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A Telecommunications Policy Primer

20 Comprehensive Answers to 20 Basic Questions

By

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www.TexasPolicy.com

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20 Comprehensive Answers to 20 Basic Questions

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A Telecommunications Policy Primer:
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Absent reform, telecom regulations will undermine job creation and economic growth.

The Power and Promise of Telecommunications

1. Why is telecommunications policy important?

Telecommunications technology has undergone tremendous leaps of progress throughout the past century. Samuel Morse first telegraphed a four-word message over a copper wire in 1844. Today, billions of people worldwide converse daily on wireless phones that double as cameras, and they access a library's worth of data in seconds from home or office via broadband connections.

The social and economic value of this continuous information flow cannot be overestimated. Knowledge is indeed power when applied by commercial firms to precisely gauge real-time market conditions across the globe, or by citizens downloading news and information from diverse sources to improve their lives. Indeed, annual U.S. telecommunications revenues have exceeded $300 billion in recent years, a testament to the demand for voice, data, and video transmissions.[1]

This reliance on telecommunications necessitates public policies that promote innovation and ensure network reliability and security. But for all the mind-boggling technicalities of "frequency division multiplexing" and "asynchronous transference," telecommunications policy need not be complex if guided by time-tested economic principles.

These principles form the basis of the policy recommendations included in this primer. We begin with a plain-language description of common technologies and a condensed history of the industry. These sections are followed by a status report on the telecommunications market and summaries of controlling statutes and regulations. A glossary is also provided, along with links to relevant Web sites.

A greater understanding of telecommunications among lawmakers, the media, and the public is sorely needed. Despite the direct impact on the nation, telecommunications policies have largely been crafted by unseen hands in ineffective ways. Consequently, America now trails a number of Asian and European nations in deployment of the most advanced wireless and broadband technologies.[2]

Enhancing consumer benefits matters far more than preserving regulators' power.

Texas is a key state in the reform calculus by virtue of its reliance on technology and its sheer economic muscle. The number of high-speed lines statewide increased from 152,518 in 1999 to 2.2 million in 2004 — the 4th largest number in the nation.[3] Moreover, the market share of competing service providers in Texas is higher than the national average.[4]

Yet the degree of penetration of broadband and other advanced telecom applications in even top-ranking states like Texas still lags behind global frontrunners in Europe, as well as many Asian countries, such as Korea, Hong Kong, and Singapore. Absent reform, existing telecom policies that inhibit investment and innovation will continue to undermine job creation and economic growth, while inducing businesses to locate abroad.

2. What are the opportunities for reform?

The regulatory process always trails the pace of technological change. In the case of telecommunications, the regulatory regime of price controls, service mandates and marketing restrictions imposed decades ago has been overtaken by the abundant, affordable telecom options available today. No longer are consumers at the mercy of the government-sanctioned "Ma Bell" monopoly. Competition among various technologies and providers has rendered rate regulation and service boundaries wholly obsolete.

There is, therefore, considerable opportunity to improve telecommunications policies at both the state and federal levels.

At the federal level, the regulations governing competition in local calling over the traditional wireline network were overturned in March 2004 as arbitrary and overreaching by the U.S. Circuit Court of Appeals in Washington, D.C. This marked the third time in eight years that these federal rules were judged improper. Subsequently, both the Federal Communications Commission (FCC) and the Bush administration decided — wisely — against an appeal, thereby opening the way for much-needed reforms.

On Dec. 15, 2004, the commission announced its adoption of a fourth set of rules governing competition in local calling. However, only a brief summary of the major provisions was released, leaving open the question of whether the redrafted regulations will pass legal scrutiny. Consequently, uncertainty continues to plague the telecom industry.

At the state level, major statutory provisions regulating telecom rates are slated to sunset this year. In devising a rewrite of the law, legislators have the opportunity to abolish antiquated regulations that have inhibited innovation and undermined telecommunications investment and job creation in the state.

As stated in a recent report to the Legislature, the Texas House Committee on Regulated Industries concluded: "Texas can help provide economic and regulatory certainty for communications companies doing business in this state by creating a more supportive framework for open competition, economic investment and technological innovation. Limited regulation must be at the centerpiece of this effort."

Telecom policy need not be complex if guided by basic economic principles.

Transforming telecom policies will demand aggressive oversight of regulators by lawmakers, the media, and the general public. Resistance to reform will run strong among those with a vested interest in the status quo. But enhancing consumer benefits and technological innovation matters far more than preserving regulators' powers or special-interest advantages.

Recent events have illuminated the path to progress. Shortly after the FCC's rules on competition in local calling were overturned, executives of the "Baby Bells" called upon their rivals to negotiate commercial agreements for network access without government interference. Within days, SBC Telecommunications Inc. and Sage Telecom Inc. struck an agreement, while Verizon and BellSouth have also announced agreements with wholesale customers both large and small.

The message is unmistakable: "This is proof positive that free markets can work in telecommunications as they do throughout the U.S. economy," said Walter B. McCormick Jr., president and CEO of the United States Telecom Association. "This is real-world evidence that we do not need to spend months and years in court defending the past and putting future telecom investment and job creation on hold. All it takes to move forward constructively for the country is reasonable people sitting down in good faith at the negotiating table."[5]

Transmission Basics

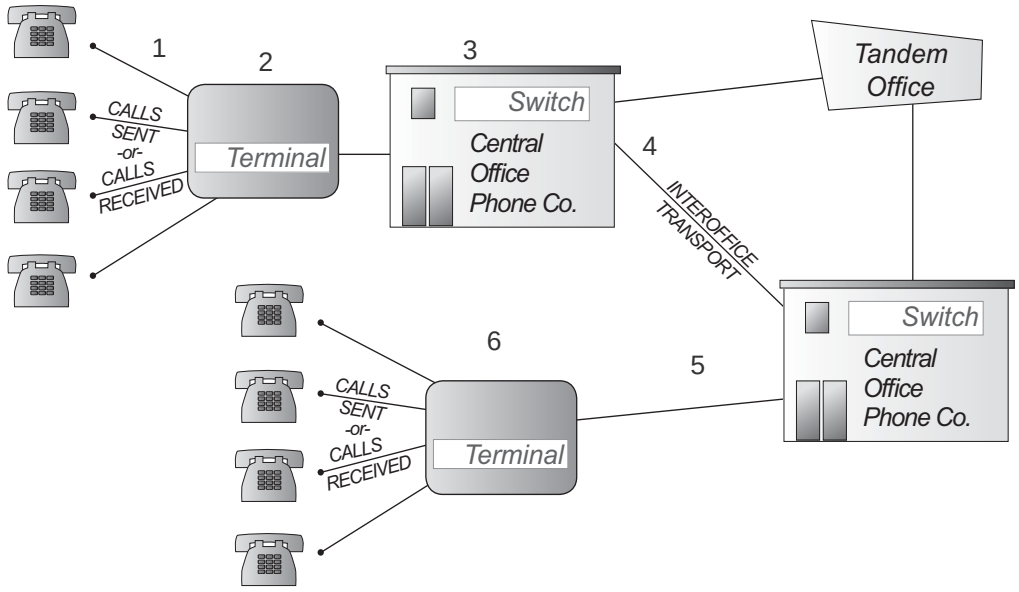
3. How does this stuff work?

Plain Old Telephone Service

"Free markets can work in telecommunications as they do throughout the U.S. economy."

Plain Old Telephone Service (POTS) refers to the basic voice service traditionally transmitted over the copper wire network. The sound waves of a caller's voice are converted by the telephone handset into electrical signals that travel over the network. The copper network is prone to interference, and the signal may weaken over distance, thus requiring amplification along the way.

Plain Old Telephone Service (POTS) Networking



1. The telephone handset converts the sound waves of a caller's voice into electrical signals. The signals then travel from the telephone to a "drop cable" that connects the residence or business to an outside terminal.
2. The terminal consolidates calling signals from the immediate neighborhood for transmission through an aerial cable to a central office.
3. Computerized switches inside the central office decipher the electronic signals to determine where to route the calls.
4. Depending upon the destination of a call, the signal may be routed to a regional hub, called a tandem office, where it is forwarded to a distant central office for further transmission. Alternatively, the signal may be routed through a cable that feeds directly to a central office near the destination of the call.
5. The central office's switches again read the incoming signal and route the call to the appropriate terminal. From the terminal, the call is transmitted to the local lines that connect the network to a home or business.
6. The telephone handset then reconverts the electrical signal into sound waves, and the call is completed.

The copper network originally carried only "analog" signals, which travel in a continuous stream and require a dedicated circuit. But the network has been upgraded also to carry "digital" signals, which do not require a continuously open and dedicated circuit, thereby increasing network transmission capacity.

Telephone Numbers

Telephone numbers in the United States are organized according to the North American Numbering Plan. The numbering plan is administered by a private firm selected by the Federal Communications Commission through competitive bidding. The numbering plan is subject to directives from regulatory authorities in member countries.

Failure to institute reforms will inhibit innovation and economic growth.

The 10-digit numbers used in the United States consist of three separate codes that designate the route and billing of every call. Each number, when dialed or pressed, emits a tone deciphered by network computers. The first three digits, known as the area code (or Numbering Plan Area), identify a metropolitan area. The next three digits, known as the exchange (or Prefix), specify the central office from which the call is routed to a local destination. The last four digits (Station) represent the individual customer line.

Under federal law, a customer must be allowed to keep a telephone number when changing service providers within a local area. This "number portability" requires a master database to determine whether the customer line is maintained by the original service provider or assigned to a competitor.

Circuit-based Technology

Circuit-based technology, commonly referred to as "analog," relies on a dedicated, continuous transmission path through the network. A dedicated circuit is among the most reliable technologies, although it is not the most efficient in terms of network capacity.

Packet-based Technology

Packet-based technology, commonly referred to as "digital," does not require a dedicated path through the network, but instead arranges data in fragmented "packets" to speed transmission. Each packet is routed using the best network connection available at a given time, and the packets are reassembled in their original order at the destination of the call.

DSL

Digital Subscriber Line (DSL) technology enables data to be transmitted at high speeds through the copper-wire telephone network. A "transceiver" linked to a personal computer connects to the network of an Internet Service Provider through the local telephone network. Data are compressed into digital packets and routed by the Internet Service Provider to the World Wide Web.

The regulatory process always trails the pace of technological change.

ISDN

The Integrated Services Digital Network technology (ISDN) allows a single copper-wire telephone line to transmit both voice and data signals. Users must dial in to establish a network connection, and fees are typically assessed based on the duration of transmission. ISDN is only available within 3.4 miles of a service provider's central office.

T1 (or DS1)

A T1 line is a high-speed digital circuit that provides the equivalent of 24 voice-grade lines (or channels) of transmission capacity. The line is leased as a direct connection to a computer system, an Internet Service Provider, or a destination specified by the customer. A T1 line is capable of transmitting large text files, as well as graphics and audio.

T3 (or DS3)

A T3 line is a higher-speed digital circuit that provides the equivalent of 672 voice-grade lines (or channels) of transmission capacity. The T3 line serves as the principal artery for heavy volumes of Internet traffic, including transmissions generated by corporations, universities, and Internet Service Providers. The T3 is capable of full-screen, full-motion video transmissions.

Fiber to the Home

Fiber to the Home (FTTH), also known as Fiber to the Premises (FTTP), entails replacing copper telephone lines with optical fiber cable at the user's residence to increase transmission capacity. The hair-thin strands of glass fiber carry pulses of light that deliver volumes more data at higher speeds. Transmitters are needed to convert electrical impulses from a computer into light streams.

OCn

OCn, or Optical Carrier Networks, transmit large amounts of data as light signals. The networks vary in capacity. An OC1, for example, can carry the equivalent of a T3 line. Telephone companies use OC12 systems between central offices to carry some 8,000 simultaneous conversations on a single strand of fiber.

Coaxial Cable

The coaxial cable through which television programming is delivered can also accommodate voice and high-speed data transmissions. Coaxial cable requires use of a modem to properly relay signals to the Internet and other network connections. Modem signals are first received by a neighborhood "node" that directs hundreds of such

transmissions to network connections at the cable vendor's facility. Amplifiers boost signal strength along the transmission route.

VOIP

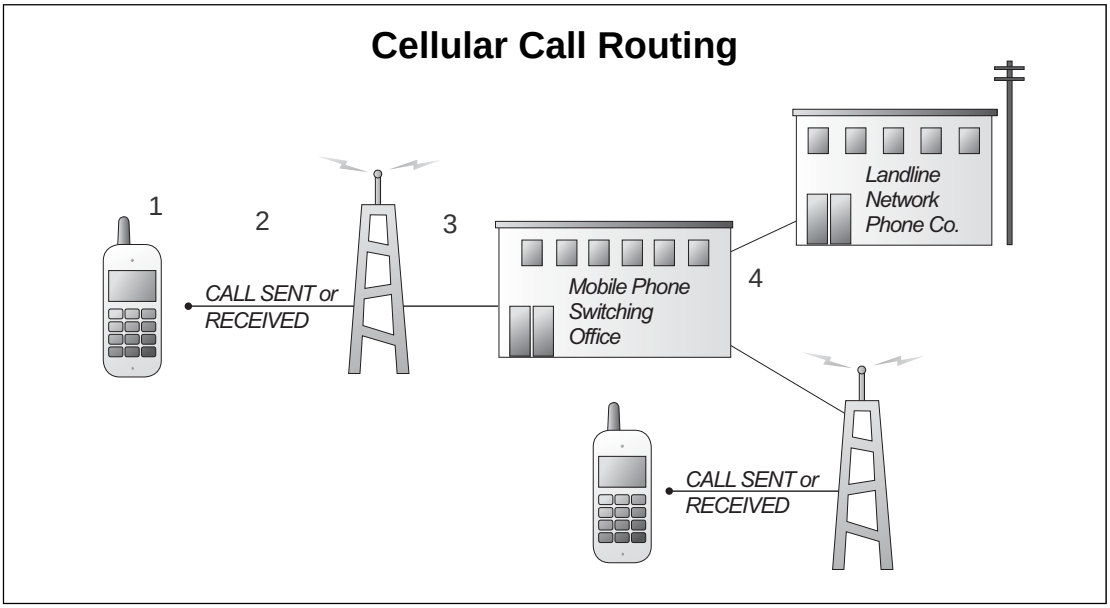
Voice Over Internet Protocol (VOIP) sometimes refers to private networks that use packet-based technology to transmit calls. The sound waves of a caller's voice are digitally encoded and transmitted as packets of data. The message is decoded to voice at the destination of the call. Private networks allow users to prioritize call routing to ensure transmission speed and quality.

The most rapidly expanding sectors of telecom are the least regulated.

VOIP also refers to calls transmitted over the public Internet in order to bypass the local calling network. Unlike private networks, calls routed over the public Internet may be impacted by network congestion associated with multiple users transmitting large amounts of data simultaneously. However, these technical challenges are expected to be overcome as the technology continues to advance.

Cellular Service

Cellular telephones essentially operate as two-way radios that are also capable of transmitting video and text data. Calls are transmitted as electrical signals within the radio-wave channels allocated to service providers. The signals are relayed between cellular towers that connect with switches to other networks, including the wireline network. Calls may be transmitted as analog or digital signals.



1. The wireless telephone converts the sound waves of the caller's voice to electrical signals — either analog or digital.
2. The signals are transmitted to a cellular tower through the radio-wave channel assigned to the service provider.
3. The tower relays the call signals to a mobile phone switching office.
4. Computer switches operated by the service provider determine whether to route the call to the wireless network or to the landline network.

Wireless Local Loop

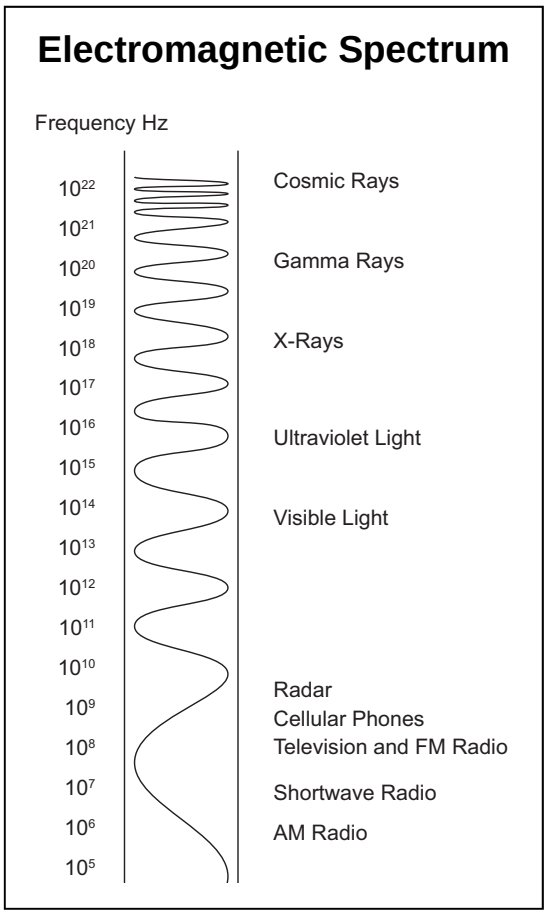
Wireless Local Loops use rooftop antennas rather than copper wire or optical fiber to transmit telephone calls. Unlike cellular calling, wireless local loops only provide service between fixed points. The antennas relay the signals to "hub" receivers, which interconnect with the wire line network.

The regulatory distinction between local and long-distance calling is irrelevant.

Spectrum

"Electromagnetic spectrum" is the scientific term for the full range of electric, magnetic and visible radiation in the universe. Waves within the spectrum vary in size, frequency and energy, and they are classified by their wavelength. The waves can extend from one-billionth of a meter, as in gamma rays, to centimeters and meters, as in radio waves. Waves of similar length are categorized into bands. Within bands, waves travel at various frequencies. The Federal Communications Commission allocates licenses for use of specific radio-wave frequencies.

Spectrum capacity continues to expand as technology improves at delineating new frequencies and reducing interference.



The electromagnetic spectrum represents the full range of electric, magnetic, and visible radiation in the universe. Waves in the spectrum vary in size, frequency, and energy, and they are classified by their wavelength. Waves of similar lengths are categorized into bands. The Federal Communications Commission allocates licenses for use of specific radio-wave frequencies.

WiFi

Wireless Fidelity, commonly referred to as "WiFi," is a local computer or audio network that uses high-frequency radio signals to transmit and receive data over short distances.

Satellite

Satellites operate as celestial antennas, relaying signals to and from computers to various Internet Service Providers. The transmissions are weather-sensitive and more prone to landscape interference than other technologies.

Broadband Over Power line (BPL)

A number of utilities are experimenting with using power lines to transmit voice and data signals. The existing wiring

of homes and businesses presents opportunities for a variety of applications. Computer adapters are necessary to filter the various signals.

History

4. How did the Bell system secure a monopoly?

Alexander Graham Bell patented the telephone on March 7, 1876, just hours ahead of rival inventor Elisha Gray. Bell's initial experiments were an attempt to enable a telegraph wire to carry simultaneous messages. His backers were intent on developing new technology to challenge the Western Union telegraph monopoly.

Bell succeeded beyond his expectations. On March 10, 1876, he placed what now ranks among the most important telephone calls in history. To his young assistant in an adjacent room he said, "Mr. Watson, come here. I want to see you."

Telephone technology took another leap in 1891, when Almon Strowger, a Kansas City undertaker who was fed up with nosy operators, patented a "switch" that could automatically relay calls to their destination without operator assistance.

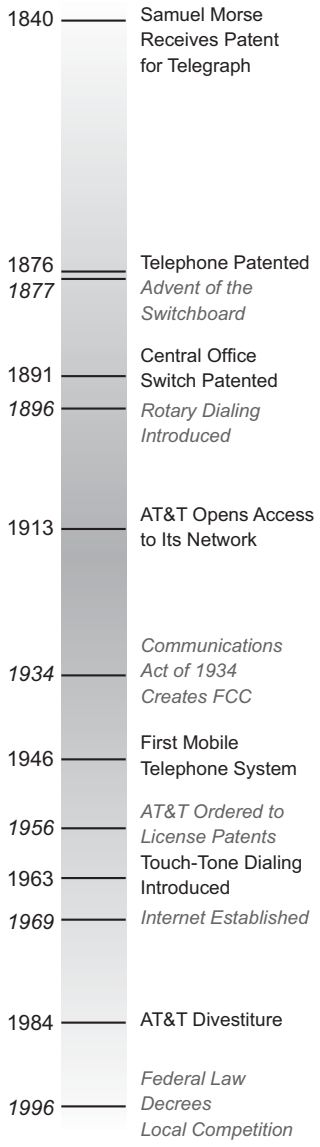
Daily telephone use in the United States grew from four calls per 1,000 people to 37 calls per 1,000 people between 1876 and 1894.[6] But once the Bell patents expired, thousands of competitors began wiring the nation, increasing the daily calling average per 1,000 people from 37 in 1895 to 391 in 1910. By 1907, Bell rivals controlled 51 percent of local telephone service.[7]

5. When did telecommunications regulation take root?

The surge of competition in the early 1900s prompted a takeover spree of rivals by American Telephone and Telegraph (AT&T). But AT&T's acquisitions troubled federal authorities, who began mulling antitrust action. This prompted AT&T officials to propose what subsequently became known as the "Kingsbury Commitment." On Dec. 19, 1913, AT&T agreed to sell $30 million of its Western Union stock and to allow competitors to interconnect with its network. The company also pledged that for every new local system it acquired, it would sell an equal share of lines.

The Kingsbury Commitment was wholly in keeping with the brilliant strategy of AT&T's President Theodore Newton Vail. The regulatory emphasis on interconnection cemented AT&T's control of the telephone network. And, the constraints on line acquisition did not keep the company from concentrating its hold in major markets. Thus, Vail was well-positioned to promote telephone service as a "natural monopoly." Public officials, eager to regulate the nascent industry, embraced Vail's motto of "One Policy, One System, Universal Service."

Telecom Milestones



As the nation's dominant service provider, AT&T had the most to gain from government-erected barriers to market entry. The more difficult it was to launch competitive service, the more secure was AT&T's market share.

Then, as now, the absence of government interference would likely have spurred technological innovations that would have prevented any one company from achieving market dominance.

AT&T secured its monopoly with the cooperation of state and federal officials.

Congress first vested federal regulatory authority over telephone services in the Interstate Commerce Commission, under the Mann-Elkins Act of 1910. This legislation adopted the practice of local franchising already begun by states and municipalities to control rates and service quality.

6. Is telecommunications a "natural monopoly"?

The theory of "natural monopoly," now widely questioned, presumed that redundant telephone infrastructure was economically inefficient. For example, a 1921 report by the Michigan Public Service Commission concluded that "competition resulted in duplication of investment," and that states were justified in denying requests by rivals to deploy new lines.[8] A report that same year from the U.S. House of Representatives likewise concluded that "there is nothing to be gained by local competition in the telephone business."[9]

The same view was also misapplied to electric power supply and water treatment, triggering creation of a massive regulatory structure to temper government-sanctioned monopoly power. In hindsight, competition could have restrained utility monopolies by generating new technologies and applications that instead took decades to achieve.

The drawbacks of the regulated-monopoly approach are now more widely recognized. Firms that enjoy government protection from competition, and for whom rates of return are guaranteed through regulation, face less financial pressure to innovate or operate efficiently. Moreover, regulators often become so committed to the regulatory structure that they regard competition as a threat, rather than as a potential solution to the very structural conditions that led to the adoption of regulation.

By 1925, telecom rate regulation was in effect across most of the nation, and competition was either discouraged or explicitly prohibited. The regulatory structure was finalized when Congress created the Federal Communications Commission in 1934.

In enacting the Communications Act of 1934, Congress authorized the new agency to impose service requirements priced at regulated rates. Any deviations in product or service required government approval, a laborious process then as now. Many such regulatory strictures persist despite fierce market competition.

As noted by a 1988 Department of Commerce report: "The chief focus of the Communications Act of 1934 was on the regulation of telecommunications, not necessarily its maximum development and promotion. (T)he drafters of the legislation saw the talents and resources of the industry presenting more of a challenge to the public interest than an opportunity for national progress."[10]

Thus, with the cooperation of state and federal officials, AT&T secured its dominance over telephone service for decades to come, controlling more than 80 percent of all telephone lines and assuming family status as "Ma Bell."[11]

Monopolies created by government face less pressure to innovate or operate efficiently.

7. What prompted the breakup of AT&T?

Intent on remaining a government-sanctioned monopoly, AT&T had little interest in selling network access to alternative service providers. (In recent years, ironically, AT&T has been the principal advocate of forcing local telephone companies to provide network access to rivals, itself included, at below-cost rates.)

Challenges to AT&T's protected standing intensified in the 1970s, prompting the FCC to allow limited competition in long-distance services. Local service, however, remained off-limits to competition. This regulatory disconnect between local and long-distance calling continues today, despite technological advances that have rendered obsolete any meaningful distinction between the two.

In 1974, the U.S. Justice Department filed an antitrust lawsuit against AT&T based on complaints by MCI and other long-distance service providers. The lawsuit went unresolved for eight years. But in 1982, the company settled with the government under conditions ordained by Judge Harold H. Greene of the Federal District Court for the District of Columbia.

The landmark settlement required AT&T to divest its local operating companies and limit its services to the long-distance market.

AT&T was allowed to continue manufacturing telephone equipment. (These operations were later spun off as Lucent Technologies.) Judge Greene retained jurisdiction over the case for more than a decade, effectively elevating himself to the role of national telecom czar. Virtually every major business decision required approval by both the judge and the FCC.

Thus, the creature of government was dismembered by government, demonstrating yet again that "government has nothing to give anybody except what it first takes from somebody, and a government that's big enough to give you everything you want is big enough to take away everything you've got."[12]

A subsequent series of mergers and acquisitions reduced the number of re-

gional operating companies from seven to four: SBC, Verizon, BellSouth, and Qwest — now commonly referred to as "incumbents."

Competition in long-distance service has yielded dramatic consumer benefits in the form of lower prices and improved service quality. Average revenues per minute for interstate and international calls originating in the United States dropped from 62 cents per minute in 1983 to 10 cents per minute in 2001.[13] In many instances, calling across state lines and even international borders costs less than local toll calls within a single state.

A government big enough to bestow a monopoly is big enough to take it away.

The State of the Industry

8. What is the nature of telecommunications competition today?

The telecommunications industry, in every respect, has grown vastly over the past two decades. Advances in fiber optics, wireless, and other signal-processing technologies have created new markets and made new network infrastructure far more affordable, increasing competition.

Consider, for example, the remarkable increase in the number of telecom patents, which rose from 2,309 in 1990 to 10,391 in 2003.

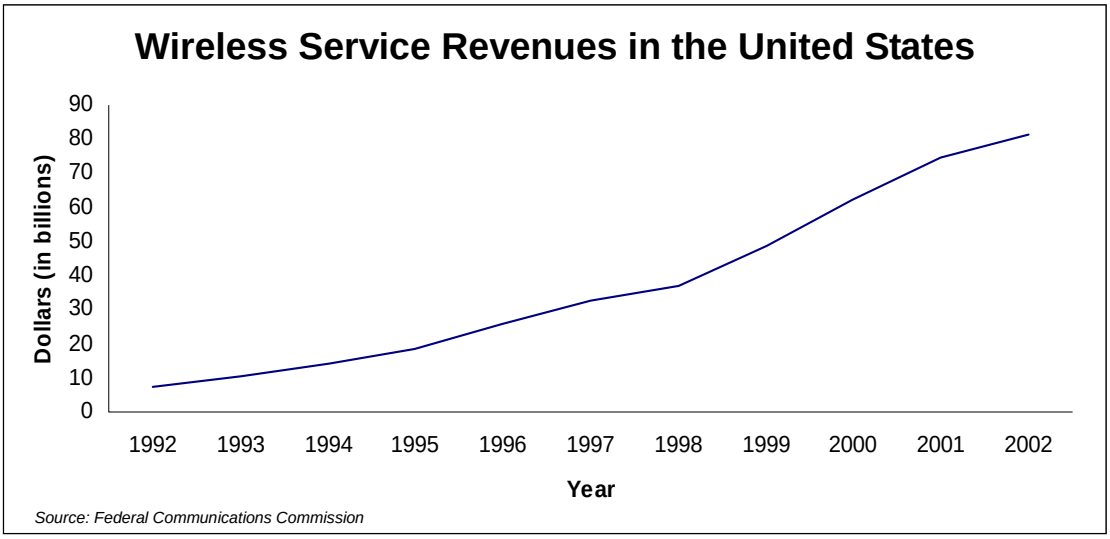
In recent years, wireless telephony has presented the greatest competitive challenge to wireline service. Cellular subscriptions have increased from just 92,000 nationwide in 1984 to more than 158 million today.[14] The number of local wire lines, meanwhile, decreased by nearly 2 million between 1999 and 2002.[15]

Competition yields lower rates and promotes higher usage. For example, the number of wireless call minutes increased 61 percent between 2000 and 2002.[16] The biggest market growth is now among lower-income customers, reflecting the increased affordability of service.

A major factor driving the extraordinary growth in wireless services has been the loosening of government's grip on the broadcast spectrum. In the early 1990s, the FCC had restricted the number of wireless carriers to two per market area. The 1993 Budget Reconciliation Act, however, forced the FCC to auction spectrum for up to six carriers per market. Consequently, by 2003 more than 95 percent of the nation was served by at least three wireless services.

This growth results from wireless carriers competing in the open market to build their own networks, with none of the regulatory management or subsidization that has characterized wireline competition.

Cable television companies and Internet Service Providers (ISPs) increasingly



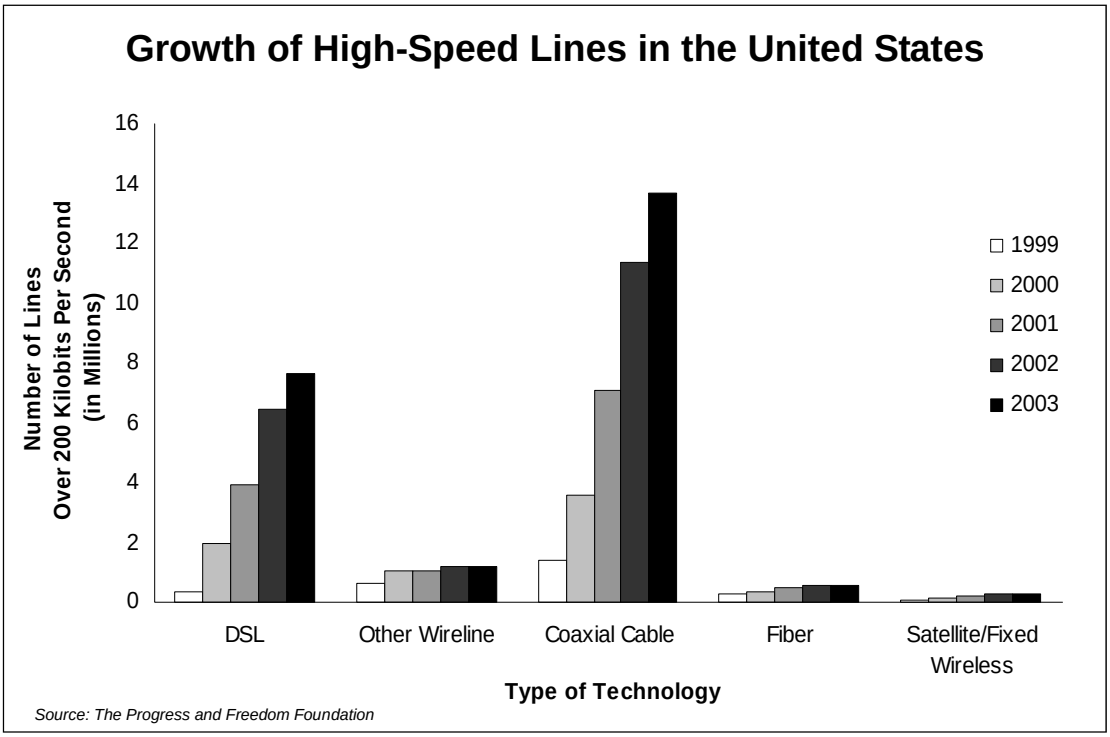
Source: Federal Communications Commission

More than 95 percent of the nation is served by at least three wireless services.

are adding telephony to their offerings. Cable telephony now serves 2.5 million residential subscribers, an increase of 70 percent annually since 2001.[17]

Voice Over Internet Protocol, or VOIP, will have experienced a compound annual growth rate of 96.7 percent between 2000 and 2007, according to calculations by the consulting firm of Frost & Sullivan. The firm also forecasts that by 2007, over 60 percent of long-distance traffic will travel over VOIP networks.

High-speed telecommunications services, in particular, have experienced tremendous growth, as illustrated by the chart above. An estimated 83 percent of U.S.



Source: The Progress and Freedom Foundation

homes now have access to cable or DSL broadband,[18] while some 59 percent of Americans access the Internet from home or work — a number projected to increase to 73 percent by 2007.[19]

Advances in technology have allowed voice, video and data services to be combined in new applications. This "convergence" is increasingly available across all types of telecommunications media.

Dramatic growth in wireless services has occurred without economic regulation or government subsidy.

Federal Statutes and Regulations

9. What federal rules govern telecommunications?

Telecom Act of 1996

The breakup of AT&T in 1984 unleashed products and services unforeseen by regulators or the courts. But the rapid pace of innovation also produced regulatory inconsistencies between various products and service providers, which Congress sought to remedy with passage of the Telecommunications Act of 1996.

Mindful of the benefits realized through long-distance competition, lawmakers declared an end to the monopoly franchise system governing local wireline calling.

The 1996 act set the conditions by which carriers would be allowed to provide local and long-distance services. Among the most significant provisions was the requirement that the Baby Bells and other "incumbent" local carriers provide network access to rivals at regulated rates. These rivals — referred to in the industry as "competitors" — included long-distance, cable, and wireless firms. In return for providing access, the Bells were allowed to enter the long-distance market, offer cable services and manufacture equipment once regulators were satisfied that local competition had taken hold.

Another key element of the act was the phase-out of price controls on cable TV, which had inhibited competition and network investment. Also mandated were telecommunications subsidies to government-run schools, health care facilities and libraries.

Unbundled Network Elements

Congress conceived of forced access to local networks as necessary to jump-start competition in local calling services. Lawmakers assumed that new entrants would need below-cost access to the network to gain a foothold in the market. They further expected that once new entrants gained market share, they would use their new revenues to build facilities to compete against the incumbent service providers.

Lawmakers established a baseline eligibility standard for this subsidized ac-

cess. Subsidized access to the incumbents' networks was not intended to be an ongoing entitlement. Eligibility was supposed to be based on whether a competitor would be "impaired" from competing if they were denied network access.

Section 251 of the 1996 act directs the FCC to "consider, at a minimum, whether … the failure to provide access to such network elements would impair the ability of the telecommunications carrier seeking access to provide the services that it seeks to offer."

Congress did not intend for subsidized access to local wireline networks to be an ongoing entitlement.

Congress delegated to the FCC the authority to determine which switches, lines and other facilities should be shared, and how various parts of the network (called "Unbundled Network Elements," or UNE) would be priced. The agency issued the first set of access rules in 1999. Subsequently, regulators required incumbents to provide to rivals at deeply discounted rates all elements of the network "platform" (UNE-P) as a single package. This would allow competitors simply to resell the incumbents' services without making any investment in facilities.

The outcome in Texas was predictable. Most competitors have preferred to use the incumbents' existing network at below-cost rates rather than invest in facilities of their own. Competitors used their own facilities to service 33.9 percent of their customer lines in 1999. By 2002, the number of lines served by competitors' own facilities fell to 20 percent.

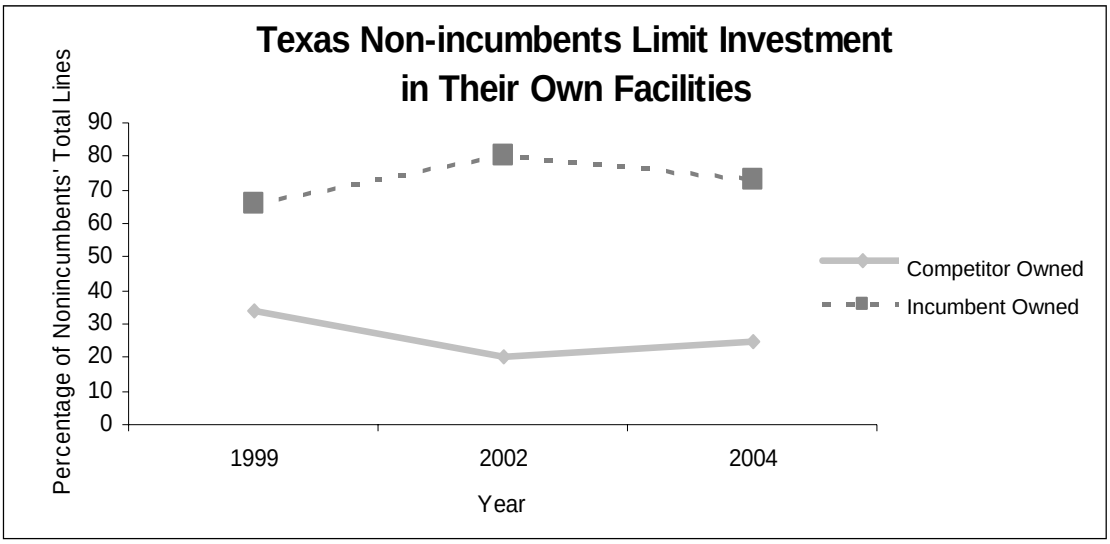
Underlying this forced-access policy is the supposition that the landline network is public property by virtue of its former monopoly status. In fact, as noted by Heritage Foundation scholars James Gattuso and Norbert Michel, today's networks are overwhelmingly the product of investment made long after legal monopolies and guaranteed rates of return were abolished.[20] According to data from Standard & Poor's, investors have replaced the entire capital structure of U.S. telecom companies almost twice over since passage of the Telecommunications Act of 1996.[21]

TELRIC

The FCC established a pricing formula for various network elements, such as switches and loops, called "Total Element Long-Run Incremental Cost" (TELRIC). This formula, which effectively constitutes a form of price control, is based on the estimated cost of building and operating a hypothetical maximum-efficiency network. The actual rates are set by states in accordance with the formula.

The rates calculated by most states have varied wildly and have been shown to be economically unsustainable by a variety of economists. The rate formula as applied by regulators is very subjective and rarely factors in the contributions made by network shareholders to earnings, depreciation and amortization, taxes, or debt service.

Today's networks are the product of private investment.



10. How have federal regulations affected the telecommunications market?

Unfortunately, forced-access regulation has skewed investment incentives and undermined innovation. Most competitors have shunned investment in facilities of their own, preferring instead simply to resell the incumbents' network services they obtain at a discount, compliments of regulatory fiat.

In Texas, as the chart above illustrates, most of the telephone service billed by non-incumbent competitors is actually provided by SBC and Verizon networks. According to state government data, 80 percent of the lines that non-incumbents billed to their customers in 2002 actually were serviced in whole or in part by an incumbent network, up from 66 percent in 1999.[22]

There also has been a corresponding decline in the proportion of lines served by competitors' own facilities. In Texas, local non-incumbents used their own facilities to service just 20 percent of their customer lines in 2002, down from 33.9 percent in 1999.[23]

This same dynamic is evident across the nation — an outcome that is precisely the opposite of what Congress intended.

11. What is the current status of federal telecommunications regulation?

Triennial Review Order

From a plain reading of the 1996 act, there can be no doubt that Congress intended to restrict competitors' reliance on subsidized access to the incumbents' networks. Yet the FCC crafted eligibility standards that effectively granted access subsi-

dies to any and all competitors for the asking.

This disregard for congressional intent was recognized by the U.S. Supreme Court, which in 1999 struck down the first set of FCC regulations and ordered the agency to rewrite the access rules.

A second set of standards, issued in 1999, was likewise judged to be overly broad in 2002 by the U.S. Court of Appeals for the District of Columbia. The FCC was again ordered to redraft the regulations.

The FCC access standards were based on a "fundamental misreading" of the law.

The FCC issued a third set of rules, titled the "Triennial Review Order," on Aug. 21, 2003, on a vote of 3-to-2. Commission Chairman Michael Powell, who joined Commissioner Kathleen Abernathy in dissent, publicly excoriated the majority for "taking a politically expedient course instead of the right course."

For the first time, the rules shifted to states the responsibility for determining what market conditions would warrant subsidized access, rather than setting a federal impairment standard as Congress intended. If allowed to stand, the order would have required 50 state utility commissions to issue 50 sets of standards for determining whether competitors were eligible for subsidized network access.

To its credit, the FCC declined to require incumbents to provide subsidized access to broadband facilities, recognizing that to do so would jeopardize investment in deployment. But this recognition, while welcome, only underscored the irrationality of continuing to require forced access to the local landline network.

Once again the rules were challenged. On March 2, 2004, the U.S. Circuit Court of Appeals in Washington, D.C., ruled that the FCC had overstepped its authority. The court rejected the commission's delegation of regulatory authority to the states, ruling that "the Commission's position is based on a fundamental misreading of the relevant case law." Moreover, the court ruled that the commission "made no visible effort" to determine whether forced access is, in fact, justified nationwide. On this issue, the court characterized the FCC's findings as "vague almost to the point of being empty."

The D.C. Circuit panel gave the FCC 60 days to rewrite the regulations, after which the forced-access rules would be vacated. A petition to extend the deadline was filed by state regulators, along with competing local service providers. The petition was rejected on June 14, 2004 by U.S. Supreme Court Chief Justice William Rehnquist.

On June 16, 2004, the FCC rules became legally void, creating a major opportunity for reform.

Calling for an end to "legalistic bickering and squabbling," Michigan Rep. John Dingell said: "All companies in the telecommunications industry should now

compete vigorously, offer the new services and products that consumers want, and build the broadband infrastructure that can reinvigorate job creation."

The FCC subsequently released an outline of new network access rules on Dec. 15, 2004. Of particular note, the commission adopted provisions to curb some forced access requirements as instructed by the appellate court. However, the commission's decision to perpetuate these requirements for incumbents' high-capacity business lines will likely provoke yet another legal challenge.

"The time for legalistic bickering and squabbling has passed."

12. What are access charges?

Access Charges

Access charges refer to payments made by long-distance carriers to local service providers for originating and terminating calls on local telephone networks. The regulation of access charge rates is therefore a form of price control.

Prior to the breakup of AT&T, regulators established artificially high long-distance rates to subsidize artificially low local service rates. To maintain local calling subsidies after the divestiture of the Bell monopoly, the FCC crafted access charges.

In most instances, a long-distance call originates on the local network, is routed to the long-distance carrier's network and then terminates on another local network. Long-distance companies pay "access charges" to the local phone companies for carrying their calls on the local networks. The regulated access charges that long-distance companies pay range from less than one cent per minute with the former Bell companies to about 10 cents per minute with smaller, independent telephone companies.

("Reciprocal compensation," another type of interconnection pricing, is paid by one local phone carrier to another local carrier to terminate a local call on the latter's network.)

Interstate access charges are regulated at the federal level, while intrastate charges are regulated by the states. This jurisdictional division is increasingly difficult to maintain as new technologies cross federal/state boundaries. For example, it remains unresolved whether Internet-based calls should incur access charges if terminated on the local network. It was precisely the high cost of access charges that helped prompt the deployment of competitive networks like Voice Over Internet Protocol (VOIP).

Because the distinction between local and long-distance calls is increasingly irrelevant, the FCC has proposed establishing one set of rules for both types of calls, a system known as "bill-and-keep." Under bill-and-keep, carriers charge their own customers instead of other carriers for originating or terminating calls.

13. What is universal service?

Universal Service

"Universal service" policies are intended to make telephone service available to all households at uniformly low rates. Thus, higher rates are applied across the board to cover the added costs of providing telephone service to rural areas, as well as to provide discounted services to low-income households. While the goal of universal service is well-intentioned, the system of fees and subsidies is threatening to collapse.

Universal service subsidies are costing consumers dearly.

The FCC first formalized a universal service policy in the 1950s. This became the "Ozark Plan," under which prices for long-distance telephone service were inflated to subsidize artificially low prices for local phone service. States had their own systems of "rate averaging," some of which predated the federal system.

Today, there exist two methods of financing universal service. There are implicit charges — that is, hidden charges — built into regulated rates. This cost-shifting is a legacy of the Ozark Plan and primarily persists at the state level.

At the federal level, the Telecommunications Act of 1996 restructured universal service subsidies as explicit charges levied on telecom companies' interstate telephone revenues. This funding stream is administered by the Federal Communications Commission, with the advice of the states.

The states determine which areas carriers must serve and their eligibility for payments from the Universal Service Fund. Nationwide, in 2002 the subsidies for carriers serving high-cost (often rural) areas reached $3 billion. Additional subsidy pools exist for advanced services to schools and libraries ($1.6 billion to $2.2 billion per year); rural health facilities ($16.5 million); and programs targeted to low-income telephone subscribers ($673 million).[24]

The 1996 act allows states to administer "explicit" universal service funds for intrastate service, as long as the state programs do not conflict with the federal system. Most states have programs for low-income residents; roughly half impose explicit charges on ratepayers to subsidize high-cost or small local phone companies.

The move to an explicit system for universal service was largely prompted by increased competition in long-distance and business phone services. The advent of competition made it much harder for service providers to artificially inflate rates. Consequently, there was less revenue collected to subsidize universal service programs.

Congress standardized the payments in the 1996 act by effectively imposing a

universal service tax on ratepayers.

Universal service as a regulatory imperative has largely been rendered obsolete by the range of affordable services spawned by competition. For example, satellites and other wireless technologies can provide service to rural areas at much less cost than the traditional wireline network.

The FCC overlooked the economic benefits of liberal spectrum allocation.

As it is, new technologies are penetrating the nation at an accelerating rate. Whereas it took 35 years for traditional telephone service to reach one-quarter of the population, and 26 years for television, it took only 16 years for personal computers and 13 years for cell phones.[25]

Continuing to subsidize higher-cost services will only undermine technological innovation by reducing demand for alternatives. And continuing to expand the eligibility for subsidies will needlessly burden families' budgets. Ironically, then, a policy intended to ensure affordable service is costing consumers dearly.

14. How does the government manage the broadcast spectrum?

Spectrum Allocation

Wireless communications are increasing in all market sectors in spite of the government's clumsy management of the broadcast spectrum. But maximizing wireless growth and innovation requires the establishment of a spectrum market.

Since the 1920s, the federal government has managed the broadcast spectrum as a scarce public resource. Spectrum licenses were awarded only sparingly by the Federal Communications Commission, which overlooked the economic benefits of more liberal allocation.

The decade-long delay in licensing spectrum for cellular telephony, for example, is estimated to have cost at least $86 billion in lost consumer welfare.[26] In 1994, the commission forecast 54 million mobile telephone subscribers by 2000, but the number actually reached 110 million by 2000.[27]

Policymakers have made only halting progress toward a spectrum market. Congress in 1993 authorized the FCC to award wireless licenses by auction. The principal benefit of spectrum auctions is not to raise yet more money for the federal government, but to more quickly put available spectrum to commercial use.

Unfortunately, the government's seemingly insatiable appetite for funds has slowed progress in spectrum allocation. Not until last year did the FCC finally issue rules on spectrum leasing to allow a secondary market to emerge. Leasing increases efficient use of the spectrum by providing lower-cost access to unused capacity.

Government agencies enjoy preferential use of some spectrum. Much of this bounty is not used efficiently. The FAA, for example, still uses wasteful analog technology, which requires more spectrum than digital transmission. But some reform is underway. In July 2002, the Department of Commerce released a plan in concert with the FCC and the Department of Defense to make more spectrum available for wireless services. In February 2003, the Department of Commerce agreed to release some of its spectrum allocation for wireless data communications. Finally, the FCC and the Department of Commerce approved the use of ultra-wideband (UWB) technology that enables broadband connections and assists in the performance of critical safety services.

Government agencies enjoy preferential use of the broadcast spectrum.

Another casualty of the government's poor spectrum management is the inability of various public safety agencies to communicate directly with each other. Spectrum is allocated in widely dispersed "chunks" to different agencies. And because no single radio can access all the various public safety channels, agencies are unable to communicate collectively via radio.

Texas Law and Regulations

15. How does Texas regulate telecommunications?

The Texas Public Utility Regulatory Act

Texas telecommunications law was last substantively revised in 1999. In many respects, state law mirrors the federal emphasis on "managing" competition in telecommunications. The Texas Public Utility Regulatory Act (PURA) prescribes network access requirements, price controls, and service mandates that contradict the act's stated purpose of "encourage(ing) and accelerat(ing) the development of a competitive and advanced telecommunications environment and infrastructure."[28]

To their credit, Texas lawmakers recognized in 1995, and again in 1999, that advances in technology and the concomitant changes in the telecom industry warranted regulatory reforms. Whereas past regulation was solely structured to control government-created monopolies, burgeoning competition rendered such regulation obsolete. But as well-intentioned as lawmakers may have been, the reforms were too limited, and regulatory constraints have continued to inhibit investment and competition.

Prior to 1995, rates for basic local service were dictated by what regulators deemed to be a "reasonable rate of return" on service providers' investments. The rates also were based on the line density in a given location. That is, higher rates were assigned for major cities, where the number of lines is largest, while rates were lowered in rural areas with fewer lines. This calculation wholly ignored the actual cost of

service, which is greatest where line density is lowest.

Pervasive rate regulation has grossly distorted the telecom market in Texas. Most regulated rates bear little relation to the actual costs of providing services, or to basic economic principles of supply and demand. Service providers thus are forced to offset below-cost rates by increasing the prices of unregulated services. Consequently, the Texas telecom market is a tangle of cross-subsidies that complicates the task of reform.

Current rate regulations wholly ignore the actual cost of service.

In 1995, the Texas Legislature established an "alternative" regulatory framework to allow incumbent service providers a modicum of pricing independence in return for network upgrades and service discounts to public institutions.

The amendments to the Public Utility Regulatory Act allowed for expedited review of rate adjustments and the pricing of service packages and promotions. Basic service rates remained strictly regulated, but lawmakers partially deregulated the rates of some "non-basic" services, such as speed dialing, three-way calling and paging, and set conditions for eliminating price caps on other non-basic services, such as call forwarding and caller ID. However, all rates for non-basic services were required to exceed the cost of service as determined by a questionable government formula.

In return for this partial flexibility in pricing, participating service providers were required to upgrade network connectivity and broadband infrastructure, as well as to provide service discounts to schools, libraries, and medical facilities.

The 1995 reforms reflected lawmakers' recognition of the dramatic changes in the telecom market. Wireless, cable, and other telephony services were increasingly common, but consumers would not reap the benefits of innovation as long as rate regulation stymied competition. Unfortunately, lawmakers failed to apply that same sound reasoning to all services, thereby depriving Texans of the full benefits of telecom advances.

State telecom law was further amended in 1999 to allow smaller telecom companies to elect alternative regulation. In exchange for expedited review of price adjustments, participating firms were required to give investment priority to rural and "underserved" areas, as well as to schools in economically disadvantaged communities.

While seemingly flexible, these so-called alternative regulatory plans often constitute far more restrictive regulations than are imposed in many other states.

To further subsidize telephone service, the Texas Legislature in 1987 established a state Universal Service Fund. Revenues for the fund are generated through a monthly assessment on the receipts of local, long distance, and wireless firms. Payments are disbursed to telecom companies for providing services to high-cost areas

and low-income households. These payments are matched by federal funds.

The Texas Universal Service Fund has grown significantly since its inception, disbursing more than $586 million in subsidies — despite a continuous decline in the state's poverty rate and the increased availability of affordable service options.

Price controls have significantly distorted the telecom market in Texas.

State law also controls so-called access charges, which are the fees paid by long-distance firms to interconnect calls with the local network. The Texas Public Utility Commission sets the access rates for toll calls that originate and terminate within state boundaries. (The FCC regulates interstate access rates.) Texas access charges do not reflect the cost of network access, and they rank among the highest in the nation. Consequently, Texas consumers pay more than average for intrastate toll calls.

The state Public Utility Commission also regulates the interconnection of networks, service quality, and a slew of other operational minutiae. The extent of its powers is all the more remarkable considering that it was only established in 1975, making Texas the last state to create a utility authority.

16. What are the pros and cons of the Texas Public Utility Regulatory Act?

The Texas Public Utility Regulatory Act empowers state regulators to micromanage most aspects of telecom service. But the public interest would be better served by allowing competitive forces to keep rates low, service quality high, and the choice of products varied. Indeed, millions of Texas consumers already enjoy significant choice in telecom services as a result of technological innovations that have largely escaped — so far — government control.

In a report to the 79th Legislature, the House Committee on Regulated Industries concluded: "(T)exas has reached the point where increasing competition has called into question the value of continued economic regulation."

Price controls have significantly distorted the telecom market in Texas. Basic local rates in the state are among the lowest in the nation, averaging $25.16 for a single residential line compared to the national average of $34.16. These artificially low rates fail to cover the actual cost of service by an estimated $600 million annually.

Price controls may appear to benefit consumers by keeping basic service rates low. In reality, the costs of artificially low basic rates are passed on to Texas consumers in the form of higher prices for other products and services.

Since 1999, for example, the monthly rate for three-way calling has increased between 48 percent and 138 percent, depending upon the provider. Similar increases have been applied to voice mail, caller ID, and directory assistance. Thus, many con-

sumers are priced out of convenient service options.

More than just telecom prices are affected. The price of a basic business line is currently set at twice that of a residential line, although the service is identical. The additional cost is shifted to consumers in the price of business products.

Regulation has largely failed to fulfill the goal of meaningful competition in wireline calling.

Price controls actually impede competition by limiting the opportunities for new market entrants. By setting rates below cost, regulators leave little room for rivals to compete on price. Competitive opportunities are further restricted by mandated subsidies for schools, libraries, and medical institutions.

The network access rates for transmitting toll calls set by Texas regulators also are problematic, adding significantly to the cost of long distance service. For example, the state Public Utility Commission allows local firms to charge long distance companies up to 6 cents per minute for toll call transmissions, while federal regulators have set the rate at 1.8 cents per minute. Overall, incumbent firms in Texas collect about $600 million in intrastate access charges each year, or an estimated $172 million more than the cost of providing network access. However, this discrepancy must be considered in light of the losses that incumbents incur in providing basic service at artificially low rates.

The rate discrepancies in Texas are further exacerbated by the unchecked expansion of the state's Universal Service Fund. For example, the number of households eligible for subsidies was 235,856 in 2000. By 2004, the number had grown to 622,860. Yet the poverty rate in the state fell during the same period. The vast majority of Universal Service Funds, some 92 percent, are allocated to telecom firms to cover the costs of supplying service to rural and other high-cost communities where rates are kept artificially low.

Texas lawmakers have followed their federal counterparts in requiring that incumbent providers subsidize their rivals by providing below-cost access to their networks at heavily discounted rates.

The state formula that is used to calculate the rates for use of the network (called Long Run Incremental Cost) assumes that local networks consist of the least costly, most efficient technology currently available. But this hypothetical cost model, based on a similar federal model, does not reflect the actual network configuration or operating costs. Consequently, the incumbent service providers who own the network earn less revenue with which to invest in upgrades.

17. What is the status of competition in Texas?

Texas regulators devote considerable time and taxpayer dollars tallying the precise numbers of wirelines and telephone service providers across the state. This method of measuring competition in local calling drives major regulatory decisions

that affect investment, job creation, and service quality. Yet this type of computation is largely meaningless.

Defining competition solely in terms of wireline market shares is loosely derived from the federal Telecommunications Act of 1996. Seeking to eliminate local service monopolies, Congress directed the Federal Communications Commission (FCC) to regulate the incumbent "Baby Bells" based on the degree to which rivals capture market share. Consequently, the FCC and state regulators adopted the most simplistic — and erroneous — method of measuring competition, one that excludes wireless, cable, and Internet telephony.

Newcomers like broadband and VOIP are outpacing regulated services.

The consequences of this skewed approach are significant. By repeatedly underrating the degree of market competition, the FCC and its Texas counterparts have secured their power to impose costly regulations that hinder telecom investment and innovation, and induce businesses to locate abroad.

Whether government should even track telecom competition is certainly questionable. The widespread availability of affordable telecom options undercuts the rationale for continued regulation. But to the extent that such tracking persists, a more accurate method should be employed.

The better alternative is to gauge the "contestability" of the market. Rather than a mere tally of wirelines, a contestability analysis would determine the actual opportunities for market entry. Simply put, a contestable market is a *de facto* open market — that is, technology exists to provide services; the investment costs are recoverable; and prices aren't likely to change in the time it takes to launch a business.

Unlike existing government criteria for measuring competition, contestability would not hinge on how many firms operate in the market at any given point in time. Nor could a contestability standard be met by the mere existence of firms created by regulatory fiat and sustained by subsidies, as is currently the case.

As the House Committee on Regulated Industries recently concluded: "It is not the legislature's role to protect a particular company or industry segment."

There is ample evidence that the Texas telecom market is indeed contestable. Advances in fiber optics, wireless, and other signal-processing technologies have made new network infrastructure more affordable, and new services more price-competitive.

As Deutsche Bank analysts observed: "The [incumbents] are facing steep declines in total access lines, caused by a sharp contraction in both primary and

secondary lines, as wireless, DSL and satellite platforms continue to cannibalize fixed line connections."[29]

The least regulated firms enjoy the greatest success in market entry. Indeed, there are now eight wireless companies, three cable firms and 10 Internet service providers offering telecom services in Texas.

Cellular telephone subscriptions have increased from 5.8 million in 1999 to more than 11.3 million in 2004. Meanwhile, the number of local wirelines decreased by nearly 550,000 in the past year alone.

The high-speed connections necessary for Voice Over Internet Protocol likewise are increasing. Broadband subscriptions in Texas exceeded 1.9 million in 2004, up from 152,518 in 1999.

Recommendations for Reform

18. How can telecommunications policy be improved?

Rate deregulation. Price controls distort competition and inhibit investment. Competitive pricing would actually impose tougher price discipline on firms than rate regulation. The Texas Legislature should eliminate rate regulation, and allow service providers to set prices based on the cost of service and prevailing market rates.

Reform access rates. Short of full-scale deregulation, access rates should be adjusted to fully and flexibly reflect the actual costs of network services. Texas lawmakers are advised to defer to federal reform of toll access charges.

End forced access. The growth of wireless service, cable telephony, and Internet communications presents a formidable competitive challenge to wireline incumbents. Taking into account these service options, there is little justification for maintaining the forced-access regime. Service providers should be allowed to negotiate network access on mutually beneficial terms. At the very least, limits should be set on competitors' use of forced access.

Technological innovation can radically change market conditions in a short time. Competitors who take advantage of subsidized access should be required to undergo a periodic review of eligibility. Whether they make any attempt to invest in independent facilities, as Congress intended, should be taken into account.

Reform Universal Service. The Texas Universal Service Fund should be eliminated. To the extent that lawmakers deem service subsidies as appropriate, a means test should be instituted and funding should be allocated from the state budget.

Hands off VOIP. The Legislature should ensure that Voice Over Internet Protocol and other broadband telephony applications remain free of all state regulation, including access charges and taxes.

End regulatory disparities. All providers in a competitive marketplace should be subject to the same rules and regulations. Such regulatory "parity" should be based upon reducing regulation across-the-board, rather than imposing stricter rules industry-wide. To the extent regulation is deemed essential, lawmakers and regulators should focus only on services, not on service providers.

Reduce taxes on wireless services. Over the past five years, the cost of the average wireless plan has fallen more than 30 percent. However, state and federal taxes, fees, and mandates are keeping consumers' wireless phone bills artificially high. Nationwide, average consumers pay 14.29 percent of their cellular phone bills in taxes. Local fees and special taxes on wireless service should be eliminated.

Privatize government telecommunications services. Consistent with sound budgeting, government agencies that use the broadcast spectrum should contract with the private sector to provide communications services, enabling the agencies to take advantage of integrated digital communications without making costly infrastructure investments of their own. Municipalities and government-run institutions should be prohibited from owning and operating a telecommunications service.

Glossary

19. What is a "CLEC"?

Analog	The method of transmitting voice or data as electrical signals.
Bandwidth	The transmission capacity of the analog or digital line.
Baud Rate	The speed of an analog signal.
Bits	The digits used by computers to represent data for transmission.
Broadband	Higher-speed data transmissions, typically greater than 128 kilobits per second, in which multiple signals are simultaneously sent.
Bundling	The packaging of various telecommunications services by a single provider, which may include local and long-distance calling, Internet connectivity and wireless.
CLEC	Competitive Local Exchange Carrier. A firm offering local telephone service in competition with a former Bell company or other incumbent firm.
Coaxial Cable	Wide bandwidth copper cable deployed by cable TV companies.
Compression	Maximizing the density of data transmissions to increase transmission efficiency.
Cramming	Adding telecom services to a consumer's bill without authorization.
Dialing Parity	The ability to place calls through a competing service provider using similar dialing patterns and without dialing extra digits or an access code.
Digital Ethernet	Light-wave transmissions arranged in binary units.
LANs	Local Area Networks. A connected set of computers and related hardware within a business or campus environment.
LATA	Local Access and Transport Areas. The geographic delineation of local calling boundaries crafted by the U.S. Justice Department as a result of the AT&T divestiture in 1984.
MANs	Metropolitan Area Networks. A connected set of local computer networks.
Modulation	The conversion of analog signals to digital signals.
Multiplexing	The division of digital signals into various frequencies to allow a single line to carry multiple transmissions of voice, video, and data.
Protocols	The operating rules governing communications transmitted between computers.
Slamming	Changing a service provider without customer authorization.
TELRIC	Total Element Long-Run Incremental Cost. The formula devised by the Federal Communications Commission to calculate the fees allowed for wholesale access to the local incumbent network.
Twisted Pair	The copper wire used in the standard local telephone network.
VOIP	Voice Over Internet Protocol. Transmission of voice calls through Internet connections.

Links

20. Where can I find more information?

Federal Communications Commission	www.fcc.gov
Texas Public Utility Commission	www.puc.state.tx.usa
Progress and Freedom Foundation	www.pff.org
Texas Cable & Telecommunications Association	www.txcable.com
United States Telecom Association	www.usta.org

Endnotes

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