id.*

service to approximately 80% of U.S. households.⁴ Corresponding to the increased geographic reach of cable voice service, the actual number of cable voice customers has grown substantially, as shown in the figure below. As of June 30 2007, cable companies provided voice service to 12.1 million homes.⁵



The price of IP-based cable voice service to residential customers, which often includes unlimited local and long distance calling and a dozen calling features, is as low as \$34.95 per month plus approximately \$6.00 in taxes and fees. (Prices will vary, depending upon the length of the service contract, promotions, and whether

⁴ Homes passed by cable voice service have reached 100.4 million of the 126.7 million households in the United States representing a penetration rate of approximately 80%, SNL Kagan LC, *Broadband Technology*, June 20, 2007 at 4. Bernstein Research estimates that 76% of total households in the United States are passed by cable companies offering voice service. (Bernstein Research, *VoIP: The End of the Beginning*, April 3, 2007)

⁵ Kagan Research, LLC, *Broadband Technology*, August 24, 2007, at 9

the customer also buys other services from the cable company.) The features of a typical cable phone service are shown in the chart below.

Features of Typical Cable Voice Service

- Call Waiting, Caller ID, Call Blocking, Three-Way Calls
- Call Screening, Repeat Dialing, Speed Dialing, Voice Mail
- Unlimited Local and Long-Distance Calls, 911 Access, Bundled Billing
- Allow Customers to Manage Features and Access Voice Mail on the Internet
- Assign Specific Ringtones to Different Numbers

Customers using cable voice services save a significant amount compared to similar services offered by the ILECs. For example, a subscriber to one of Verizon's Freedom packages pays in the range of \$34.99 to \$60.99 per month plus at least \$10.00 in fees and taxes (most prominently, the subscriber line charge, which is collected and retained by the ILEC). Comparable services from AT&T and BellSouth cost at least \$50.00 plus fees and taxes. Depending on the features sought by the customer, the savings provided by cable voice service can be as high as \$29 per month, as shown in the table below.

Voice Product Type	Product	Price
Cable	Cablevision	\$34.95
	Comcast	\$39.95
	Cox	\$44.90
Traditional	AT&T One Rate USA	\$63.95
	Bell South PreferredPack Plan + PreferredPack Unlimited	\$53.94
	Qwest Choice Home + Qwest Unlimited	\$45.99
	Verizon Freedom Value	\$34.99
	Verizon Freedom Essentials	\$39.99
	Verizon Freedom	\$55.99-\$60.99

Cable companies have also introduced bundled packages containing high-speed Internet access, digital video and unlimited local and long distance calling. These new “Triple Plays” offer significant savings off the price for each of the individual services included. The prices of these new Triple Plays are as low as \$89.95 for cable customers, and in response the ILECs have provided similar service bundles priced as low as \$94.99. The price differentials here are significantly smaller, perhaps indicating that consumers view the cable companies and telephone companies as much closer substitutes for the entire suite of services.

Triple Plan Product Type	Product	Price
Cable	Cablevision Optimum Triple Play	\$89.85
	Comcast Triple Play	\$99.99
	Time Warner All-the-Best Package	\$109.85
Traditional	Bell South Triple Choice	\$120.93
	Qwest Choice Bundle	\$107.97
	Verizon Triple Freedom	\$94.99-\$104.99

2. BARRIERS TO COMPETITION IN LOCAL VOICE MARKETS

Local voice markets in the United States have experienced a roller-coaster ride over the eleven-year period following the passage of the Telecommunications Act of 1996 (“1996 Act”). The 1996 Act was expected to stimulate intense competition for local and long distance voice services by facilitating entry into the provision of local voice services by long distance carriers while allowing the local monopoly Bell Operating Companies (BOCs) to enter the long distance marketplace. Most observers anticipated a complex and confusing transition period to competition; nevertheless, they hoped it would result in vigorous competition among different providers of voice services and therefore benefit residential, small business and enterprise customers.

Robust and sustainable competition, however, did not develop in all parts of the local voice market. There was a “land rush” by the competitive local exchange carriers (CLECs) to construct fiber optic networks in major business districts to serve large enterprise customers. But these investments were not extended to residential areas. Rather, the CLECs relied on facilities leased from the local phone companies to serve residential and small business customers. The FCC interpreted

the 1996 Act to require the local phone companies to unbundle their entire network at forward-looking prices, and then allowed competitors to reassemble the pieces of the network to create a complete local “platform.” This was called the Unbundled Network Element Platform (“UNE-P”).

These efforts to bring competition to local markets were successful, demonstrating that customers wanted a choice among voice service providers. As of December 2003, the CLECs provided almost 14% of residential and small business telephone lines and 24% of medium and large-business lines.⁶ Competition from the CLECs in the residential market, however, rested on very thin ice. Of the total 18.7 million lines provided by CLECs to residential customers, 15.2 million were provided over the unbundled network element platform.⁷ UNE-P permitted rapid, widespread entry by CLECs, but it was dependent totally on the will of the FCC to continue to pursue the goal of facilitating entry by UNE-P-based competitors and on whether the FCC’s interpretation of the 1996 Act would be upheld in the courts.

In December 2004, following a long period of litigation and regulatory warfare at the FCC and state commissions, the FCC adopted an order that eliminated the UNE-P requirement.⁸ The impact of this decision on competition in the residential voice market was compounded by the acquisition of the two largest CLECs operating in the residential market (i.e., AT&T and MCI) by the two largest BOCs (i.e., SBC and Verizon). As a result of these events, the share of the residential market served by CLECs using facilities owned by the ILECs has been shrinking steadily.⁹

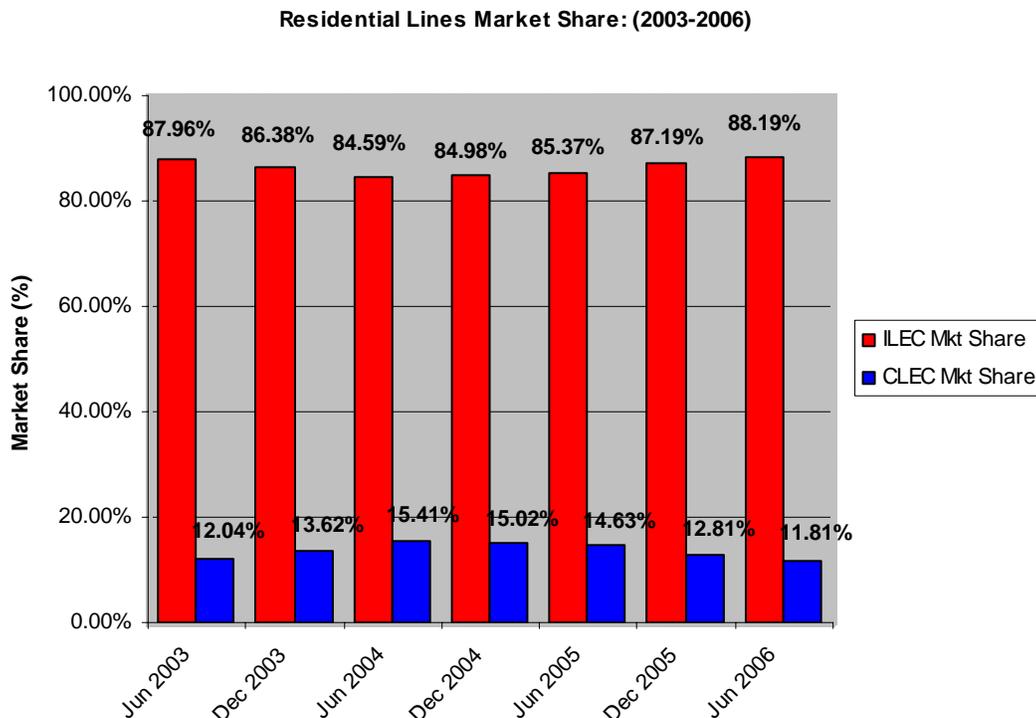
⁶ Federal Communications Commission, *Local Telephone Competition: Status as of June 30, 2006*, January 2007, Table 2. (Hereafter: FCC Local Telephone Competition Report)

⁷ FCC Local Telephone Competition Report, 2007, Tables 2 and 4

⁸ Federal Communications Commission, *Order on Remand*, WCC Docket No. 04-314, December 15, 2004. CLECs were allowed to continue to serve existing UNE-P customers for a brief transition period.

⁹ Between June 2004 and June 2006 the number of UNE-P lines has fallen from 17.1 million to 8.4 million lines. Over the same period, resold lines increased by 123,000 and unbundled loops (without switching) increased by approximately 100,000. FCC Local Competition Report, Table 4.

Since the demise of the UNE-P rules, competition has grown in the residential and small business market from cable television companies, wireless carriers, and providers of voice service over the Internet, such as Vonage, that do not own local communications facilities. Nevertheless, the ILECs still maintain a dominant position in the provision of voice service to residential and small business customers, with an 88% share of residential access lines.¹⁰ As shown in the figure below, the incumbents' shares remained virtually unchanged between 2003 and 2006.



Even with the rapid pace of growth by these new competitors, the ILECs will continue to dominate the provision of voice service to residential and small business customers for many years. And until there is a greater and more sustained shift in

¹⁰ FCC Local Competition Report, Table 2. This report shows the ILECs with 94.4 million residential lines and the CLECs with 12.4 million lines, as of June 30, 2006.

their shares, the ILECs will have the incentive and ability to foreclose competitors' access to the marketplace by using a variety of tactics that can raise their rivals' costs. In contrast to competitive industries, new entrants offering voice service to residential and small business customers remain at the mercy of the firms with a dominant embedded customer base to provide universal connectivity to their customers.

Wireless competition is an important factor in the residential market, but it does not provide as powerful a competitive threat as cable voice service for a number of reasons. First, only some households appear willing to "cut the cord" and use wireless service as a complete substitute for wireline service.¹¹ Most consumers do not view wireless as an effective substitute for wireline service, and it would be improper to put the two products in the same market for purposes of competition analysis.¹² The small number of customers that have ported their wireline number to their wireless phone also points to wireless service as more of a complement to wireline service, not a substitute (with the exception of certain demographic groups).¹³ Second, the customers that stand to benefit the most from cable voice competition are the big spenders on wireline service, who are typically not cutting the cord.¹⁴ Third, the two largest wireless carriers (AT&T and Verizon) are owned

¹¹ As of 2005, approximately 10.5% of US households with telephone service had "cut the cord". Federal Communications Commission, *Trends in Telephone Service*, February 2007 at Table 7.4, which shows that 11.3 million households of the total 107 million households with telephone service in 2005 had wireless service only.

¹² *Declaration of Simon Wilkie*, Exhibit A to Petition to Deny of Cbeyond Communications, et al., Before the Federal Communications Commission, WC Docket No. 05-65, August 25, 2005, at 21; and "Confronting Telecom Industry Consolidation, A Regulatory Agenda for Dealing with the Implosion of Competition," prepared for National Association of State Utility Consumer Advocates by Lee L. Selwyn, Helen E. Golding, and Hillary A. Thompson, Economics and Technology, Inc., April 2005

¹³ Since number portability to wireless service began in November 2003, only 1.8 million numbers have been switched from landline numbers to wireless number as of June 2006. This figure represents only 3.2% of the total numbers that were ported during the period. Similarly, during the same time period 54,000 wireless numbers were switched to landline numbers FCC Telephone Trends Report, Table 8.8

¹⁴ "Cord-Cutting Reaches One in 20 Mobile Households," Charles S. Golvin, Forrester Research Inc., at 2

or controlled by the BOCs, who have little incentive to cannibalize their own wireline businesses in their own region.

Moreover, to the extent that independent wireless providers, such as Sprint, constitute a competitive threat to the ILECs, they too depend on the ILECs for the same essential inputs as the cable companies and are subject to the threat of significant cost increases for interconnection with the ILECs.

VoIP service providers unaffiliated with a cable company or ILEC, such as Vonage, are also important players in the market, but they do not control access to their own customers. Their customers must subscribe to a broadband service, which is provided generally either by an ILEC through DSL or by the local cable company through a cable modem. The VoIP companies do not have as widespread an appeal as the cable companies' voice services, because they require customers to be more technically proficient and do not provide the same capabilities, such as back-up power.

3. QUANTIFICATION OF POTENTIAL BENEFITS FROM CABLE VOICE COMPETITION

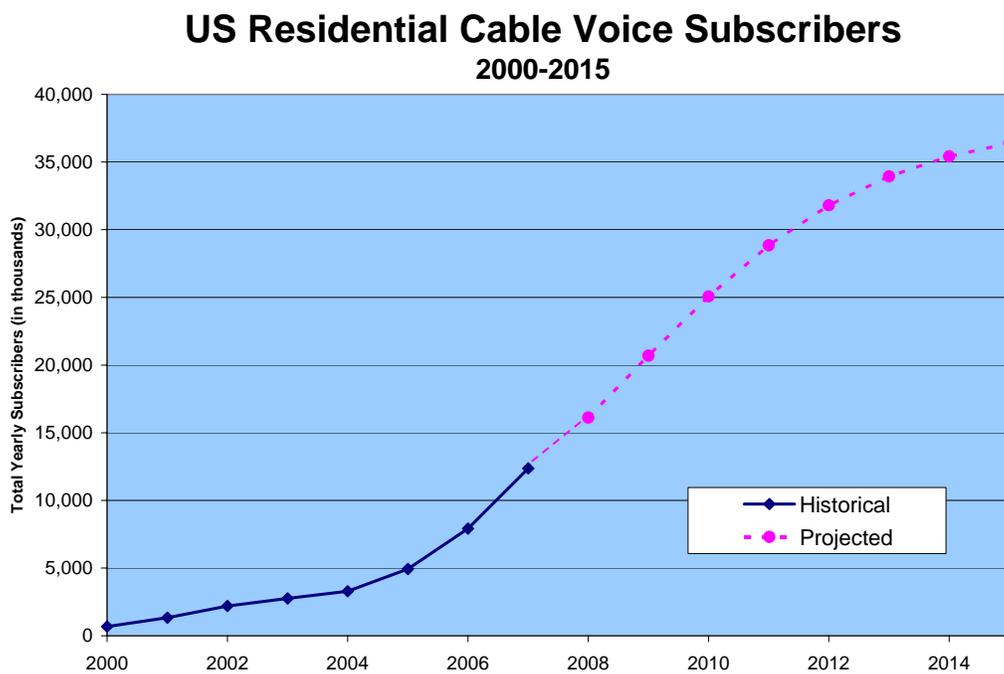
A recent study conducted by MiCRA estimates total consumer benefits to date from cable competition in the residential and small business voice markets to be \$23.5 billion and projects benefits of \$111 billion over the period 2008 through 2012.¹⁵ These benefits derive from a number of sources, the largest of which are the direct benefits of lower prices paid by subscribers to cable voice service and the competitive response of the ILECs, which have expanded benefits to all subscribers.

Direct benefits to cable voice subscribers

Direct benefits to cable voice subscribers were calculated in the MiCRA report by estimating the market potential of cable voice service over the next 15 years and

¹⁵ "Consumer Benefits from Cable-Telco Competition," Microeconomic Consulting and Research Associates (MiCRA), Updated November 2007.

then applying a Bass Model of market diffusion to estimate the annual growth in subscriptions during this period. The MiCRA report estimates that the market potential over the next fifteen years for cable voice services is 38.8 million subscribers, which is based on the experience in the long distance market where facilities-based providers achieved a 35% share of the market within 15 years following the AT&T divestiture. The adoption curve for the entire 15-year period appears in the table below.

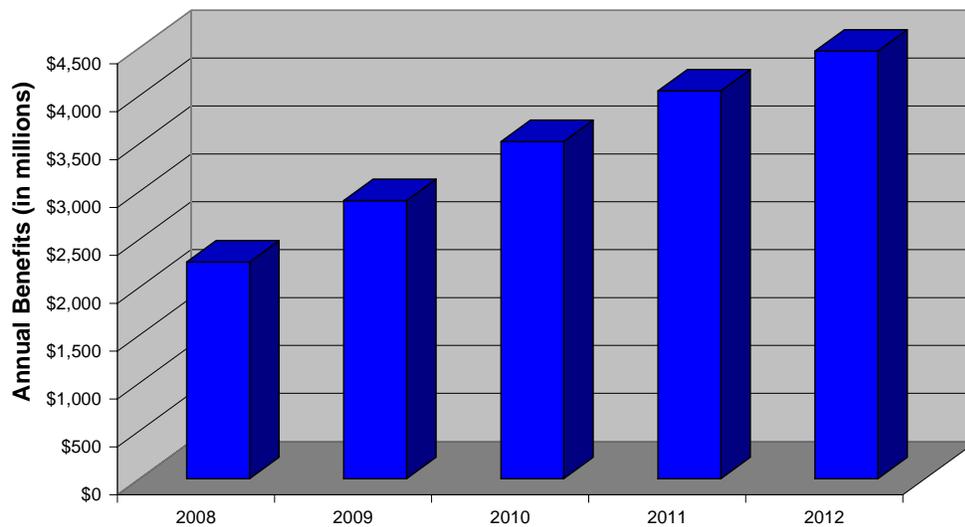


Consumer savings in the study are based on a J.D. Power study, which reports average monthly spending by cable voice service customers of \$39.80. By contrast, customers of the ILECs reported spending an average of \$51.50 per month on voice service. This indicates that cable voice service cost \$11.70 less per month on average than their ILEC competitors' traditional phone service.¹⁶

¹⁶ This price difference is slightly greater than the price difference reported in the 1996 J.D. Power report of \$11.19

Using this estimate of cost savings \$11.70 per month and applying it to the number of cable voice subscribers from the market diffusion model, MiCRA estimated annual benefits of \$2.3 billion in 2008. These benefit increase yearly, reaching \$4.5 billion in 2012, as shown in the figure below. The sum of these benefits for the five-year period is \$17.2 billion.

Direct Benefits to Residential Customers of Cable Voice



Indirect benefits from the ILECs' response to competition

The magnitude of indirect benefits can be gauged by looking at the ILECs' response to the entry by the CLECs into the local market. The CLECs introduced services that offered unlimited local and long distance services and bundled calling features, such as call waiting, caller ID, and voice mail. This led the ILECs to respond with their own bundled service offerings, which were priced well below the sum of the prices of the individual components of the package.

Now that competitive pressure from the UNE-P-based providers has been eliminated, prices would rise and the consumer benefits from CLEC competition would fade away, absent competition from another source. The pressure on the

ILECs to maintain low prices will come primarily from the cable companies and to a lesser extent from the wireless providers, and the non-facilities-based Internet voice services such as Vonage.

To estimate the effect of competition on the ILECs' rates and the resulting benefit to consumers, the MiCRA study compared prices for voice services before and after competition became widespread in residential markets. One of several measures used to make this comparison was to compare the average monthly household expenditure on voice service in 1998 to monthly expenditure in 2004, when UNE-P-based competition reached its peak.¹⁷ According to the FCC, the average household spent \$61 per month on local and long distance services in 1998. This fell to \$49 in 2004.¹⁸ Based on this observed decline in spending, MiCRA estimated that the effect of competition on average spending by residential customers was \$12.00 per month. Using an estimate of 96.7 million households with wireline service, they calculated savings of \$71.7 billion over a five-year period.¹⁹

The MiCRA study also estimates benefits from the cable companies' entry into the small business market, the expected competitive response by the ILECs, and the benefits from the OTP VoIP providers. The size of these benefits appears in the table below.

¹⁷ This measure of the effect of competition on voice service prices is confirmed by an analysis performed by the Phoenix Center in 2004 of the telephone bills of 16,000 subscribers to ILEC services and comparing the size of the customer's bill to the price of a CLEC competitor. Phoenix Center Policy Bulletin No. 8, January 27, 2004.

¹⁸ *Trends in Telephone Service*, FCC, April 2007, Table 3.2.

¹⁹ This number of households excludes 4.5% from the nationwide total of households with wireline service to account for customers served by rural ILECs, many of which have refused to interconnect with cable companies.

Total Savings from Cable-Telco Voice Competition (in millions)

Category	Savings
Cable, Residential Market	\$17,202
Cable, Small Business Market	\$811
OTP VoIP	\$6,110
ILEC Competitive Response, Residential Market	\$71,723
ILEC Competitive Response, Small Business Market	\$15,503
Total	\$111,348

4. TECHNICAL DESCRIPTION OF CABLE VOICE SERVICE

Cable companies are the only facilities-based alternative to the local telephone companies capable of providing a full suite of video, data, and voice services to virtually all homes in America. Cable companies have invested \$117 billion since 1996 to upgrade their networks' capacity,²⁰ investing in fiber optic cable connecting neighborhood hubs to their major centers, upgrading electronics throughout the network and placing new digital equipment in subscribers' premises. We provide the following description of the new technology used by most cable companies to facilitate the later discussion of key policy issues. Subsequently, we explain how the local telephone companies' network differs from the cable network and how the non-facilities-based Voice over Internet providers, such as Vonage, operate.

Description of the Typical Cable Company Network

The cable companies connect to homes and businesses using a combination of fiber optic and coaxial cable. Fiber optic lines run to neighborhood hubs, from which coaxial cable is run to each home and building. These fiber and coaxial cables carry all of the cable companies' services, including video, data, and voice. As shown in

²⁰ National Cable & Telecommunications Association, "Cable Industry Infrastructure Expenditures," citing Kagan Research LLC, <http://www.ncta.com/ContentView.aspx?contentId=56>

the figure below, when the coaxial cable enters the customer's premise it can be connected to different devices in the house to provide a multiplicity of services, including: (1) a television set or digital cable box to provide video service; (2) a cable modem to provide broadband Internet service; and (3) a combined voice/data modem used to provide broadband Internet service along with voice service. In Comcast's network, for example, this equipment is called an embedded multimedia terminal adaptor (eMTA). The eMTA includes a jack into which the customer plugs a phone or in-house wiring. The eMTA also contains a cable modem for use in accessing the Internet, as well as a device that converts voice signals and voice into Internet Protocol ("IP") packets. These packets, containing digitally encoded data, are routed and later assembled using the protocol designed by the originators of the Internet, hence the derivation of the name used to describe all voice traffic using the Internet Protocol - Voice over Internet Protocol or ("VoIP").

Unlike the "Over the Top" (OTP) Voice-over-Internet providers, such as Vonage, which do not own or provide their own broadband transmission facilities, the cable companies carry voice packets over their own managed data networks. Voice packets sent from the home terminal device will terminate on a cable modem termination system (CMTS). The voice packets are then sent to a call management server (CMS), which functions similarly to a router on the Internet. This equipment is sometimes referred to as a "soft switch." From that point, voice calls can be routed in a variety of ways, depending upon their destination.

Description of the Local Telephone Company Network

The telephone companies provide voice, data, and (in some cases) video services over copper and fiber optic cable that connect the customer premises to the company's end office. In contrast to the cable companies, the voice signal is carried as a traditional analog signal from the customer's premises either to the end office directly or to a node in the neighborhood which converts the analog signal to a

digital signal.²¹ As opposed to cable's managed IP-services, however, the digital transmissions used in traditional voice networks do not involve conversion of the information into packets or use Internet Protocol. Rather, analog voice signals are converted into a digital bit stream, with dedicated time slots in a much larger bit stream. The time slots assigned to an individual voice call are dedicated to the call for its duration. This technology, termed Time Division Multiplexing ("TDM"), has been used for many years to enable efficient carriage of voice traffic.

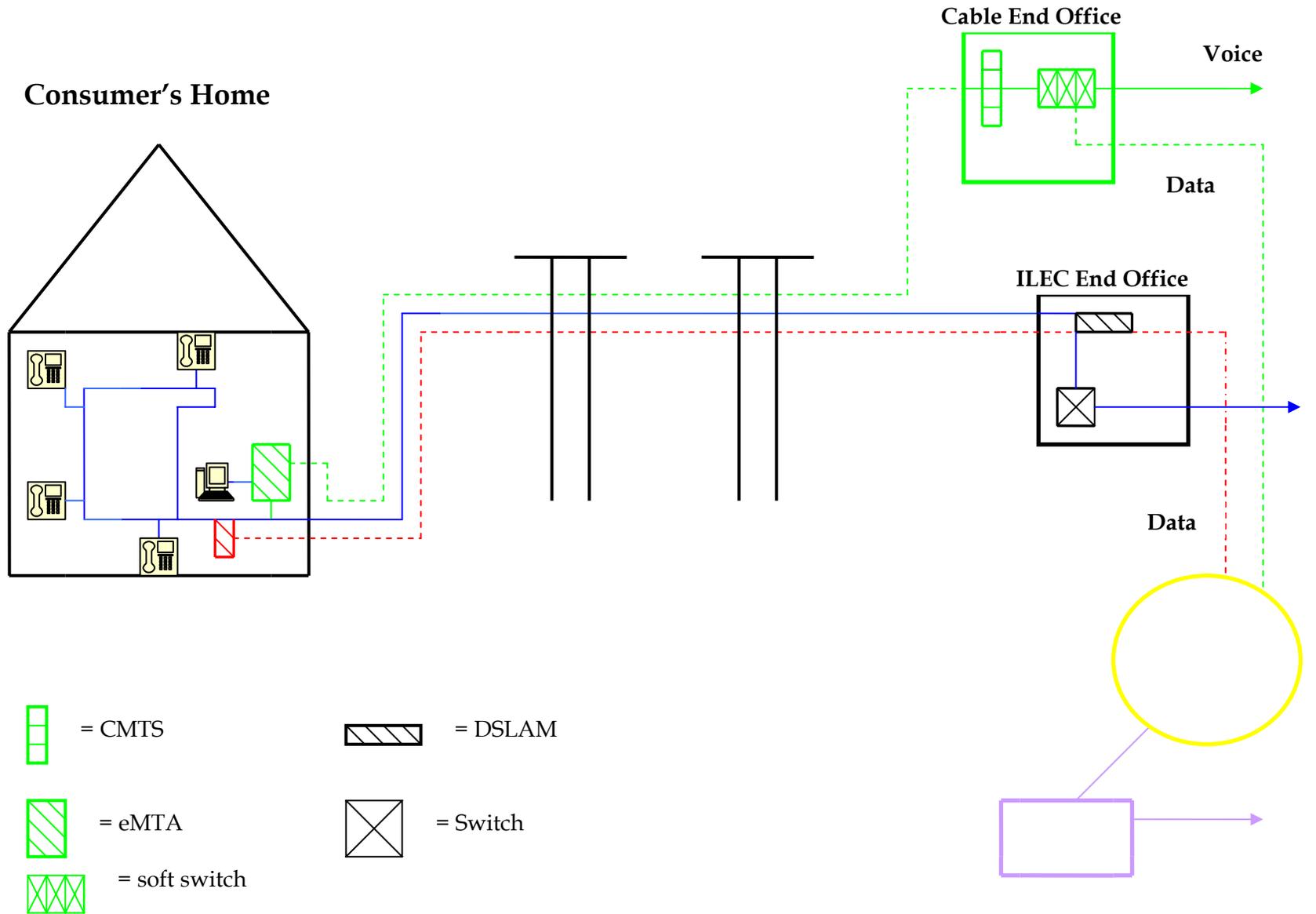
The telephone company provides broadband data service using digital subscriber line (DSL) technology. DSL carries data over the same copper and fiber optic cable as the voice signal. When the signal reaches the telephone company end office (or a neighborhood node) it terminates in a piece of equipment called a Digital Subscriber Line Access Multiplexer ("DSLAM"). The DSLAM separates the ordinary voice and data traffic and routes the data traffic towards the appropriate network. The voice traffic is carried to the local switch and then routed on a different network from the data traffic using traditional digital TDM technology.

Description of Over-the-Top VoIP Provider Operations

Vonage and other smaller non-cable VoIP providers do not own facilities connecting the subscriber's premise to the broadband network. Because these services rely on a customer obtaining a broadband connection from a third party, they are often referred to as over-the-top ("OTP") providers of VoIP service. Vonage does, however, provide a modem that performs a similar function to the Comcast eMTA. When a Vonage customer makes a call using a Comcast *broadband connection*, for example, that call travels over the same facility as a Comcast call during its transmission from the customer premise to the Comcast headend and it terminates to the same CMTS equipment in the Comcast headend. While Comcast traffic remains on a private managed IP network until it is delivered to the

²¹ If the customer's premise is connected by a fiber optic cable, then the digital conversion occurs in equipment placed outside the home.

traditional telephone network, a Vonage call traverses the public Internet before it is routed to the traditional telephone network. Both Comcast and Vonage offer the capability for customers to manage their service and features over an Internet portal, and both portals permit subscribers to listen to voicemails, view call logs, and manage vertical features. Both services involve a net protocol conversion from IP to TDM when calls are routed to the traditional telephone network.



III. Reforming Regulatory Policy to Fit Current Competitive Conditions

Regulatory policy must be tailored to fit present and near-term conditions in the marketplace. In this paper we focus on the impact of the recent success of cable companies in the residential and small business telephone markets on regulatory policy. The cable companies are much more powerful contenders for the local voice customer's business than any of the historic or current competitors. They do not rely on resale of ILEC facilities or the unbundled network elements ("UNEs") either as a platform or as a major component of their own service.

While the growth of competition from cable may justify a greater degree of retail deregulation of the ILEC offerings, and of certain wholesale offerings as well, it is critical to understand that the ILECs still retain market power and have the incentive and ability to leverage their market power to disadvantage their rivals and disrupt the development of competition in the residential and small business market. This means that substantial deregulation of the ILECs must proceed only if there are effective rules in place to prohibit ILECs from leveraging their remaining market power. Here we explain the source of the ILECs' market power and provide a conceptual underpinning for retaining (and, where necessary, supplementing) regulation to prevent the ILECs from leveraging their remaining market power.

1. RATIONALE FOR MARKETPLACE INTERVENTION

Market power is defined as the ability to profitably set price above competitive levels.²² Although in many industries firms will have a limited ability to set prices above perfectly competitive levels, the government will not intervene to constrain a firm's activities unless there is evidence of actual anticompetitive conduct or a structural infirmity that prevents competition from developing. Intervention can

²² Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization*, 3rd edition, Addison-Wesley, 2000, at 92

take the form of prophylactic measures, i.e., regulation or enjoining a merger, or *ex post* enforcement of antitrust law against monopolization.

Historically, regulation in the telecommunications industry went hand-in-hand with the franchise granted to the local telephone company. The assumption underlying this policy was that voice service was a natural monopoly, (i.e., only one firm could be sustained profitably in a market). The purpose of regulation was to prevent the telephone company from raising prices to monopoly levels, which would harm consumers and generate excessive profits.

As technology (and marketplace changes) undermined this premise, policy evolved to include regulation of the relationship between the incumbent and the new entrants. Regulation was needed to prevent the incumbent from denying access, interconnection, or other unique resources (e.g., telephone numbers) to competitors. For example, long distance competitors (e.g. MCI, Sprint) needed to interconnect their long distance networks with the networks of the incumbent local telephone companies. Competitive providers of telephone sets or answering machines required regulations that allowed a customer to connect a competitor's phone instrument to the telephone line running into his home.

2. SOURCE OF THE INCUMBENTS' MARKET POWER

The incumbent telephone companies (ILECs) still wield sufficient market power to prevent competition from developing fully in the local residential and small business telephone market. This market power stems from a combination of historical and economic factors:

- *Incumbency*: The ILECs started the race with 100% of the local exchange market. This means that a competitor must attract customers away from the ILEC with which they have a longstanding relationship. Consequently, the ILECs' market share is likely to remain high for several more years, even in the presence of vigorous competition from facilities-based providers. For

example, AT&T's share of the long distance market remained above 50 per cent until ten years after divestiture.²³

- *Ubiquity:* The ILECs' networks were built to provide telephone service to all customers, regardless of where in the local area they are situated. The ILECs' ubiquitous network, which was constructed during the era when they were immune from competition and effectively guaranteed a return on investment, provides a potential competitive advantage over rivals that cannot invest economically in a network with the same geographic footprint, due to the importance of economies of scale.
- *Economies of scale:* The high fixed costs of building a ubiquitous telecommunications network cannot be justified economically, unless a firm has a large market share. Therefore, it will be costly and inefficient for competitors to replicate some key components of the ILECs' network, at least over the next several years. This is an important characteristic of the transport networks that connect geographically dispersed locations.
- *Network effects:* The telecommunications industry exhibits significant network effects, which means that the value of the network to any individual subscriber will increase as the number of subscribers to the network increases. Since any competitor's share of the market will be much smaller than the incumbent's, its ability to attract and retain customers will be compromised if it cannot interconnect with the incumbent.

Network effects can arise where there are complementarities in production or consumption. This means each consumer's choice of service provider will depend upon what other consumers are doing. (By contrast, in a typical market setting, such as a supermarket, a consumer will not be concerned with the selections made by other consumers.) In the telecommunications industry, network effects are of great consequence and reflect the fact that a competitor to the ILECs is not an island into itself but must be able to connect its customers to the rest of the world - and especially to the customers of the ILEC with which it is competing. As described by a leading scholar of network economics:

²³ Michael D. Pelcovits, "Long Distance Telecommunications" in Diana L. Moss, editor, Network Access, Regulation and Antitrust, (Routledge), 2005.

Networks are composed of complementary nodes and links. The crucial defining feature of networks is the complementarity between the various nodes and links. A service delivered over a network requires the use of two or more network components. Thus, network components are complementary to each other.²⁴

Network effects can play a very important role in the ability of competition to develop or survive in a market. Under certain circumstance, network effects can create conditions where one firm can establish and perpetuate a monopoly, especially when there are other barriers to entry, such as high sunk costs.²⁵ For example, Microsoft has been able to monopolize the market for computer operating systems even though other firms have developed competing systems, because it has limited compatibility between its system and its competitors'. This constitutes a denial of interconnection between two "networks" in an industry characterized by strong network effects.

The significance of network effects in the telecommunications industry has been studied in the economics literature, which finds that under certain conditions, a firm with a market share as low as 50% will have an incentive to deny, degrade, or overprice interconnection. Opponents to the proposed mergers first between MCI and WorldCom and later between WorldCom and Sprint demonstrated that a large firm in a network industry may have the ability and incentive to deny or raise the costs of interconnection in order to "tip" the market on a path to monopolization.²⁶ This analysis was applied to Internet backbone services, which had never been monopolized and in which barriers to entry were much lower than in local telecommunications markets.

²⁴ Nicholas Economides, "Competition Policy in Network Industries: An Introduction," in *The New Economy: Just How New is It*, University of Chicago Press (2003), Dennis Jansen (ed.). Available at <http://www.stern.nyu.edu/networks/site.html>, at 4.

²⁵ In some industries with strong network effects, even the elimination of barriers to entry may not significantly affect market structure, *Id.* at 15.

²⁶ J. Cremer, P. Rey, and J. Tirole, "Connectivity in the Commercial Internet," *Journal of Industrial Economics*, 48, at 433-472.

As explain by Maleug and Schwartz in a recent journal article:

A long-standing regulatory and competition concern in network markets is that a firm with a large enough share of the industry's customer base may, even at a cost to itself, impede competitors' sharing in network effects so as to strengthen its *relative* 'quality' position. Impediments can entail imposing above-cost variable prices for network access (e.g. inflated call termination fees) or contrived technical and other non-price impediments to compatibility.²⁷

Malueg and Schwartz explored the conditions that would incentives for firms to interconnect and found that smaller firms will have a much harder time obtaining interconnection with the largest firm "in relatively mature industries such as traditional telephony than in faster growing industries such as the Internet."²⁸ The reason for this is that competition for entirely new customers will play a much less important role, and thus the rivals will be unable to forge a strategy based on targeting brand new subscribers to the network's services.

In sum, although the barriers to enter many voice market segments can be overcome by new entrants, competition will not succeed unless the former ILEC monopoly is required to interconnect with its competitors. As stated by Laffont and Tirole: "It is generally agreed that an intelligent interconnection policy is the key to harmonious development of competition in the telecommunications industry."²⁹

3. COSTS AND BENEFITS OF REGULATION

Even the best designed regulatory intervention imposes costs on the industry and on consumers. There are the direct costs of establishing and complying with the regulatory processes and procedures that are incurred by the regulated firm, the government, and intervening parties. More important, regulation is a blunt instrument, which will constrain the regulated firm from pursuing not only

²⁷ D. Malueg and M. Schwartz, "Compatibility Incentives of a Large Network Facing Multiple Rivals," *Journal of Industrial Economics*, 54, at 527-567, December 2006.

²⁸ Id.

²⁹ Jean-Jacques Laffont and Jean Tirole, *Competition in Telecommunications*, MIT Press 2000, at 98.

anticompetitive strategies, but also business plans that would enhance efficiency and benefit consumers.

Therefore, the government should only impose regulation where there are demonstrable and sizeable benefits sufficient to offset these costs. In particular, there should be a large burden of proof on the advocates of a new set of regulations, particularly if applied to a previously unregulated industry. This burden should be lower, however, to retain existing regulations that have successfully constrained the market power of the firm or industry in the past.³⁰

The likelihood that the benefits of regulation will exceed the costs is especially true where the dominant firm can disrupt the entire transition from a historic monopoly to a competitive market. A firm with significant market power will have the *incentive* to engage in anticompetitive conduct that will disadvantage its rivals unfairly and increase its own profits. This general category of behavior is given the label of “exclusionary conduct.” This conduct can be distinguished from ordinary and beneficial competitive conduct, which occurs when a firm tries to improve its own products, reduces its prices, or reduces its own costs. Exclusionary behavior involves efforts by one firm (usually the dominant firm) to increase its profits by harming its competitors directly. If the dominant firm is successful at raising its rivals’ costs, it can increase its own profits, usually by raising the prices it charges to consumers. This will harm consumers over the long run, because it will reduce or eliminate the pressure to reduce prices.

³⁰ The FCC has followed this approach recently in retaining regulations governing contracting between vertically integrated programming vendors and cable operators. These regulations, which have been in place for fifteen years, prevent exclusive contracts between vertically integrated programmers and affiliated cable operators. The reason behind these regulations is a concern that the vertically integrated programmers would restrict access to the most popular programs by competitors to their affiliated cable company and thereby strengthen the cable company’s position in the MVPD market. The FCC retained these regulations even though it recognized that the cable industry’s share of MVPD subscribers had fallen from 78 percent in 2002 to 67% in 2007. Federal Communications Commission, *Report and Order and Notice of Proposed Rulemaking*, MB Docket No. 07-29, MB Docket 07-198, October 1, 2007, ¶52

The problem of designing appropriate regulations is compounded in an industry, such as telecommunications, which is subject to rapid technological change. The impact of the Internet and the increased utilization of Internet Protocol (IP) by more carriers and for more services have led to greater scrutiny of traditional regulatory policies.³¹ Although many regulations do not apply at all, or in the same manner, to IP-enabled services, the one constant that cannot be ignored is the vital role of interconnection. So long as the ILECs provide service to a majority of voice customers, they will have the incentive and ability to disrupt the transition to competition by denying, degrading, or overpricing interconnection.

Although many dominant firms have the *incentive* to raise rivals' costs, few will have the ability to do so and thereby cause long-term damage to the market. In the case of the ILECs, however, their control over interconnection and other inputs essential to the competitors provides the opportunity to impose large costs and cause lasting damage to the market. Therefore, it would be premature to eliminate existing regulations on ILEC provision of these essential inputs. Indeed, to the extent regulators target this limited set of issues, the harmful "side-effects" of regulation should be minimal and more than offset by the lasting benefits.

4. POLICY RECOMMENDATIONS

Future papers in this series will expound on the regulatory policies needed to prevent the ILECs from leveraging their still-dominant position in the provision of residential and small-business local voice service. White Paper #2, which will be released in a few weeks, will provide detailed recommendations on interconnection regulations. These policy recommendations flow from the economic analysis provided here of the role of regulation in a network industry undergoing a major transition. These recommendations are summarized below:

³¹ Federal Communications Commission, *Notice of Proposed Rulemaking*, In the Matter of IP-Enabled Services, WC Docket No. 04-36, March 10, 2004

Interconnection Principle No. 1: Incumbent local exchange carriers must provide interconnection at any point or points as determined solely by the requesting provider.

Interconnection Principle No. 2: Incumbent local exchange carriers must provide interconnection on nondiscriminatory terms and conditions and in any format or protocol as determined solely by the requesting provider.

Interconnection Principle No. 3: Incumbent local exchange carriers must terminate all calls made to their subscribers and handed off at a valid point of interconnection at rates based on forward looking economic cost.

Interconnection Principle No 4: Incumbent local exchange carriers must provide tandem transit service for all telecommunications carriers at rates based on forward looking economic cost.