The past quarter-century was one of halting progress.

A Somewhat Better Connection

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Twenty-five years is a very long time in high-technology industries like telecommunications. In 1977, none of us owned a personal computer or a cellular telephone. That same year, state and federal regulators were trying to use the federal courts to block competition in telephone handsets and long-distance services. At the same time, AT&T was defending itself against monopolization charges brought by the U.S. Justice Department, despite the fact that its monopoly had been conceived, nurtured, and protected by the government itself.

Today, the very same regulatory commissions that were once working to protect AT&T's monopoly in long distance and telephone terminal equipment have been converted, at least rhetorically, into advocates for competition and consumer welfare. They have come a long way — or have they?

Unlike transportation, the change in atmosphere has not led to deregulation in telecommunications. Most telecom service rates are still regulated or at least subject to the filing of regulatory tariffs. AT&T and WorldCom cannot selectively cut prices without running afoul of rules that require geographically uniform rates. Local telephone companies are more highly regulated today than 25 years ago because they are now required to sell services to their competitors at (regulated) cost-based prices.

There has been progress, though: long-distance providers compete for service, wireless rates are fully deregulated, and consumers can purchase equipment at unregulated prices. It is disappointing that deregulation has not spread much further across the telecom landscape.

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THE COST OF TELECOM REGULATION

Economic regulation, if effective, may constrain monopoly pricing. But the potential gains from such regulation must be weighed against its costs. Those costs are of three varieties:

- Stunted incentives that reduce the productive efficiency of the regulated firms.
- Distorted prices that reduce allocative efficiency.
- Slowed deployment of new technologies and restrained entry of new firms, which reduce dynamic efficiency.

Telecommunications regulation has produced all three of those costs. By the late 1980s, the Federal Communications Commission itself recognized the deleterious effects it was having on productive efficiency and began to shift from cost-based regulation to price caps. The increase in economic efficiency that resulted has not been estimated with precision, but it is surely billions of dollars per year.

Federal and state regulators also created a distorted rate structure to promote "universal service." Economists have estimated that the rate structure cost the economy approximately $10 billion per year in the 1980s. Those pricing policies remain in place today, although in less extreme form. Additionally, the FCC has often been slow to approve the use of new technologies; for instance, the agency delayed the introduction of cellular telephony until 1983, at a cost to consumers that MIT's Jerry Hausman estimated to be as much as $50 billion in one year. Hausman also estimated the cost of the FCC's refusal, until 1990, to allow the Bell companies to offer voice-messaging services totaled $5 billion per year.

In short, the costs of telecom regulation have been very high. It is doubtful that the economic welfare gains from controlling monopoly power could be nearly as great, particularly today. The only possible locus of monopoly power in mod-

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ern telecommunications lies in the provision of access to the network, i.e., local service. Yet, most U.S. consumers would have a substantial number of choices for voice and low-speed data access even if there were no regulation: at least one wire-based telephone carrier (perhaps more), numerous wireless carriers, and maybe even a cable-television operator. For higher-speed Internet access, most U.S. consumers already face a choice among three or more services: cable modem services provided by local cable operators, Digital Subscriber Line (DSL) service provided by the local telephone company, and satellite service. In addition, there are fixed wireless systems that might be deployed more widely today if not for regulation.

In this environment, it is very difficult to conclude that regulators are providing consumers with much protection from monopoly pricing. It is even more difficult to argue that the benefits — if they exist at all — offset the obvious costs of regulation.

THE TELECOM SECTOR IN 1977

At the time that *Regulation* magazine first appeared, the United States and Canada stood alone among developed countries in having privately-owned telephone systems. Despite their ownership, the systems were very much under government control, regulated under the traditional rate-of-return methodology.

The winds of change were starting to blow, however, as entrants began to appear in the United States, pleading to be allowed to compete with AT&T in long-distance services. Microwave had largely replaced wires as the transmission technology of choice for longer distances, reducing entry costs and scale economies. And long-distance rates had been kept very high by regulators who preferred to create huge margins in long-distance to defray a substantial share of the costs of the local network. By keeping local rates for residential connections low even to this day, regulators satisfied the politicians and deflected any potential interest in competitive entry into local telecommunications.

But doubts were arising among the regulators. In a world in which some large businesses could own their own microwave circuits, how could the Federal Communications Commission be sure that AT&T's rates for business services would be based on costs? Might it not try to reduce rates for large customers, thereby disadvantaging the smaller businessman? The doubts led the FCC to approve the entry of a "specialized" long-distance carrier (MCI) that was allowed to offer only dedicated business connections, not ordinary long-distance service. The FCC hoped that MCI and the later entrants would provide it with market evidence on the degree to which AT&T's business tariffs were discriminatory. The goal was, and still is, "optimal regulation."

Long-distance competition Unfortunately for the FCC, the entrants understood where the money was: ordinary long-distance services. The regulators had allowed long-distance rates to exceed costs greatly, so as to create a source of subsidy for more-

expensive-to-provide local residential connections. The excuse for that distortion was that it would promote "universal service," but the truth is that low residential rates have very little effect on customers' decisions to subscribe to telephone service.

Enticed by the deliberate rate distortions, MCI began in 1974 to offer businesses regular switched long-distance service — the ability to call any number — without FCC approval. The FCC responded by seeking a federal court order to banish MCI from that business, but over the next four years the commission would lose every court battle on the issue.

When MCI and other entrants began to offer long-distance services without FCC permission, AT&T used its ownership of local telephone service companies, such as New York Telephone or Pacific Bell, to block long-distance competition by frustrating the entrants' attempts to connect with AT&T's customers. Without access to the local lines — AT&T controlled 80 to 85 percent of the country's local subscriber lines — the entrants simply could not provide service.

As the FCC was pursuing its case against MCI's entry into long distance, the Justice Department was hearing from the entrants that AT&T was frustrating their attempt to compete in long distance. Earlier antitrust cases against AT&T had been threatened and even brought, but settled quietly due to AT&T's political clout. This time, a post-Watergate Justice Department felt no such political constraints and filed a Sherman Act monopolization suit against AT&T in late 1974, charging it with restricting competition in long-distance services and telephone equipment.

Equipment At about the same time, the FCC decided that competition was a good idea in the provision of subscriber equipment. There was no need to let AT&T and its brethren in the regulated local telephone business control the supply (and even the color) of telephone handsets or other equipment. State regulators, who had the authority to control intrastate telephone services, did not agree, but they eventually lost their case in a 1978 federal court decision.

Cellular I will not describe the market for cellular wireless services in 1977, because such a market did not exist. By that time, the FCC had decided to establish a cellular telephone duopoly in each local market. The agency was prepared to give one license to the incumbent local telephone monopolist, usually an AT&T company. Unfortunately, it would take the commission several years to figure out how to give away the other licenses.

THE AT&T CASE AND ITS AFTERMATH

The *AT&T* monopoly suit languished until 1981, when Reagan appointee William Baxter took it up. Baxter pressed the case and refused to give up until he had convinced AT&T that it would lose, thereby inducing AT&T to agree to a draconian 1982 consent decree. The decree required the telecom giant to divest itself of its local phone companies, thereby separating the monopoly "bottleneck" from the potentially competitive equipment and long-distance sectors. The Justice Department reasoned that if the divested local companies were forbidden to offer long distance and to manufacture equipment, they would presumably have no incentive to discriminate against AT&T's competitors in long distance and telephone equipment. Competition would flower in the latter sectors, and the local companies would remain regulated islands and not be able to export their monopolies to adjacent markets. At least that was Justice's theory.

AT&T kept the equipment manufacturing division, later christened "Lucent," and much of Bell Labs. (Fortunately for its stockholders, AT&T eventually spun off Lucent before that firm became the lender of last resort to most under-funded entrants into telecommunications in the late 1990s.) The local telephone service was spun off into seven "Baby Bells."

After some consolidation, the Bell companies evolved into the foursome of Verizon, SBC, Bell South, and US WEST (now part of Qwest). For the next 12 years, the divested companies were banned from equipment manufacturing and the provision of long-distance services. They would only be freed from that straightjacket if they could demonstrate that competition had emerged in local services — an impossibility because state regulators kept the price of local service artificially low and otherwise frustrated competitive entry into local markets. The result was an expensive deadlock that would require legislation to break.

THE 1996 TELECOMMUNICATIONS ACT

The first 12 years after the *AT&T* decree were marked by continuing controversy over its enforcement. The vertical fragmentation required by the decree has not been tried in any other country, and for good reason: the boundaries between "long-distance" and "local" services cannot be easily defined in a world of rapid technical change. For instance, is my connection to the Internet a "local" or "long-distance" service? More importantly, why should anyone care? And, in that changing world, when does research and development cross into "manufacturing," or when do telecommunications services cross the line into "information services"? Lawyers could (and did) argue for years over those issues.

Given the benefits of integration in telecommunications networks, Canada and the European Union have wisely chosen not to break up their telephone companies. Instead, they simply require the incumbent firms to interconnect in a nondiscriminatory fashion with their new rivals. Many of those countries have achieved competitive results much more quickly than we did in our years of protracted litigation. Their lawyers are poorer, but their consumers are better off.

The divested Bell companies and their long distance nemeses — AT&T, Sprint, and MCI — spent enormous sums arguing in endless proceedings before the federal court that supervised the decree. The Bell companies wanted to exploit new technologies and offer new services; the long-distance companies wanted them bottled up forever. The backlog of petitions before the court began to result in years of waiting for a court ruling while markets were evolving. The Internet began to grow like wildfire. Digital switches with remarkable capabilities were developed. But would the Bell companies be allowed to move Internet packets across the quarantine boundaries established by the decree, and could they offer voice messaging or other information services?

Because the long-distance companies did not want Bell competitors in their markets, they argued for continued balkanization of the U.S. telecom sector. The Bell companies, for

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their part, could only argue that technology and a court decision had changed the environment, making discrimination far less likely than it had been before 1974. The state regulators were not going to allow local competition; therefore, the Bell companies could not have responded to the implicit incentive in the decree to allow local entry, even if they so desired.

Congress steps in The telecom policy logjam was finally broken by legislation. Congress brokered a deal between the Bell companies who wanted to be unshackled from the AT&T decree's constraints and the long-distance companies who thought they could enter local services if regulators were to let them. The 1996 Telecommunications Act opened all telecom markets to competition and ended the *AT&T* decree. Unfortunately, it did not take the next step of mandating the deregulation of rates. Instead, Congress established a complicated set of regulations that it thought would accelerate entry into local telecom markets.

Without pausing to ask which, if any, local telecom network facilities are essential bottleneck facilities, Congress enacted complicated provisions requiring the established local companies, Bells and non-Bells alike, to share their networks and services with entrants at regulated, cost-based rates. The FCC was given the task of deciding which of the incumbents' facilities should be made available to entrants and how to divine the cost of such facilities. The commission took the simple course of deciding that virtually every component of established networks should be made available, and at prices that reflect forward-looking costs. In the alternative, the entrants could simply resell the established carriers' services, which are to be made available to them at wholesale rates that are about 18 to 22 percent below retail rates.

The Bell companies had thus been freed from the restraints of the *AT&T* decree. But now they would have to demonstrate on a state-by-state basis that they are complying with the Telecommunications Act's complex requirements for easing entry into their local markets before they could offer long-distance service. Under the act, the Bell companies would have to persuade each state commission, the U.S. Justice Department, and the FCC that they are in compliance with all requirements. That mandate has led to further growth of the legal cottage industry that developed in enforcing the *AT&T* decree. Scores of lawyers and consultants lined up to argue over every detail of the Bell companies' procedures in leasing facilities, handling orders, and transferring customers. The telecommunications bar may be the only clear winner from the 1996 Act.

The act did not deregulate telecommunications, though thankfully it ended an embarrassing regime of regulating cable-television rates. It could have fully deregulated long-distance prices, but representatives of rural states fought to require geographically uniform rates. Under the act, the price of a 450-mile call between Cheyenne, Wyo., and Billings, Mont., must be the same as one between Washington and Boston, even if the cost per minute is much lower in the dense Northeast corridor.

Congress could at least have required deregulation of all new services on the grounds that the incumbents have no first-mover monopoly advantage in those services, but it did not. It could have instructed state regulators gradually to eliminate the cross subsidies in the local rate structure and then close their entire regulatory apparatus, but it did not. It could have phased out all regulation — intrastate and interstate — over time, but it did not.

At least the 1996 Act left wireless services unregulated. Congress had forced open the wireless market in 1993 by requiring the FCC to begin auctioning spectrum so as to reduce the federal government deficit. The auctions have raised billions of dollars for the federal government, a dubious achievement, and have led to the development of six national wireless carriers who compete without the guidance of the regulators, a much more important outcome. The 1993 Budget Reconciliation Act that freed the spectrum also required that the states not regulate wireless rates unless the carriers have market dominance. They do not; therefore, the states must desist. The result has been a competitive free-for-all in which wireless rates have tumbled from 50 cents per minute to the 10-to-15-cent range in peak hours, and much lower in off-peak hours. The capitalized rents in wireless carrier stocks have now virtually disappeared.

THE LAST SIX YEARS

The 1996 Act coincided with, and perhaps fed, one of the more remarkable stock-market booms in history. The S&P500 rose 140 percent between December 1995 and December 1999, while the technology-driven NASDAQ average rose nearly 300 percent. Among the beneficiaries of that wave of optimism were the new entrants into telecommunications. Fed by the Internet boom and its demand for connectivity, the new Competitive Local Exchange Carriers (CLECs) had a market capitalization of more than $100 billion at the end of 1999, or roughly that of the Big Three automakers. By the end of 2001, the bubble had burst and the CLECs that remained were worth a bare $8 billion on the equity market.

The frenzy of competitive entry that saw the new companies invest more than $35 billion in capital facilities in the first five years after passage of the 1996 Act has now settled down into a struggle for survival among the remaining entrants. Without a roadmap for success and with little new to offer, most entrants rushed in to lease their larger incumbent rivals' facilities at the low short-term rates set by regulators. The incumbents may have been operating inefficiently due to generations of incentive-reducing regulation, but they were not earning monopoly rents for their stockholders. Given the large startup costs and the understandable difficulty in attracting customers from reliable incumbent services to the offerings of an unknown, the entrants faced a daunting set of challenges.

Unfortunately, the social cost of the act's competitive architecture has been enormous. The Bell companies have been kept out of long-distance services for a number of years, thereby depriving consumers of billions of dollars per year in the benefits of lower long-distance rates. The pressures on their margins that the long-distance carriers are now experiencing could have developed years ago. The cost of continual regulatory strife before state commissions, the FCC, and the courts has added substantially more to those costs. But the largest cost of the act may have been its restoration of cost-based regulation and the extension of regulation to new services.

Prior to 1996, the FCC and state commissions were moving

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away from cost-based regulation to price caps, decoupling prices from the year-to-year movements in overall carrier costs. Price caps are known to accelerate innovation and potentially to allow for a rationalization of a distorted regulatory rate structure. Unfortunately, the 1996 Act moved away from that approach, placing state and federal regulators in the position of trying to control both the wholesale and retail rates of the incumbents in an attempt to facilitate entry. Detailed cost models are built for that purpose, often requiring several years, and then adjusted if they do not achieve the desired amount of entry.

In many states, the incumbent is forced to lease its entire "platform," or full complement of network facilities, to entrants at rates that are far below any conceivable cost of building and amortizing a new network. That is the reason that entrants build their own facilities for only about one-third of their lines. MIT's Hausman has demonstrated that the low rates on "sunk" facilities convey a very large "free option" to entrants, reducing the incentive of incumbents to invest. While the incumbent Bell companies understandably first advanced that argument in the regulatory arena, it is now widely accepted by economists.

THE GROWTH OF COMPETITION

Entrants rushed in to gobble up venture capital in the first four years of the act's existence, but a large number of them are now somewhere in the process of proceeding through bankruptcy. Nevertheless, the 1996 Act cannot be judged to be a failure at this juncture, even if it is flawed. Entry into any erstwhile-protected market is likely to result in numerous failures as the entrants find their way. Given the rapid technological change in telecommunications and the huge costs of building networks, bankruptcies are much more likely than in the mundane sectors that were subject to earlier deregulation exercises, such as trucking and airlines. Investing in expensive wire-based local telephone networks just to share the limited fruits of voice telephony is likely to be a losing strategy. As a result, the focus of competition has shifted to new services, such as broadband Internet connections. Along the way, competition has also intensified in wireless services and long-distance voice/data services. It is useful to have some numbers to understand just how much progress has occurred.

Long Distance When AT&T was broken up, regulators awoke to an embarrassing fact: They had so overpriced long-distance calls to defray local costs that they now faced a very real danger that an independent AT&T and the other long-distance companies would try to "bypass" the divested Bell companies for larger customers' connections. At the time of divestiture, a long-distance carrier was charged more than 17 cents per minute to pay for local connections at each end of an interstate call. That was far above the marginal cost of connections by anyone's guesstimate, and probably above the marginal cost of the entire call. As a result, the FCC began to move to reduce access charges by assessing fixed, monthly charges on customers in lieu of the extraordinarily high per-minute connection charges. At first slowed by Congress, the FCC has persevered over the last 17 years and reduced carrier access charges to about 1.5 cents per minute of conversation.

In addition, competition has intensified in long-distance services since 1984, but particularly in the last few years. The largest three carriers' share of long-distance revenues has declined somewhat, as shown in Table 1. The Bell companies have begun to gain entry into long distance in such states as Texas, New York, and Massachusetts. And state regulators have been forced by the 1996 Act to allow entry into intrastate long-distance markets. Finally, the wireless carriers are now competing aggressively for long-distance revenues. The result has been a sharp drop in the price of long-distance service over the past few years, even greater than the decline in carrier access charges would suggest.

Nominal interstate rates declined at an average rate of 2.7 percent per year between 1984 and 2000, but the real rate of decline, adjusting for inflation, was 5.8 percent per year. By comparison, rates had been falling at a real rate of 4.6 percent per year between 1970 and 1984 — a period in which AT&T had enjoyed a virtual monopoly in long-distance services. Therefore, the decline in long-distance rates achieved under competition has been somewhat greater than that achieved in the 14 years prior to divestiture. The decline in the margin over access charges, even as late as 2000, reflects substantial monopoly rents that are slowly being squeezed by competition. The sharp decline in the share prices of long-distance carriers in recent years suggests that the financial markets now recognize that fact. Further downward pressure is on the way from the Bell companies and wireless carriers.

TABLE 1

The Effects of Competition

Selected long-distance data, 1972-1999

Year	"Big Three"* share of revenues (%)	Average revenue per minute (current $)	Access charges per minute (current $)	Revenue per minute minus access charges (current $)	Revenue per minute minus access charges (1982-84 $)
1984	73.8	0.32	0.173	0.147	0.141
1988	69.8	0.23	0.105	0.125	0.106
1992	71.8	0.19	0.069	0.121	0.086
1996	73.0	0.16	0.061	0.099	0.063
2000	64.4	0.12	0.024	0.096	0.056

*Includes AT&T, Sprint, and WorldCom (including both MCI and WorldCom prior to merger). Source: FCC, *Trends in Telephone Service*, August 2001.

Wireless The wireless telecommunications sector receives less attention than traditional wire-based telecom in large part because regulators are forced to leave it alone. That is fortunate because the wireless sector has performed extraordinarily well, especially since the passage of the 1996 Act. Most of the improved performance is attributable to the sharp increase in competition caused by the auctioning of sufficient spectrum to increase the number of carriers in each market from two to six. The auctions began in 1995, and the winning bidders

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TABLE 2

The Wireless Era

Users and costs, 1986-2000

Year	Wireless subscribers (millions)	Wireless telephone access lines (millions)	Average wireless bill (dollars per month)
1986	0.68	120.78	N/A
1988	2.07	126.95	98.02
1990	5.28	134.74	80.90
1992	11.03	142.43	68.68
1994	24.13	151.61	56.21
1996	44.04	165.42	47.70
1998	69.21	180.47	39.43
2000	109.48	N/A	45.27

Source: CTIA, FCC.

began to build their networks shortly thereafter. Wireless rates soon began to plummet.

The growth of wireless subscribers has continued unabated for the past decade or more, as shown in Table 2, and will soon equal the number of subscribers to ordinary wire-line voice telephony. The cell phone will become a virtually perfect substitute for the wire-line connection for voice and low-speed data calls. The average wireless bill declined through 1998 in the face of increasing competition, even though minutes of use expanded. Since 1998, the average bill has begun to rise once more, not because rates have stopped declining, but because wireless users are beginning to use their cell phones to bypass traditional long-distance service. As a result, long-distance rates are now falling to single-digit territory in terms of cents per minute.

The shift to wireless long distance began in 1998 when AT&T's wireless division initiated a new pricing plan that would reverberate throughout the entire telecommunications sector. Its "One Rate" plan offered AT&T wireless customers a single rate for all calls made within the United States without regard to the originating location. The other national carriers followed suit shortly thereafter. As a result, subscribers who were away from home could use their much-more-convenient cell phones to make long-distance calls rather than being forced into using high-priced credit card calls or pay telephones. The national plans even allowed subscribers to avoid making expensive intrastate calls over their home or business telephone, thereby frustrating state regulators' continuing attempts to have long-distance calls defray the costs of the local network.

Local competition By the middle of 2001, the local telephony entrants had garnered nine percent of the country's telephone access lines, but only one-third of that capture was accomplished over an entrant's own facilities. (See Figure 1.) The entrants' new lines were built in areas of high population density, often with large business concentrations, because the regulatory rate structure has generally kept urban residential rates and business rates above cost while forcing the carriers to offer service to the rest of the country at subsidized rates.

Two-thirds of the entrants' lines are currently either leased from incumbents ("unbundled network elements" or "UNEs") or simply reflect the resale of the incumbent's own services. It appears that entrants' heavy use of leased facilities will not be disrupted anytime soon; a May U.S. Supreme Court decision rejected a regional Bells' challenge to the leasing scheme and its price-setting standards.

However, no one has demonstrated that resale or lease of incumbents' lines can be a successful business strategy. Already, many entrants using such a strategy have been forced to abandon the chase.

Cable The cable television and long-distance companies might have been expected to invade local telephony, but they have discovered the lack of returns to such a venture. AT&T has been notably unsuccessful, attempting first to execute a resale strategy. When that failed, the firm launched Project Angel, which utilized a fixed wireless technology. When even its angels seemed to be failing, it resorted to buying two of the three largest cable television companies in the country, TCI and Media One, at enormous premiums. All of those strategies failed. AT&T has all but abandoned resale, closed Project Angel, and spun off the cable companies into a separate broadband entity at a large loss.

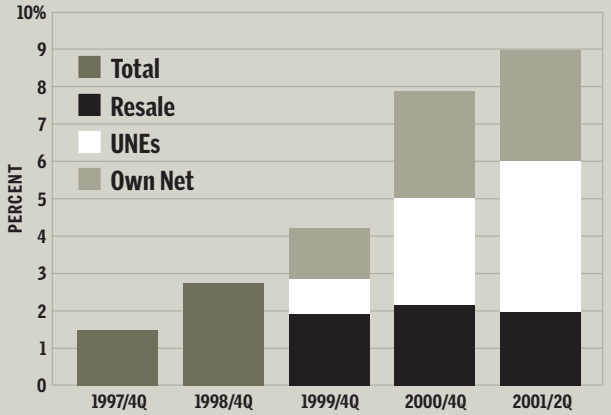
The other cable companies have begun to enter local telephony slowly, but most seem to be waiting for Internet telephony technology to improve. They simply do not wish to attempt to replicate the local telephone companies' older circuit switched architecture just to try to garner a share of the mundane revenues that are available from residential voice telephony, given a regulatory policy that keeps the incumbents' local residential rates low.

Arbitrage? Almost from the beginning, it appeared that local telecommunications competition would begin as an extensive exercise in regulatory arbitrage. Entrants presumably would attack the markets that regulators had set up as the source of cross-subsidies, namely business services and long distance. Given that regulators had not allowed retail rates to adjust towards

FIGURE 1

Reaching Out

Competitive carriers share of access lines



Source: FCC.

cost but had required that wholesale rates be somehow related to cost, the prospects for regulatory arbitrage seemed boundless.

But the arbitrage has not developed as aggressively as one might have expected. Local residential rates have not risen and business rates have not fallen, as shown in Table 3. As of June 2001, large businesses and institutions accounted for only slightly more than half of the entrants' lines. Moreover, the average revenue per entrant line appears to be falling and may now be less than the incumbents' revenues per subscriber line.

It is possible that large businesses are not enticed by the prospect of shifting their communications lifelines from stable incumbents to undercapitalized, inexperienced entrants. That is a problem that startup airlines or trucking firms did not face; if the new carriers failed, their customers could easily shift back to the incumbent carriers. In the case of telecommunications, such a shift of vendors can be a traumatic experience, costing a firm days or weeks of adjustment and loss of internal efficiency.

At this juncture, no one can know how competition will unfold in local telecommunications. It is likely that once the Bell companies are fully admitted into long distance, the distinction between local and long-distance service will disappear. As in the wireless sector, the local companies will simply offer an integrated service, allowing a fixed amount of use per month or even unlimited use. After all, the cost of transmitting a call to China or Russia is now measured in tenths or hundredths of a cent per minute. As more rational policy develops, assuming the regulators allow it, competition will develop in earnest between ubiquitous wireless services and ubiquitous wire-line services. It is likely that the long-distance carriers, such as AT&T, WorldCom, and Sprint, will simply wither away or be acquired by other companies, including perhaps the Bell companies. In the future, we are likely to look back on long-distance service as an exercise in regulatory arbitrage begun by MCI when the FCC and state regulators misguidedly let long-distance rates remain high to cover the cost of local service and ended by the entry of wireless carriers and local Bell companies into the "long distance" fray.

Broadband Today, all participants in telecommunications are focused on the new broadband services for delivering content over the Internet without a "world wide wait." Those services may be delivered to residences through cable modems, by telephone companies over DSL, through wireless connections, or by satellite. At present, a little over 10 percent of households have opted for one of those services, two-thirds of which obtain it through cable modems.

Cable television systems have a substantial advantage in offering broadband because they are able to do so without the intervention of regulation. The incumbent telephone companies, on the other hand, must offer such services at a rate that is approved by federal or state regulators. They also must spend billions of dollars to modify their networks to support widespread DSL service, but they could be forced to lease the upgraded facilities to their rivals on a month-to-month basis at forward-looking costs. It is hardly surprising that, under those conditions, some of the incumbents have been hesitant to invest in upgrading their networks to allow more widespread diffusion of DSL. Legislation has passed the U.S. House of Representatives to deregulate incumbents' offerings of DSL, but it appears stalled in the Senate. The FCC, however, may finally move to deregulate the new services under the authority granted to it by the 1996 Act.

Broadband may well provide the opening that competitors need to compete with the incumbent local telephone companies. At present, the services offer residences speeds that vary between 200 kilobits per second to perhaps 1.5 megabits per second. With current digital compression technology, the speeds are probably not sufficient to allow real-time video transmissions over the Internet for anything but the slowest-moving entertainment. However, someone may soon bring optical fibers directly to the home, allowing households to receive upwards of 20 megabits per second. Such a service would require the household to have equipment that could convert the optical signals into the electrical impulses required to communicate with computers, television sets, or other receivers. That potential transformation could provide entrants with a market opportunity far greater than fighting for a share of voice telephony connections.

IS DEREGULATION LIKELY?

The rapid rate of technical change in telecommunications and the continuing development of widespread competition among large local telephone companies, wireless carriers, satellites, and even cable television must call into question the need for any regulation in this sector. There is no obvious "natural monopoly" in telecommunications today; perhaps there never was one. Regulators have succeeded in distorting rates and holding back technical progress, generally in the pursuit of keeping residential users' local telephone charges low, particularly in rural areas. But even they may wish to talk to someone in China at a reasonable price, watch a movie over the Internet, or play video games with friends on the other side of the country.

We are now far removed from the time when the regulators and AT&T could agree on the political structure of telephone rates without worrying about the competitive consequences of their decisions. International companies like Vodafone and Deutsche Telecom are now active competitors in the U.S. telecom market. There are six national wireless companies, two major satellite companies, and scores of entrants trying to deploy new fiber-optic networks across the country and in most of the major metropolitan areas.

Previous experience with the Interstate Commerce Commission and the Civil Aeronautics Board has taught us that regulated competition is much worse than no regulation at all. We should now apply that lesson to telecom. We have come R

TABLE 3

Little Local Change

Average local residential and single-line business rates in dollars per month, 1993-1999

Year	Residential rate	Single-line business rate
1993	19.95	42.57
1994	19.81	41.64
1995	20.01	41.80
1996	19.95	41.81
1997	19.88	41.67
1998	19.76	41.28
1999	19.87	41.00

Source: FCC.

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a long way since 1977, but there are still many miles to go

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