

PUBLIC POLICY IN TELECOMMUNICATIONS: THE THIRD REVOLUTION

Gerald R. Faulhaber*

Abstract

Telecommunications has undergone two major revolutions and is currently undergoing its third and potentially its greatest revolution. In each case, technology and markets drove the revolution, pressing against existing public policy constraints. Eventually, public policy adapted to these revolutions, but at significant economic cost. Public policy will continue to play a crucial role in telecommunications for the foreseeable future, especially as it (perhaps) evolves into the multimedia information infrastructure envisioned by many. However, *appropriate public policy mechanisms* to ensure the maximum contribution of this sector to national income will be significantly different from today's policy institutions.

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* Professor, Department of Public Policy and Management, Wharton School, University of Pennsylvania, Philadelphia, PA 19104.

Telephone: (215) 898-7860

Fax: (215) 898-9463

Internet: faulhaber@wharton.upenn.edu

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I. Introduction

Telecommunications has undergone two major revolutions and is currently undergoing its third and potentially its greatest revolution. In each case, technology and markets drove the revolution, pressing against existing public policy constraints. Eventually, public policy adapted to these revolutions, but at significant cost (in direct costs, delays, and market distortions). Today, the public policy “solutions” to the last revolution, such as the Modified Final Judgment, have become impediments to achieving the potential social welfare benefits of the pending revolution.

Public policy will continue to play a crucial role in telecommunications for the foreseeable future, even (particularly!) as it (perhaps) evolves into the multimedia information infrastructure envisioned by many. However, ~~the~~ *appropriate public policy mechanisms* to ensure the maximum contribution of this sector to national income will be significantly different from today’s appropriate policy mechanisms, such as the MFJ, state regulation, etc. The existing mechanisms will constitute a barrier to the evolution of newer, more appropriate mechanisms, and will almost surely impede (if not stop) the revolution and the benefits it can bring to the nation.

The use of the terms “technology” and “revolution” might lead some to believe that this paper’s thesis is that technological innovation drives everything, sweeping away all constraints. Nothing could be further from the truth; it is part of this paper’s thesis is that technological change is a process mediated via markets, and via public policy, in order to bring its benefits and costs to the public. With all technological innovation, markets perform a rigorous, indeed ruthless, screening process, often leaving engineers’ dreams in the dustbin of consumers’ rejects. With innovation focused on regulated industries, additional impedance can be inserted into the mediation process, based on political and administrative preferences rather than on consumer needs and desires.

It is the thesis of this paper that while the market leads to a generally effective sorting of innovations based on consumer values, history shows us that public policy has led to inordinate delays of effective innovations reaching the market. We are currently at what appears to be a significant opportunity for new technology to contribute to a national well-being. Now is the time

to make the conscious decision to abandon policy mechanisms, such as the MFJ, that served us well in a former era, before they become counterproductive.

II. The Rise of the “Bell System” Regime: Technology, Markets, and Public Institutional Response, 1915-1960¹

The early years of the telephone industry (1876-1915) belied the regulated monopoly it was to become. The years directly following the telephone’s invention by A. G. Bell saw substantial struggle over patent rights, with others (including Thomas Edison) claiming first invention of the device. The holders of the rights to Bell’s invention eventually won, and the industry developed as a monopoly during the life of the basic Bell patents. Telephony at this stage consisted only of what we call today “local service:” calling from one telephone station to another within a geographically delimited calling area (the “exchange”). Initially, copper wire connected each instrument to a “central office,” which consisted of a telephone operator and a switchboard. By the end of the 19th century, automatic switching (the step-by-step, Strowger, switch) was introduced in many exchanges.

During the life of the Bell patents, the monopoly over the telephone instrument was quite lucrative for their holders. However, the expiration of these patents in 1892-93 saw a rapid increase in competition to the American Bell Company in virtually all of its exchanges. This increase in competition naturally brought with it significantly lower prices for service and a significant decline in American Bell profits. By the early 20th century, the American Bell Company was in serious financial difficulty. In 1907, investment bankers holding much of Bell’s low-valued financial assets placed Theodore N. Vail, a nationally-recognized telephone management expert, in charge of the firm. Over the next decade Vail instituted the “first revolution” in telecommunications: the transformation from an industry based on highly competitive local markets for a business/luxury good based on a readily available technology, to an industry based on a regulated monopoly of a national market for a mass consumer good based on high technology. Vail summed up his strategy in his corporate motto: “One System, One Policy: Universal Service.” His intent was to turn the industry into a monopoly, albeit a regulated one, whose mission would be to bring telephone

¹ The historical material of this section is covered in many works; see, for example, Faulhaber (1987).

service to every household and extend the reach of the telephone across the country and across the world.

Several social currents that were strong at the time fit well with this strategy:

- The original basis of the telephone had been the technological innovation of the telephone instrument; Vail saw the next leap forward as long-distance service, which entailed *new* innovations. In order to keep the telephone monopoly strong, it needed to gain control of the day's high technology: radio, vacuum tubes, switching, etc., as it had with Bell's original invention.
- The corporate giants of America were beginning to turn their attention to the mass market. Railroads, farm equipment, even automobiles bent their efforts to get their products and services into the many hands of the masses. Transforming telephone from a business and rich-consumer service into a mass market item fit well with industry trends of the time, such as Henry Ford's Model T for the masses.
- The American public had grown suspicious of the large "trusts," and had turned to its governments to control what many perceived to be unbridled corporate power beyond anything Adam Smith had envisioned. The institutions of antitrust law and economic regulation came of age in this era as an expression of this populist concern with this relatively new form of capitalism. Vail's strategy was to cooperate with (perhaps co-opt) these new forms of social control, seeking to gain protection from competitive entry in return for price controls.

Universal service was the watchword uniting Bell System managers, employees, and regulators in a common mission. It justified huge capital expenditures, substantial investment in R&D, protection from competitors that could distract the Bell System from its social mission, and a guarantee of an adequate rate of return needed to finance this endeavor. The invisible hand of vigorous competition of the 1890's-1900's was foregone for the more visible hand of regulated monopoly. This was the Bell System.

It can be argued whether the Bell System was the *optimal* solution to the economic and social problem of developing the national telecommunications infrastructure ("universal service"). However, it is clear that it certainly *was* a solution; by the 1960's, over 90% of US households had telephones, and the mission had been accomplished. The regime of high technology and strict

regulation had maintained the monopoly. Few firms could match the technological leadership of Bell Laboratories in this field, and so did not have the products and services needed to challenge the Bell System in its market.² Further, even if they had, regulation presented yet another barrier to entry. In combination, these two barriers sustained the Bell System monopoly into the 1960's.

The task of putting into place the corporate resources to effect this change was Herculean, and occupied Vail throughout the remainder of his life. The strategy was effectively in place by 1915. However, the public policy mechanisms required of this new regime took much longer to put in place. Telephone market power was constrained first by regulation and second by antitrust. Antitrust was used sparingly but effectively in telecommunications in the first quarter of the 20th century. The explicit threat of antitrust action in 1913 ended Vail's "buying spree" of competitive exchange companies. However, further antitrust activity in this industry was not forthcoming until the 1949 case against the Bell System.

Regulation was a new institution in America, and took several decades to evolve. Much of the impetus for regulation was the development of electric power utilities in American cities. The first decade of this century saw a battle between states and municipalities for political control of electric utilities, with states eventually winning regulatory control.³ The first public utility commissions were established in Wisconsin and New York, in 1908 and 1909, respectively. Telephone regulation became part of the new commissions' charters, though by no means their main line of business. While regulators strictly maintained restrictions against entry, it is not clear how vigorously telephone rates were controlled during this early period. Regulation of interstate services were beyond the jurisdiction of the local commissions, and hence interstate long-distance

² In addition, the Bell System was party to the Cross-Licensing Agreement of 1920 (negotiated in 1926) by which the major electrical/electronic producers in America agreed to share all patents in return for which each was granted exclusive rights to exercise those patents in a specific market (public telephony in Bell's case). This agreement functioned until the late 1940's, and effectively eliminated entry into telephony from the only firms capable of doing so. See Reich (1977).

³ For a brief history of the political origins of state regulation, see Anderson (1980). For an account of the intellectual origins of regulation, see McCaw (1984).

service remained an unregulated monopoly until 1934, when the Communications Act established the Federal Communications Commission.

The public policy response, then, was substantially slower than the technological and market response to changing conditions. Though the private side of regulated monopoly was in place before World War I, the public side of regulation was not fully in place until World War II. The form of regulation was not settled until the famous *Hope Natural Gas* case of 1944, which established the fundamentals of so-called rate-base rate-of-return regulation, which dominated utility regulation of all kinds in postwar America. As the industry regime involved a highly capital-intensive monopoly, regulating its price on the basis of its capital investment fit the model quite well. Rate-base rate-of-return regulation was by no means perfect, and the institution has always had its detractors, but in the days of a capital-intensive monopoly supplier it is not clear what other policy choices could outperform it. Again, it is not clear that rate-base rate-of-return regulation was the *optimal* policy response to this regime, but it was at least a *workable* response, at least through the 1950's.

It is virtually impossible to assess the cost associated with the leisurely pace of public institutional development in telephony. Could more vigilant state commissions have forced lower rates for basic service and thus increased the rate of household penetration? Would earlier regulation of interstate long-distance service led to lower rates and therefore less deadweight loss?

⁴ Rate-base rate-of-return regulation is considerably older than 1944; however, much legal wrangling ensued over decades concerning how this form of regulation was to work in order to be “fair” to both regulated utilities and their consumers. The *Hope* case settled the conceptual issues involved.

⁵ *Smith v. Illinois Bell Tel. Co.*, 282 US 133 (1930) permitted regulators to use revenues from long-distance services to cover costs for local service, arguing that such costs were joint, and that such use of long-distance revenues allowed lower rates for local service which encouraged households to subscribe to the service, enhancing universal service. While this argument is economically suspect, it was widely believed. Yet it took over twenty years from *Mail*'s proclamation of the Universal Service objective to implementing a means that was perceived to accomplish it.

⁶ “Deadweight loss” is the term economists use for the economic loss of value associated with the ability of a monopolist (or any firm with market power) to hold price above cost. This action has two effects: (

period of time? Some economists, disposed to believe in the efficacy of regulation, would think this cost of delayed and incomplete regulation to be large. Other economists, disposed to believe that regulation makes things worse, would think that delayed and incomplete regulation was a social benefit, not a cost. We take no position on this, but simply note that regulation was perceived as the appropriate public policy response to the new regime, and its full implementation considerably lagged the private response. The compelling evidence of lag in the development of public institutions to accommodate the new technological and market regime of the early twentieth century supports the hypothesis set forth in the Introduction.

III. “Close Calls”: the Regime Survives Potential Challenges.

That a strategy implemented in the first decade of the twentieth century could change the regime of an important American industry for over fifty years is unparalleled in modern business history. The success of this strategy is in part due to the genius of Theodore Vail and in part due to incredible luck. Twice during this period, technologies emerged that could have upset the regulated monopoly regime, but did not. Both of these “close calls” involved wireless technology. It is worth a brief review of each event, as it illuminates the role of public institutions in preserving an existing regime in the face of a potential challenge.

Radio The commercial development of radio in the 1920’s took a rather different turn than scientists, engineers and businesspersons had expected. Originally, radio was seen as a means to extend communications to ships; i.e., a point-to-point service where wires could not reach. The advent of broadcast radio in the early 1920’s was a wholly unexpected commercial use of the medium. During this period, neither public nor private institutions were able to cope with the new markets. Both technical and market chaos reigned; radio operators broadcast interfering signals, few knew how to make the new medium pay, and little capital flowed into the business. By 1927,

those consumers who buy at the higher (than cost) price, who lose value that is transferred to the firm; and (ii) those consumers who do not buy at this higher price, but would buy if price were equal to cost. The first effect results in a transfer of value from consumers to firms; the second effect results in a loss of value by these consumers. This loss is referred to as “deadweight loss,” reflecting the fact that above-cost pricing actually destroys value (as opposed to simply transferring value from consumers to firms).

the beginnings of networks appeared, and the Federal Radio Commission was granted authority to allocate radio spectrum among users.⁷ In 1934, radio broadcast regulation (including spectrum allocation) was subsumed in the mission of the Federal Communications Commission.

For several reasons, this new technology had little impact on telephony: (i) the market was entirely different; broadcast radio is a mass entertainment market involving one-way communication, while telephone is an individual point-to-point market involving two-way communication; (ii) radio technology was of little direct value to telephony, and cable technology was of little direct value to broadcast radio (though both shared many important components, such as vacuum tubes). As a result, the two industries coexisted as regulated entities with little interaction. Even though the FCC regulated both the Bell System and the broadcast industry, two entirely separate organizations within the FCC regulated each: the Common Carrier Bureau and the Broadcast Bureau.

Television and Microwave At the end of World War II, two technologies came on line which in combination presented another potential challenge to the regime of regulated monopoly. The first was television, the natural extension of broadcast radio, whose commercial development had been suspended by the war. However, to fit television into the broadcast industry structure of networks of local providers, some means of simultaneously distributing very high bandwidth TV signals nationally to all affiliates was required. Enter the second technology: microwave transmission, whose development had been accelerated during the war due to its applicability to radar. High capacity point-to-point microwave radio held the promise of becoming the long-distance transmission medium of the future, eliminating (or at least reducing) the need for long-distance coaxial cables. In the late 1940's, the Bell System used its microwave expertise developed in wartime to design and deploy a national microwave network to keep pace with the enormously expanding telephone demand of the period. However, it could also use this microwave network capacity to transmit television signals from broadcast network headquarters to affiliated stations

⁷ In this case, the chaos of interfering radio signals was perceived by consumers and producers alike as sufficiently serious that the necessary public "traffic cop" for radio spectrum use in the form of the Federal Radio Commission appeared within a few years after the need was recognized (as contrasted with decades for public utility regulation of telephone to evolve). We do not view this as contradicting the hypothesis of

around the country simultaneously. The broadcast networks were enthusiastic, so the market was there.

Other electronic suppliers had also benefited from wartime experience and could also supply sophisticated microwave systems directly to the broadcast networks. It appeared that this market could become competitive, thus upsetting the regulated monopoly regime that had been in place since 1915. The technology, so long the exclusive franchise of the Bell System, was available to others for commercial exploitation, and the market was ready. However, the FCC was persuaded by arguments of furthering universal service, and continued its entry restriction⁸. This effectively forced the networks to send their signals via the Bell System's network.

This "close call" was actually a much more direct challenge to the regime of regulated monopoly than the earlier advent of radio. In this case, the technology available to potential competitors was perfectly suited to the needs of the contested market, and there seemed little reason to restrict their entry. It was *theregulators* who exercised their authority to preserve the regime against the possibility of competition. Of course, it was in the interest of the Bell System to persuade the regulators that this indeed was their duty. Of greater interest was that the Federal Communications Commission was quite receptive to these persuasions. Indeed, it seems plausible that the Commission, having adapted to the regime of regulated monopoly, decided to maintain the regime with which it was most familiar and granted it the most control. We take this as evidence that the institution of regulation (in this case, the regulators themselves) resist change that may change a comfortable status quo and/or reduce the powers of the principal parties involved. This foreshadows our conclusion of the next section that public policy institutions tend to inhibit change to new regimes, even when the technology and the markets favor such change.

the Introduction; even though the public institutional response in this was quicker than our previous examples, it is by no means lightning-like.

⁸ It may not be immediately obvious why universal service would be affected if the Bell System lost the broadcasters' business to competitors; the argument advanced was that, as the any profits earned from this business would help reduce rates to local telephone subscribers, thus enhancing universal service. Therefore, losing this business and its profits would raise (or at least not reduce) local rates.

IV. The Regime of Competition: Technology, Markets, and Public Institutional Response (1960-1990).

The postwar era saw the commercial development of two related technologies, both of which owed much to the basic science conducted at Bell Laboratories: microwave transmission and solid state electronics. As noted in the previous section, the mastering of microwave led to the deployment of microwave transmission systems in the high-capacity intercity Bell network. The existing technology of high-capacity cable systems required the purchase of continuous right-of-way along the cable route, trenching and protecting the cable, and suitable electronics at each end to encode/decode the carrier signal. The new microwave technology eliminated the need for continuous right-of-way and trenching, requiring instead radio relay towers at 25 mile intervals (line of sight) with antennae aligned along the route, as well as suitable electronics at each end. Microwave radio constituted one of the first major uses of wireless in a point-to-point mode.

This is not to say microwave radio became the transmission medium of choice for all applications. Microwave was cheaper than cable for medium-haul systems, roughly 200-1200 miles. For a public utility with access to limited eminent domain rights for acquiring rights-of-way and with long experience in handling cable, microwave radio was by no means a universal least-cost technology. Even in its range of application, its advantages over cable were significant but not overwhelming. Further, cable technology was itself advancing at a rapid rate; coaxial systems, such as L3 and L5 were introduced in the 1950's as very high capacity systems especially suited to transcontinental links⁹.

For a potential competitor seeking entry into the lucrative long-distance market, microwave had substantial advantages. The technology was more broadly understood than coaxial cable transmission, land need only be acquired for antenna sites and not continuous rights-of-way, and perhaps most important antennae and associated electronics were fungible, in that they could be put to use in other markets. In contrast, cable costs were sunk in the most literal meaning of the word. While microwave did not necessarily represent a huge cost advantage over cable, it was a

⁹ This was also the period during which undersea cable was introduced.

technology that lent itself more easily to deployment by small competitors with limited resources who wished to retain flexibility in their investments.

During the 1950's, several microwave system suppliers sought permission to sell systems to large corporate clients, whose internal communications needs were large enough to support their own microwave systems. In what has come to be regarded as a landmark decision, the FCC permitted the use of private microwave systems in 1959,¹⁰ its first accommodation to the pressures of potential competition. This accommodation was cautious in the extreme, in that the relevant market was those customers large enough and dispersed enough to support an entire communications network for their own internal traffic. While the technology and the markets were ready for something more serious, regulators certainly were not.

Indeed, competition in all long-distance markets would not be permitted until 1977 when a sequence of FCC decisions and muddled court cases culminated in MCI being permitted to offer its "Execunet" service in direct competition with the Bell System's switched long-distance service. During this twenty-year delay, neither the market nor the technology changed in any appreciable way. Both the technology and the market was prepared for the competitive regime by 1960; it was the public institutions (regulatory commissions and the courts) that prevented the adaptation which could have brought the benefits of competition to the American people.

It was not from spitefulness or ignorance that our public institutions acted to forestall benefits to Americans for two decades. Indeed, public-spirited and intelligent people abound in all these institutions: regulatory commissions, legislatures, and courts. However, the process by which public institutions come to decisions has a strong bias toward the status quo and therefore against change. Technology and markets, on the other hand, are ~~not~~ respecters of the status quo. If more efficient ways can be found to do things (such as transmit long-distance phone calls), markets will quickly discard the old and adopt the new. On balance, this leads to an increasing national

¹⁰ *In the Matter of Allocation of Frequencies in the Bands Above 890 MHz*, Report and Order, 27 FCC 359 (1959).

¹¹ Third Circuit Court, *Execunet II*, 580 F. 2d at 590.

income,¹² and justifies our national bias toward competition as the driving force of our economy. There is a cost, however; if the “old” that markets are about to discard happen to control capital, hold jobs, or have other interests in the status quo, they may lose in this transition, even though others may gain, and gain substantially more than the losers lose. Our public institutions are designed to ensure that this does not happen; that those with a strong stake in the status quo are protected to the extent they can be. In regulated markets (such as telecommunications), that protection can take the form of preventing change which is healthy for the nation as a whole but hurtful to those who have the ear of the regulator (or legislator, or judge).

A similar sequence of events regarding customer premises equipment (CPE) unfolded contemporaneously. In 1965, Tom Carter filed an antitrust suit against the Bell System for forbidding his customers from connecting his coupling device to their Bell phones. After referral to the FCC, open competition was permitted in the supply of CPE, via the registration program of 1975-77. Again, the unwillingness of the regulatory and legal process to upsetting a status quo led to a ten-year delay in bringing the benefits of competition to the CPE market.

Of all the telecommunications markets opened up to competition during this period, CPE was the most obviously competitive. The regulated monopoly regime of the Bell System had controlled the CPE market up to this point, claiming that total control of every aspect of the system was required to realize the goal of universal service. The characteristics of the market pre-competition are revealing. Product life-cycles were very long: the World War I-vintage candlestick phone was not

¹² Obviously, this salubrious outcome depends upon certain economic conditions obtaining. Whether these conditions do in fact obtain in telecommunications was and is the subject of hot debate, among economists and other policy analysts. We do not attempt to resolve this issue here; we merely note that despite the ubiquitous presence of regulation, the prevailing political economy of our nation is in favor of competition unless proven otherwise.

¹³ CPE, sometimes referred to as terminal equipment, is the equipment actually visible and used by the customer to originate and receive calls. For a household, this is a simple telephone set; for a small business, it is a “key system,” which appears as a largish telephone with many buttons; for a large business, CPE can be an entire switching system (PBX) plus all the push-button phones in its offices connected to it.

replaced until the 1930's with the first cradle phone. In turn, these phones were not replaced until the 500 set was introduced (for new subscribers only, of course) in the early 1950's. Similarly, PBX's and key systems had product life-cycles measured in decades. For a technology-intensive industry, the pace of change was singularly slow. In keeping with the expected lifetimes of CPE, the equipment was highly durable, capable of absorbing severe punishment and still functioning. On the other hand, virtually no new features were added to the basic telephone for fifty years (except the dial).

Contrast this with the post-competitive market. Within two years after the FCC Registration program, CPE had become a consumer electronics market, characterized by very rapid product life-cycles, high-functionality, and relatively non-durable product. New models were introduced by foreign and domestic producers every year (or even more often). Automatic dialers, memory calling, redial buttons, speakerphones, all began to appear on telephones sold in retail stores throughout America. The plain 500 set, sturdy and reliable as it is, simply could not compete in this market.

It is not for us to judge whether these fancy but less sturdy phones were "better" than the 500 sets in some fundamental way. What the market did prove, and prove conclusively, is that when confronted with the opportunity to actually choose, most purchasers opted for Panasonic and Uniden phones over Bell System phones. They voted with their dollars, clearly showing their preference for the high-function short-life telephone. Consumer electronics soundly defeated public utility telephones for the hearts and wallets of those who use them.

By delaying this competitive process for over a decade, the regulatory process denied to all purchasers during that delay period the benefits of choice and diversity which characterize competitive markets. Unfortunately, it is only after the market appears that customers realize the value of such markets. Customers who were forced to lease (purchase was not possible pre-1975) Bell phones during the regulated monopoly regime literally did not know what they were missing, what was being denied them by restrictive regulatory practices. As with many such practices, those who stand to benefit by relaxing them often are unaware of the possibilities that a more competitive market can bring them. However, there is little doubt that those who stand to lose by relaxing restrictive practices (such as the Bell System, in this case) are fully aware of the costs to them of having to face competitive pressures if restrictive practices are relaxed, and will fight hard before regulatory commissions, legislatures, and the courts to maintain a status quo favorable to

them. Thus, public institutions permit the few whose costs are obvious to delay, perhaps indefinitely, the flow of benefits, speculative in prospect, to the many.

But Federal regulation was not the only public institution that participated in the great debate over public policy in telecommunications. Both antitrust prosecution by the Department of Justice and continuing attempts to pass legislation further stirred the pot. In 1976, the Bell System had introduced in Congress the Consumer Communications Reform Act. Stripped of its rhetoric, it would have (if passed) reaffirmed by law the nation's commitment to the regime of regulated monopoly and the Bell System. It did not pass, but it did get Congress's attention focused on telecommunications. Over the next seven years, bills to reform the industry were introduced and debated in committee. Substantial lobbying occurred by those with vested interests in these bills, none of which ever got to the House or Senate floor. Nevertheless, successive bills were increasingly stringent on Bell's ability to respond to the competition that all hoped would emerge.

Clearly, the US Congress was in favor of ushering in the new competitive regime. Just as clearly, it was unsuccessful at doing so. The inability of Congress to act absent a consensus of the affected parties, some of whom stood to lose in a competitive regime, demonstrated the strong bias for the status quo characteristic of public institutions generally, and not just regulators.

In 1974, the Department of Justice filed an antitrust suit against the Bell System, alleging a number of anticompetitive acts and seeking structural remedies. A number of private suits were filed shortly thereafter, and yet another public institution, the DC court, joined the policy debate.

¹⁴ Interestingly, these bills were thought of as "pro-competitive", in that they would put in place a regime in which entry by new firms would be easy and response by the incumbent would be tightly circumscribed by strict rules on behavior by the "dominant" carrier. Apparently, Congress and others believed that having a number of competitors was not only necessary but sufficient for there to be competition. For economists, the benefits from competition occur as a result of *process* by which firms in a market strive for the consumer's dollar by lower price, higher quality, greater convenience, or all of the above. Having lots of competitors is neither necessary or sufficient for this process to occur. However, it is easier to measure the number of active competitors, or market share, than it is to measure the health of the competitiveness of a market. "Number of competitors" often serves as a proxy for competitiveness, usually with bizarre results.

Preliminary maneuvers by both Bell and Justice occupied the first seven years of this trial; the discovery procedures alone were both costly and time-consuming. Not until the fall of 1981 was Judge Greene in a position to let the trial move forward. On January 6, 1982, the parties presented Judge Greene with a proposed settlement. After further hearings and modifications, this settlement was accepted by the Court as the Modified Final Judgment, ending the government's antitrust case through the divestiture of Bell's Operating Telephone Companies from AT&T.

Without doubt, the MFJ was decisive in moving the industry toward the new competitive regime. Thus, the Court deserves to be commended for ending the decades of public near-paralysis in dealing with the second revolution in telecommunications: the competitive regime. Neither Congress nor the FCC had been able to break through the logjam of special interests to allow full competition where the industry could sustain it. It was the DC Court that showed the way.

Unfortunately, the antitrust case and the court system was likely the worst forum for such a regime change, for several reasons:

- The nature of the judicial process is that it must focus exclusively on the facts of a particular set of actions that occurred in the past. Thus, the Court must be backward-looking and specific, while establishing good public policy is forward-looking and general. Solving the problems of a particular case from the 1970's need not be a good way to set good public policy for the 1980's, 1990's, and beyond.
- The industry has been and continues to be of very great public significance. Certainly a major change in regime requires ongoing monitoring if not control by some public institution. In fact, this is precisely the role for which political theorists invented regulatory commissions. It is not a role that courts normally take on. Judge Greene did assume the ongoing role of supervision of the MFJ; however, it is unlikely that one man, no matter how intelligent and well-motivated, is able to regulate an entire industry on a part-time basis. Quite simply, this is not a job for which our courts are designed.

Nevertheless, the MFJ and the DC Court became the new public institution which forced accommodation of the old regulated monopoly regime to the new competitive regime. The central problem which the MFJ addressed was the monopoly control of a bottleneck facility (local access) by a firm competing in markets (long-distance, CPE) in which its competitors required access to

this bottleneck. By separating the Bell System into a monopoly segment (the Bell Operating Companies, orBOCs) and a competitive segment (AT&T), the MFJ removed any incentive of the bottleneck owner to undertake anticompetitive practices based on its market power to favor one competitor over another. To use an often-misused phrase, it tried to level the playing field.

The theory of the case envisioned a tightly-regulated narrowly focused access monopolist providing access for customers to a broad array of competitively provided services and products.

Unfortunately, this was not to be.

- The newly formed Regional Holding Companies refused to stay in the box that AT&T and the Department of Justice had tried to put them in; their own view of their future was much broader both in product and geographic scope. No sooner were the “line of business” restrictions uponBOCs announced than the Regional companies sought relief from them.
- On the other side of the divestiture divide, AT&T, now putatively competitive, found itself subject to all the regulations that had existed before divestiture, with no immediate hope of having regulation lifted or even lessened. Indeed, it was many years before AT&T succeeded in having even a reduction in the degree of regulation, from rate-base rate-of-return to price caps.

Though regulation was still the general rule, the divestiture and the MFJ required all regulators, both state and Federal, to re-think their roles in a changing environment. Regulators of all stripes largely abandoned the old model of regulated monopoly and sought ways to make competition work (or not work) in their jurisdictions. The public institutions adapted, however, imperfectly, to the new regime.

Again, the MFJ was not necessarily the *optimal* public institution to support the new competitive regime, but it was certainly a *workable* public response to these forces. Further, it signaled change to other public institutions: it was time to accommodate to the new world. Broadly construed, then, the MFJ was the public institution responsive to the second revolution in telecommunications of competition.

The second revolution in telecommunications brought substantial benefits to the consuming public: far more choice and lower costs for CPE, more choice and lower cost for long-distance services.

Unfortunately, it had little effect on local exchange services. In fact, in the two years following divestiture, local rates increased at a faster rate than ever before. The long-standing transfer of revenues from long-distance service to local service (“separations and settlements”) was made explicit after divestiture in the form of interexchange carrier access charges. Initially, these access charges from AT&T, Sprint, MCI and others to the local exchange carriers (Bell Operating Companies and Independents) represented a very large proportion of the revenues of the interexchange carriers. AT&T claimed that as much as 65% of their long-distance revenues was turned over to the operating companies. While some of these funds go to cover the costs to the operating companies of carrying interexchange calls from subscribers to the long-distance carriers’ facilities, most of this transfer is a subsidy from long-distance users to local exchange users, designed to keep rates for local service low.¹⁶ Originally, this rate strategy was adopted by regulators as a means to promote universal service. Now that universal service has been achieved, it has proven difficult to take away this subsidy. Nevertheless, the FCC has kept a steady downward pressure on access charges since divestiture, recognizing that such subsidies are incompatible with the new regime of competition. At present, access charges represent about 21.1% of AT&T’s total long-distance revenues.

It is surprising that the local exchange market, viewed by all as the last remaining natural monopoly, has attracted competitive entry. This competition has come from so-called “bypass” carriers, firms that focus facilities on very densely populated downtown areas, connecting high-

¹⁵ While most observers view these benefits as the triumph of competition, Taylor and Taylor (1993) have argued persuasively that this positive outcome was due principally to the aggressive reductions in carrier access charges mandated by the FCC (see below), and competition’s role is more problematic.

¹⁶ The extent to which this payment is a cost-based charge vs. a subsidy has been the subject of more argument and Jesuitical reasoning than perhaps any other regulatory issue, with both sides invoking the present author’s work (Faulhaber (1975)). We take no position here on this contentious issue, except to note that it is highly unlikely that access charges would be at their present levels if local exchange service were a competitive market.

volume business users to interexchange carriers in order to avoid operating company access charges. There is much dispute over how extensive such entry has been, and whether it is “economic” or not. There are, however, two facts about which all can agree: (i) such entry is aimed at the small number of high-volume users that constitute the largest fraction of operating company revenues; thus it represents an economic threat to these companies far beyond the number of subscribers they have captured; (ii) the presence of the subsidy from long-distance service to local service has distorted market signals for entry.

It might be questioned why the issue of competition arises at all in local service. This was the market identified at the time of divestiture by all concerned as a monopoly which needed continued regulation, even in the new competitive regime. Access lines from customer premises to the operating company central office were a sunk cost, representing a substantial portion of the firm’s investment. If ever there was a natural monopoly, it was thought, local exchange was it; why expect competition?

In fact, the proposition that local service is a natural monopoly was tested directly after the expiration of the Bell patents in the 1890’s, and it was found that the market could support a very healthy competition.¹⁷ However, the presence of the subsidy from long-distance to local service leads to local exchange prices which, many argue, are actually below the cost of providing this service. With such a pricing policy, it is no wonder that competitors are not eager to enter this market.

The belief that this market could not sustain competition has led to its continued regulation which has in turn been accompanied by such significant distortions that effective and efficient competition is all but impossible. Paradoxically, the belief that local exchange service is a natural monopoly has become a self-fulfilling prophecy. What are those market distortions, and how have they distorted competitive entry?

¹⁷ The comparison between the 1980’s and the 1890’s might strike the reader as fatuous; it might be assumed that the technology of local access has changed radically. In fact, the technology of local access had not changed (by 1980) at all; the overwhelming number of customers are still connected to the operating company’s local switch by a pair of copper wires.

- Maintaining artificially low prices, some would argue below cost, for basic exchange service. Even firms that could supply this service at a cost less than an operating company's cost are unlikely to be able to supply it less than a market price set below that cost and still make a profit. Keeping the price low discourages competitors.
- Using prices above cost for long-distance services (both inter- and intra-state) to subsidize low prices for local exchange presents an opportunity for bypass carriers to "cream skim" users with large demand for these services. These customers, primarily businesses, have traditionally supplied the operating companies with the revenue base to pursue the mission of universal service under the old regulated monopoly regime. Under the competitive regime, these customers have other options. Competitors are thus drawn to this market because prices are held artificially high by regulation, not because they have any competitive advantage over the operating companies. Federal and state interconnection rules ensure that such entrants (competitive access providers, CAPs) are viable; state regulations that inhibit competitive responses by operating companies to this form of entry encourage and protect CAP entrants. Thus, competition may not be fulfilling its usual role of ensuring that the efficient producer is the most successful.
- The very presence of a regulator often "chills" the enthusiasm of competitors for entry, even in markets in which such entry is permissible. There are two fears potential entrants may have: (i) at some future date, the regulators may subject the new entrants to regulatory scrutiny, forcing them to reveal information about themselves and their markets that they consider proprietary;¹⁸ (ii) at some future date, the regulators may change the rules in favor of the entrant's competitors, especially if the incumbent operating company begins to suffer

¹⁸ It has been suggested by some that IBM's reluctance to directly enter telecommunications markets was due to this fear. Its entry into the lucrative long-distance market in the mid-1970's was via Satellite Business Systems, a joint venture with other firms, that was sufficiently at arm's length from IBM as to "immunize" it from regulatory scrutiny.

financially and the regulators feel the need to “save” the company in ways that advantage it relative to its competitors.¹⁹

Could the local exchange market, as traditionally defined, be competitive? The evidence of the competitive era (1893-1907) suggests the answer is yes. Further, the recent development of CAP competition suggests that at least in certain sub-markets, any market power of the operating companies is on the wane. However, the question is rapidly becoming moot, because after more than a century of the stagnant technology of copper wire, local exchange service is about to change beyond recognition, as we explain below.

In sum: the competitive era arrived with the twin technologies of microwave radio (for long-distance service) and microelectronics (for CPE), and aggressive entry strategies of potential competitors, in the late 1950’s and 1960’s. However, it was several decades before public institutions adapted to this new regime. Arguably, the MFJ and its administration marked the turning point for public institutions in recognizing and dealing with this new market reality. Curiously, this competitive regime was based upon an assumption that local exchange service was a “bottleneck” that should continue to be tightly regulated in order to ensure that other services could be competitive, and the MFJ enshrined this particular set of assumptions.

V. The “Multimedia/Computers/Wireless” Regime: Technology, Markets, and Public Institutional Response (1990-)

The MFJ can thus be seen as the appropriate public policy response to technological and (potential) market conditions of the late 1950’s and 1960’s. The inability of public institutions such as regulation and legislatures to adapt rapidly to these conditions led to enormous pressures which eventually found release in 1984 with the Bell System divestiture and the MFJ. What this meant is that the 1980’s were a period of regulatory and market adjustments that had been delayed

¹⁹ There are many examples of this; the most recent involves bankrupt domestic airlines being permitted by bankruptcy courts to continue to compete but without the burden of paying past due bills or interest on debt. This court-granted relief, it has been argued, permits them to underprice carriers which were competitively successful (and hence not bankrupt), but which are thus threatened by failed carriers shielded from their obligations by the public institution of the bankruptcy court.

for almost two decades. By then, the technologies of microwave and microelectronics had been overwhelmed by changes undreamed of in the earlier era.

The science of transmission of electrical signals continued its advance after the commercialization of microwave. By the mid-1970's, stunning advances in opto-electronics led to the first commercial *fiberoptic* systems. Fiber optics differs from microwave in three important dimensions:

- Fiber optic transmission is through a *physical* system, like a coaxial cable, rather than a *radio* system, such as microwave.
- The medium of fiber optics is a thin glass "pipe," rather than copper, as with coaxial cables.
- The frequency of electromagnetic transmission is that of visible light, which is substantially higher than that of microwave radio. This higher frequency means that a *fiber optics* system can theoretically transmit as much as 1000 times as much information as a microwave radio system²⁰.

This enormous increase in information-carrying capacity has changed the nature of networks of all kinds, shapes, and sizes. The deployment of fiber optics in the long-distance networks of the three facilities-based carriers (AT&T, MCI, and Sprint) has resulted in substantial excess capacity; it is unlikely that demand for long-distance voice service, fast-growing as it is, will fill up available capacity before 2000.

As the cost of fiber optics and its attendant electronics comes down, operating telephone companies and cable TV companies are now using fiber optic systems for applications that would have called for coaxial cable or radio in 1985. Virtually all new cable systems since 1990 have used fiber optics rather than the more traditional coaxial cable. Telephone companies have been installing fiber optics in their inter- and intra-city networks, as well as in their "feeder plant": transmission systems that collect individual telephone lines from households into bundles for carriage to the central office.

²⁰ See Noll (1986).

In the next five years, many operating companies expect to deploy fiber optics for all new telephone plant, including systems passing each home. Currently, there are roughly thirty companies experimenting with "fiber-to-the-curb" services.²¹ This leaves only the "drop", or physical copper wire from the home out to the telephone pole or buried cable in the street, as the last vestige of copper. The nation is almost to the point where many households will have one or more fiber optic systems into which they can easily tap, supplying information, entertainment, even two-way video services.

The key to understanding the difference between copper wire and fiber optics is information volume: the copper wire permits (i) voice telephone calls and (ii) low-speed data and fax transmission. The fiber optic cable has thousands of times the transmitting capacity of traditional copper wire,²² including several simultaneous high-definition television channels, over 500 standard TV channels, multiple two-way full-motion video calls, live access to (for example) interactive libraries capable of showing information in video format, data transmission of medical information to a hospital, home shopping while viewing video presentations of goods and services, and many, many other services. The potential for a fully fiber optic national network to significantly change the lives of Americans, the way we work, learn, and play, is far beyond anything we see today in either telephone or cable networks.

Not only does the deployment of fiber optics systems and the software required to exploit them promise gains to the American consumer, it promises increased efficiency and better ways of doing business for American enterprise both large and small. The availability of a public high-capacity network could be particularly advantageous to small businesses which cannot afford large private systems. Such deployment could boost what is recognized as the most dynamic sector of the US economy: entrepreneurs and small businesses.

²¹ Bell South, Bell Atlantic, GTE and Contel have begun experimenting with fiber-to-the-curb service. See "Bell's Heathrow Project Generates Video Over Fiber," *Fiber Optic News* Oct. 8, 1990, p. 3; "The Promise of Fiber Optics," *Public Utilities Fortnightly* Aug. 16, 1990, p. 14; and "Carriers Test the Broadband Waters," *Data Communications* Sept. 1990, p. 49.

²² *Video Magazine* March, 1992.

There are several visions of the drivers of this new information age, not mutually inconsistent:

- entertainment: “video-on-demand,” by which viewers can choose to watch a show or movie when they wish; direct-TV marketing, high-definition TV, etc. This vision stresses the movies-and-cable TV aspect, and is primarily consumer-focused.
- information superhighway: the availability of databases, user forums, downloadable programs and graphics, electronic mail and other communications functions; this vision sees the network as an expanded version of the Internet. This vision stresses the computer network aspect, and is primarily business-focused.
- interactive video: this can include electronic shopping, home banking, playing electronic games with others at remote locations, speaking and viewing a friend or friends, or any other form of transaction. This vision stresses the videotelephony/wideotext aspect, and is both business- and consumer-focused.

To understand how such a system could develop, it is useful to think of it as consisting of two parts: (i) the *infrastructure*, which consists of the “electronic highways,” the networks, that connect homes to homes to information libraries to ...; and (ii) the *applications*, which consist of the services that people and firms use, but which can only be offered using the infrastructure. An example of an application would be, say, the Library of Congress offering a broadband reference service that permitted citizens to access information in the form of full-motion videos on health news, agricultural help, demos of home detection of breast cancer, etc. The infrastructure that permitted this application consists of the fiberoptic systems (transmission and switching) connecting US households to the Library of Congress, appropriate electronic gear at the Library and in the homes of subscribers to send and receive video information, etc.

Examples of the infrastructure/applications dichotomy abound:

- Transportation: highways and vehicles. In this case, highways (the infrastructure) are publicly provided, and the vehicles which use them, such as autos and trucks (the applications), are privately provided.
- Transportation: canals and barges/boats. Again, canals are publicly provided for use by private barges and boats.

- Communications: telephone network and various information providers. Weather, 900 services, computer bulletin boards, CompuServe, etc., all use the telephone network to reach their customers over an infrastructure provided by various telephone companies. It is traditional to separate carrier ownership from content ownership, so that telephone companies have only recently been permitted to own information services provided over their own facilities.
- Communications: cable networks and entertainment. Cable companies supply the infrastructure while entertainment distributors of movies, TV shows, news, and other channels supply the applications. In this case, there is no prohibition of carriers supplying or owning content providers.
- Transportation: railroads and cargo/passenger services. In this case, the rails and the services are provided privately, often by the same company. Southern Pacific may own rail track, but only upon payment of a fee. Clearly, there is no prohibition on owners of rails from operating rail services.
- Computers: operating systems and applications. Operating systems, such as DOS, are common across a wide variety of software applications, such as spreadsheets, word processors, presentation packages, etc. Suppliers of operating systems are not prohibited from providing applications software as well.

The examples given suggest that public policy issues will continue to be of paramount importance as the industry develops. A key issue that must be resolved early on is whether public policy should encourage competitive infrastructure facilities, and if so, should competitive networks be compatible? If there are barriers to entry in providing infrastructure, then the owners of an infrastructure network may seek to extend their market power by developing proprietary systems with which only their applications will function. Just this situation occurred in mainframe computing in the 1960's and still obtains in this segment of the computing market. The extent to which the proposed infrastructure is "open" to any and all application providers will determine how the market develops, what services are made available, the competitiveness of the applications market, and the value of the infrastructure to US consumers and US businesses. *This is therefore a legitimate public policy issue, to which our public institutions must adapt.*

Most critically, the public policy issues of the new information superhighway bear only a dim resemblance to those of the competitive regime. What is the meaning, if any, of “universal service” in this new world? Do we encourage private provision of multimedia entertainment, or do we judge it a basic right whose provision should be subsidized if need be? Do we wish to encourage competition in the supply of infrastructure as well as applications? Some might think fiber optics network constitutes a natural monopoly, similar to cable TV networks. However, there is substantial evidence that facilities competition in cable, in the few metropolitan areas in which it has been tried, works just fine²³. Why not the same for fiber optics? *The policy problems of the information superhighway are substantially different from the old telephone system, and the public institutions required to solve these problems will be substantially different than those adapted to the previous regimes.*

Technologists and telecommunications analysts have been predicting a world of complete video and information connectivity since the 1960's. Examples abound: in the late 1960s, the Bell System conducted a trial of its new Picturephone service (videotelephony) between New York and Chicago, with plans for a national rollout of the service in the 1970s, before economic reality reasserted itself. In the mid-1970s, IBM, Comsat, and Aetna jointly founded Satellite Business Systems (SBS) on the firm belief that broadband business-to-business links for high-speed data transfer was the wave of the future. The market decided otherwise, and SBS folded its tents in the early 1980s. What is different about today is that telephone companies, cable companies, and entertainment companies are actually putting up money based on plans to deploy these new technologies. Whether or not these ventures, or others like them, will be successful is not the point; the point is that the technologies and business strategies are close enough to commercial realization that the risk is now worth taking. The idea of the information age has moved from academic discussion and futurology to the real world of investments and corporate strategic plans; now it's real money.

However, the information superhighway is only half of the new regime. As radio technology in the form of microwave challenged more traditional long-distance transmission systems, so radio technology in a new form is challenging the traditional bastion of monopoly power: the local loop.

²³ See Hazlett (1990)

The earliest form of radio as a medium of local exchange was cellular telephone, developed at Bell Laboratories in the early 1970's and deployed commercially in the early 1980's. It has proven to be an immensely popular service, even at the very substantial rates charged for actual usage. In 1991, residential customers spent an average of \$45.10 per month for local and toll services compared to cellular customers' average monthly bill of \$72.²⁴

Currently, cellular telephone uses analog technology, which requires significant radio bandwidth for each call. The FCC allocation of a total of 50 MHz of bandwidth to this service is modest relative to demand. As a result, only two cellular operators per metropolitan area can "fit" within this bandwidth, each offering only limited channels for use by cellular subscribers in each "cell", so the service has become a duopoly. It is not surprising that prices are relatively high and the market capitalization of cellular firms is significantly above the replacement cost of their plant. The position of cellular service in today's market is with mobile business users and high-income personal users; it is not a substitute for basic local exchange service. Despite these limitations, however, the growth of cellular has been phenomenal; 14 million cellular phones (as compared to 144 million land access lines) are currently in service.²⁵

However, new radio technologies are now commercially viable that solve the scarcity of bandwidth problem, and promise to become not just substitutes for basic local exchange service but something far more valuable. Dubbed "Personal Communication Service," these new "microcellular" technologies deliver a lightweight telephone that can be carried by a person as easily as their billfold through which the consumer can call anywhere in the world. Freed from the traditional restriction of the copper wire, the telephone can now be associated with a person rather than a location (such as home or office). The new radio technologies used (i) digital rather than analog, thus permitting substantially more calls in a given bandwidth; (ii) compression techniques that

²⁴ The residential customer average monthly bill for local and toll services is calculated as the total average monthly expenditures on telephone less average monthly expenditures for additional services not including toll service. See Industry Analysis Division., FCC, Reference Book *Rates, Price Indexes, and Household Expenditures for Telephone Service*, pp. 37-38. See the Cellular Foundation *Wireless Communication Forum* 1, July 1993, p. 71 for the average monthly bill of cellular customers.

²⁵ USTA PHONE FACTS 1993, p. 20 (1993).

permit even more efficient use of radio bandwidth; (iii) smaller cell areas ("microcells"), with concomitant lower demand; and (iv) the much expanded (by a factor of more than four) bandwidth allocated to these systems by the FCC and Congress.²⁶ Taken together, these developments can increase the capacity of wireless by at least a factor of eight over currently deployed systems. As cellular now represents almost 10% of telephone access in the U.S., PCS promises capacity sufficient to boost wireless capacity to over 40% of total telephone access, and more likely even higher. At this capacity potential, the market for access can change dramatically (substantially more wireless operators can be supported than the current monopoly, holding out the promise of a competitive market in PCS; (ii) PCS can become a viable competitor to land-based access.)
brief, PCS can spell the end of the local access monopoly.

This rather dramatic assertion relies more on the future promise of the new microcellular technologies than on the actual performance of existing "beta" models. As with existing cellular systems, early models tended to have substantially weaker performance than today's models. It is reasonable to project the same sort of improvements in PCS systems.

As with fiber optics technology, the new microcellular technology could lead to a new paradigm of how people communicate and how communications markets evolve. Telephone numbers will be associated with an individual, not a house or office. Consumers can access the global telephone net from anywhere within reach of a microcellular antenna. Further, sufficient bandwidth exists for a significant number of PCS service suppliers to operate in competition with one another, and with the operating telephone companies. The old "bottleneck" theory of local access, upon which the MFJ was based, is in danger of becoming outmoded in the next 3-5 years as PCS are deployed in urban, suburban, and rural areas. In half a decade, it is likely that the policy problem *would* be the market power possessed by the local exchange "monopoly," but rather how the local

²⁶ This recent FCC allocation of 220 MHz of bandwidth to emerging communications technologies represents a significant change in FCC policy which is strongly consistent with adaptation of a public institution to this new regime. Even more suggestive of significant change in public policy is Congress' direction to the Secretary of Commerce to reallocate 200 MHz of spectrum, previously reserved for government use, to new wireless services.

operating companies are going to write off the copper wire local exchange plant still on their books that has been made worthless by PCS.

Expensive and inefficient of bandwidth as it is, the success of current cellular services have proved that consumers place a high value on mobile communications. The added value PCS and the potentially greater competition suggests that the new PCS regime will have rapid success in the market as performance improves with experience.

The outlook for fiber optics and the information superhighway is more speculative. It has been a truism in telecommunications for many years that despite the introduction of sophisticated new services, the mainstay revenue stream has always come from "plain old telephone service." Further, this business is now relatively mature, with only modest growth expected in the future. Why all the excitement? The potential for fiber optics has been much discussed in the popular press over the last year (see, for example, "A Superhighway in Need of a Destination," *Philadelphia Inquirer* page A1, January 3, 1994), yet it must be emphasized that it is *potential* that is being discussed. As with any significantly different product or service, it is virtually impossible to predict with scientific accuracy how, or even if, consumers will use the service. The many recent business deals which have been concluded based on the vision of huge information volume to homes and businesses represent a calculated risk on the part of private firms. It is recognized by all that this is not a game for the faint of heart. If this vision of video and information to the home is correct, then commercial success will require very substantial investments in fiber optic deployment as well as other facilities. If this vision turns out to be chimerical, then these investments will be of little value, and many firms and investors will lose. The current situation, then, is fraught with *risk* for corporate participants: the potential for very substantial earnings coupled with the potential for very substantial losses.

Adapting to the New Regime: Private Institutions

We stand, then, on the verge of the third revolution in telecommunications, one that has the potential to be as profound in its effect on Americans as the original invention of the telephone itself. There is great risk, and there is great opportunity. Exactly what our private sector institutions need to lead this revolution will only be discovered as events unfold, but even at this early date it appears that certain *technological* and *market* conditions will be important:

- The various skills required by a firm to be successful in developing either the information superhighway or PCS systems, such as experience with fiber optic technology, radio technology, construction and distribution skills, operating a two-way network, supplying information and entertainment, etc., are currently not possessed by any single market participant. It appears that mergers, acquisitions, and joint ventures of firms both large and small are required to make this work (as evidenced by the rash of such actions recently announced²⁷).
- The ability to command large amounts of capital, a relatively high tolerance for market risk, and a willingness to invest for the long term are requirements for investors and corporations alike in this market.
- The ability to command technological resources, such as development and deployment of leading edge fiber optics and microcellular systems in an uncertain demand environment, is a requirement for firms in this market.
- The “openness” of the infrastructure to development and deployment of new applications by entrepreneurs, corporations, and public entities.

What are the public policy conditions that are conducive to this?

- A clear, consistent, and stable public policy, focused clearly and cleanly on this new emerging regime.
- Re-orienting public institutions (or establishing new ones) away from the paradigms of the past regimes (competitive or even regulated monopoly) and toward the policy issues of this new regime.

²⁷ To illustrate: five of the seven Regional Bell Companies are merging or forming joint ventures with cable companies, although the largest of these (Bell Atlantic-TCI) has recently been called off. MCI has recently announced its acquisition of a 17% stake in Nextel, a cellular firm, matching the stake of Comcast, a cable operator. Bell Canada Enterprise acquired a 30% stake in Jones Interchangeable. TCI and Cox Cable have jointly acquired Teleport, a firm that offers two-way fiber optic capabilities.

Adapting to the New Regime: Public Institutions

The history of the first two revolutions in telecommunications suggests strongly that these public policy conditions may not occur for decades, and that these delays in putting in place the required policies and public institutions will translate into delayed benefits and increased cost to the American consuming public and to American business. As the technology and the market come together, past performance suggests that our public institutions will become the “bottleneck”, forcing consumers and business to wait until the decades-long process of institutional change accommodates to the new regime.

Unfortunately, the changes that appear to be necessary for firms to succeed in the new regime are those with which public institutions are particularly ill-suited to cope:

- Corporate restructuring, as potential participants merge or acquire new partners and joint ventures are undertaken.
- Significant risk-taking; regulatory commissions are generally quite risk-averse, and expect their “utilities” to behave the same way.
- Flexibility; in an uncertain environment, firms need to be able to change plans quickly and easily. This *does not* mean “expedited hearings” before a regulatory commission or a judge; it means making a decision this morning that gets implemented this afternoon. In a rapidly changing market, asking permission from public institutions before undertaking actions is completely inappropriate.
- A clash of regulatory “cultures”; telephone companies are regulated by state PUCs and the FCC, using price caps or rate-base rate-of-return regulation, while cable companies face regulation by municipalities. In telephone, carrier and content is strictly separated while in cable carrier and content are not.

The first three changes are ones that public institutions have found difficult to accommodate in the past. The fourth change suggests that in addition to the normal delays, disputes between commissions, courts, and legislatures over both jurisdiction and methods of regulation may add yet more delays before the new regime is put in place.

On the other hand, there are some early indications that policymakers are aware that helping rather than impeding the revolution may be the better public policy. The enthusiasm and expertise of the current administration for the information superhighway suggests it is taking the lead in a major policy initiative to bring this to reality. As previously mentioned, the FCC's willingness to allocate a generous amount of spectrum to PCS and to move on an expedited basis to help start this industry is also encouraging. In both cases, policymakers seem to be willing to be out in front of these changes, rather than dragging them down. However, many other public institutions, including the DC court, the FCC, state regulators, Congress, and state legislators, must be prepared to adapt to this exciting but risky opportunity.

Key Public Policy Issues of the New Regime

It is impossible to foresee all the public policy issues that are sure to arise as a result of this third revolution. However, it is possible to discern some issues that must surely be on policymakers agenda. We alluded to these issues on page 25; they are:

- Competitive service provision vs. franchise monopoly. Cable is offered in most American cities as a franchise monopoly, and telephone has traditionally had a similar franchise. Regulators have historically shown a preference for this form of control. For example, when the 1992 Cable Act was passed to control what many saw as substantial price increases, Congress had a clear choice between encouraging competition and adopting regulation, and they decisively chose the latter. On the other hand, the FCC in its award of PCS bandwidth, clearly has in mind a more competitive market structure than currently exists in cellular telephone.
- Strict separation of content and carriage vs. vertical integration of network and content provision. This is a fundamental principle in telephone regulation, in that telephone companies are enjoined from any control over the content of messages sent over their wires. However, this is not true in cable television, an industry in which the distribution carriers completely control the entertainment content that they distribute. This has given rise to questions of vertical integration in cable, and a concern that large cable companies may "lock up" entertainment producers, excluding competitors from using their product.

- Does universal service have a role to play in broadband and/or cellular services? Universal service in public utilities has often meant the provision of service to remote and/or disadvantaged populations at below-cost prices, requiring some form of internal subsidy from other users. This in turn has led to some form of franchise monopoly to protect the sources of subsidy from competitive entry. Are there other, more flexible ways to provide universal service that do not drive the industry to monopoly?

The advent of the third revolution thus puts a number of vexing policy issues into play. While in the past, state regulators could concern themselves primarily with keeping local rates low, the new environment will demand more of the public policy arena. If it fails to respond effectively, the benefits from the new regime may be postponed, perhaps indefinitely.

The MFJ and the New Regime

Our discussion so far has considered the role of public institutions generally in adapting to change. We turn our focus on one specific institution: the MFJ and its administration by the DC Court.

As mentioned above, the MFJ may be viewed as the driver of public institutional change from regulated monopoly to the competitive regime. It was designed to solve a very specific problem that the antitrust case brought to the fore: the alleged exercise of market power that stemmed from ownership of the bottleneck access line by the Bell System to monopolize related markets such as long-distance. The MFJ solution was based on divesting the ownership of the bottleneck access line (the operating companies) from the ownership of more competitive services (AT&T), and then ensuring that the owners of the bottleneck were sufficiently restricted in their businesses that they would have no incentive to abuse their market power.

Shortly after divestiture, each operating company expressed keen interest in expanding into other lines of business. In keeping with the theory of the case and the MFJ, the DC Court has been extremely cautious in permitting entry into closely related businesses for fear of the exercise of market power. Such restrictions include: no entry into long-distance, no manufacturing or even R&D, total revenues from non-telephone businesses limited to 10% of total revenues, and (until recently) no entry into information services. While the logic of these restrictions had some basis in the bottleneck theory of the MFJ, they turned normal economic logic on its head: firms generally diversify into areas of strength based on their core business, not into areas so far from their core

business that they have little competitive advantage. Not surprisingly, restrictions which attempt to keep operating companies locked in the “access line monopoly” box have become increasingly onerous as firms perceive the advent of the next telecommunications revolution.

How does the theory of the MFJ stack up as a public institution in the new regime? Unfortunately, the MFJ and its administration is based on one key assumption that seemed to comport with the facts of the competitive regime:

MFJ Assumption *The access line is a natural monopoly, due to high sunk costs of copper wire local loops.*

From this key assumption follows the two conclusions that have governed public control of this industry since the divestiture:

- As a natural monopoly, operating companies must be tightly regulated to ensure that they do not abuse their market power from this natural monopoly;
- CPE, long-distance, and information services are competitive, and can only be reached by customers via the monopoly access line; therefore, guaranteed equal access is critical for a competitive market to develop in these other services. Operating companies cannot be allowed to offer any such services for fear of cross-subsidy and/or denial of equal access to competitors.

In the new regime, does this key MFJ Assumption still make sense? As argued above, it is not clear it *ever* made sense; we have had no clear market test in modern times of the natural monopoly argument for local exchange. However, the point is fast becoming moot. Cellular PCS alternatives to the local loop are coming on line quickly, and their market acceptance (based on the cellular experience) should be high. The generous bandwidth allocation that has been made available by the FCC together with new techniques of digital radio and signal compression promise an end to radio spectrum scarcity and a more competitive market that should lead to ready availability and low prices for Personal Communications Services. *This development invalidates the key MFJ Assumption* quite simply, there will be no market power in the local loop. Quite the contrary; the advent of the personal telephone could virtually eliminate all economic value from the local loop.

The MFJ strictures against entry into telecommunications-related markets has the single focus of preventing potential abuse of market power arising from the operating companies' control of the local loop. However, the third revolution brings with it a critical role for the operating companies above and beyond the simple provision of the local loop: participation in developing and deploying the information superhighway and the new wireless technologies. Reviewing the necessary conditions on page 29 for private sector success in this area makes it clear that the expertise and experience of the operating companies are key ingredients in bringing the benefits of this new technology to our nation. Keeping the operating companies locked in the "access line monopoly" box, unable to participate in these dramatic changes, will at the very least increase the costs and delay the advent of these new services to the American people. The MFJ was not designed to carefully balance the public interest between encouraging the rapid deployment of the information superhighway and protecting against monopoly abuse of the local loop. Its focus is entirely upon the latter. The MFJ thus stands in the way of the careful balancing of public interest concerns required to bring this promising technology to market.

It might be thought that though microcellular developments may at last bring true competition and the end of market power in the local loop, there will now be a new version of the local loop, in the form of fiber optics to the home (or office), and the potential for abuse still calls for the MFJ. After all, isn't this the new natural monopoly?

While the development of the information superhighway certainly raises important public policy questions, it is crystal clear that the MFJ is not the solution to any such problem.

First, fiber optics to the home is not the local loop, which is the specific problem the MFJ addressed. Extending the MFJ to a new fiber optics distribution network is judicial imperialism in the extreme.

Second, it is by no means clear that fiber optics to the home is a natural monopoly. In fact, the evidence of recent events suggests that multiple suppliers are willing to enter: cable companies, long-distance companies, and local telephone companies have not only expressed interest in the information superhighway, they have made investments and acquisitions that are predicated on their entry into this market. Encouraging facilities competition in the supply of fiber optic information superhighways to the home/office is likely to be the public policy option that yields the greatest societal benefit of all. Unless states and municipalities insist on creating a highly

unnatural monopoly by awarding franchises, it is likely that we shall see two or ~~n~~fiber optics distributors in most metropolitan areas.

Third, the public policy problems of the information superhighway are substantially different from that of the local loop in telephony. Over the years, access to a telephone line has come to be seen as a social necessity (access to emergency services, etc.), and so various subsidy schemes have been put in place to ensure universal service. The viability of these subsidies rests on the regulated monopoly granted the supplier of local access. It is not clear that our society will take a similar view toward in-home entertainment and information access. Does every US citizen have a right to 500 channels of television delivered to his or her home? Must we grant monopoly franchises to vendors in order to secure this right? Should every citizen have the ability to access the Library of Congress from the privacy of his or her bedroom, or will access from the local library suffice?

Fourth, during the transition to the new regime, residual market power problems will remain. However, since the implementation of equal access, both public and private institutions are in place that make it practically difficult and economically unattractive to local operating companies to abuse its few remaining years of waning market power. There are two mechanisms which mitigate the potential for market power abuse during the transition:

State and Federal regulators can adopt “light” regulation, such as price caps and structural and accounting safeguards that encourage efficiency while minimizing potential abuse. Whether or not regulators actually implement such forward-looking measures based on actual market conditions is certainly a question, though there are indications that such changes are underway in some jurisdictions. However, it is certain that this mechanism is more appropriate in a period of change and uncertainty than a court-administered solution such as the MFJ, which is aimed at problems of the 1970s.

Competitors are extremely sensitive to such abuses, and should they believe themselves subject to less-than-equal access have recourse to the courts. It was the MFJ that ensured that these institutions would be in place; now that they are, equal access is largely self-enforcing by market participants. The close supervision needed in the mid- to late 1980’s is becoming counterproductive.

Generally, the public policy challenge during this transition is to balance two somewhat conflicting societal objectives: i) encouraging the most rapid deployment of new technology that promises to enhance the lives of all Americans and improve our national competitiveness, while (ii) protecting telephoneratepayers from potential abuses of remaining market power in the local loop. To hold back the operating companies from participating in this new technology until there is absolutely zero market power remaining in the local loop deprives our nation of the essential expertise and experience of these companies, increasing costs and delaying deployment of this third revolution. On the other hand, precipitous and complete deregulation could invite at least short-term abuse of residual market power in markets in which competition will not be viable for some years. The public policy challenge of balancing these two objectives is not what the MFJ was designed to do. In fact, its continued enforcement would seriously interfere with this necessary balancing.

VI. Summary and Conclusions

The MFJ and its administration was perhaps the key public institution of the competitive regime, and it served the American public well in establishing a policy environment in which competition would thrive. Its greatest success is that competition did indeed thrive. Part of this success can be attributed to a “demonstration” effect; the MFJ showed other public institutions, such as regulators and legislators, that competition was here for good and they had to adapt to it. By and large, our public institutions have adapted rather well to this regime.

But good answers to yesterday’s problems are more likely to impede rather than help in solving today’s and tomorrow’s problems. Unfortunately, the history of this industry suggests that public institutions have constituted a major impediment to beneficial change, delaying technological and market adaptations by several decades. Our nation is now faced with a new set of challenges, in the form of risky opportunities to change the way we live, work, and think. These challenges require good public policy and good public institutions to implement that policy, and they are needed soon. The delays of previous revolutions, costly as they were at the time, would be even more costly in terms of delayed benefits from the new revolution. It is time for public institutions to be in front of change, not dragging it down. It is time to vacate the MFJ; its job is done, and it needs to be retired with honor.

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