

Beyond Liberalization: Past  
Performance, Present Hype,  
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## Beyond Liberalization: Past Performance, Present Hype and Future Direction

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The first U.S. telegraph message, sent from Baltimore to Washington in 1844, was "What hath God wrought?" The same question was being asked one and a half centuries later when telecommunications were being transformed by the policy of liberalization. And what is the answer? To respond, this article covers much ground. It looks at the empirical record of liberalization policy in telecommunications, primarily for the United States, and reaches a generally positive conclusion. On the other hand, liberalization in many other countries is a fairly modest reality. The article also looks at the record of *prognostication* of the impacts of liberalization and finds it a mixed bag, frequently at odds with the unfolding reality. The best predictive record is held by those in favor of deregulation but willing to intervene structurally to reduce monopoly power.

From there, the article ventures into the future, looking at how the trend of liberalization will work itself out. The conclusion is that the central institution of future telecommunications will not be carriers but systems integrators that mix and match transmission segments, services, and equipment, using various carriers.

What will be the policy agenda in such an environment? Liberalization of telecommunications will not mean libertarianism. There will be no "end of history" in telecommunications policy. The new issues will be those of integrating the emerging "network of networks" and the post-deregulatory agenda will be conceptually and politically complex. Liberalization will prove to have been the easy part. Dealing with the

consequences, and protecting traditional policy goals in the new environment by fashioning new tools will be the next and more difficult challenge.

## I. WHAT IS LIBERALIZATION?

In the recent past, telecommunications policy debates have centered on liberalization. Is competition sustainable? Is it advisable? Who wins? Who loses? Liberalization means entry into previously monopolized markets, and the lowering of restrictions. For telecommunications equipment, the opening involves the adoption of standards which do not favor any single or group of suppliers, simple procedures for type approvals, non-discriminatory procurement, and the absence of protective quotas. For infrastructure, liberalization includes the opening, to new service providers, of already established markets such as long-distance telephony and of new services such as cellular telephony. For computer-enhanced value-added service, it means access from main network and central office functions.

Liberalization should not be confused with deregulation. Deregulation is a reduction in government-imposed constraints on the behavior of firms. It is also used to mean a reduction in red tape and government involvement. It does not necessarily mean a diverse market. One may have a deregulated monopoly, or, conversely, a tightly regulated multi-carrier system. The experiences in the U.S. and the U.K., two of the most liberalized markets, reveal that more rather than less regulation emerged, at least initially, after markets were opened. Partial liberalization as a process tends to complicate things much more than an outright prohibition and can lead to a more extensive set of rules to address the new

problems. Interconnection arrangements were set, access charges determined, and a leveling of the playing field among competitors was sought. In some cases, cross-subsidization had to be prevented. Competitors received preferential treatment in order to protect competition in its infancy. All of this led to considerable regulatory complexity. No system is more lawyer-intensive than partial liberalization. Liberalization also needs to be distinguished from corporatization and privatization. Corporatization is the transformation of a state monopoly organization into a structure semi-autonomous from government, which may still be state owned, but controls its own managerial and administrative functions. The monopoly status is not touched by corporatization as such, though once the close link to the government is severed, a process is set in motion that makes further changes more likely. Sometimes the corporatized entity is described as a "private" firm, in the sense that it may be organized under private law provisions, which determines its status in, for example, contract and labor law. But that description often confuses legal detail with the reality of control, which may still be very governmental. In other instances, a minority or shares may be issued to the public, though control is still retained by the state. Because corporatization loosens direct administrative controls, it is usually accompanied by the creation or strengthening of a government regulatory mechanism.

Privatization involves the government sale of shares in the telecommunications organization to private investors. However, ownership need not affect the monopoly status, and may therefore not achieve the gains of efficiency of a competitive system. In the United States, AT&T was private and a near monopoly for a very long period. In Canada, private regional monopolies exist, and long distance competition has only recently been begun.

Most European privatizations are only partial.

Privatization may encourage efficiencies of operation. But quality of service may fall if an unconstrained monopolist seeks cost reductions without regard to its captive customers. Privatization can also have the unintended effect of strengthening a monopoly and slowing liberalization, as shareholders become a political constituency to preserve a monopoly.

The American historical experience, for a long time, followed the path from relatively unbridled laissez-faire capitalism to a regulatory system that kept steadily expanding in the decades following the Great Depression and World War II. But in the 1970s, telecommunications policy in the U.S. began to shift in the opposite direction towards a lessening of restrictions.

These policy changes were partly due to a general political and economic philosophy of limiting the role of the state, which made the public more receptive to allowing new entrants as an offset to corporate power, and as a substitute to direct governmental intervention. This philosophy far antedates the conservative Reagan and Bush administrations. Inspired by Lockean principles of natural law, the classic American ideology of government seeks individualism, fragmentation of private power, limitation of government (with the major exception of its role in national security), and protection of property rights and contracts. As applied to telecommunications policy, this philosophy justified a governmental role that is far narrower than in most other countries: it centered on permitting competitive markets to limit the exercise of dominance by any single firm, and in permitting users to choose among service providers. This view was shared by many across the political spectrum, joining those Democrats who were distrustful of concentration of

private economic power with those Republicans opposed to government interference.

## II. HISTORY OF LIBERALIZATION IN THE UNITED STATES

In the United States and other industrialized economies, the system of public networks has been subject to forces of centrifugalism. While technology is one of the reasons, the driving force for restructuring telecommunications has been the phenomenal growth of user demand for telecommunications, which in turn is based on the shift toward a service and information based economy. In consequence, electronic information transmission, i.e., telecommunications, became of ever increasing importance to the new services sector. Price, control, security, and reliability became variables requiring organized managerial attention. This, in turn, led to pressures by large and specialized users to be served outside the traditional, slow-moving and redistributive, monopoly network system.

To understand today's move to a liberalized environment in America, it is necessary to understand the instability of the old monopoly. Telecommunications in the United States began in 1836 with Samuel Morse and his electromagnetic telegraph. In 1876, Alexander Graham Bell introduced a workable telephone. From the beginning, the U.S. telecommunications system was never the centralized state monopoly system prevalent elsewhere known as the "PTT" system (for the post, telephone and telegraph). While the Bell firm grew and prospered, its dominance was the outcome of an effective strategy led by its early guiding spirit, Theodore Vail. That strategy centered around Bell control of interconnection: of rival equipment to their own network; of rival local networks to Bell local networks; and of rival networks to the Bell long distance system.

Once the basic Bell patents expired in the 1890s, independent competitors entered those areas not serviced by Bell concessionaries, especially in rural districts and areas facing high prices. In 1895 alone 199 new firms entered the market; and in 1900, 508.<sup>1</sup> Rival manufacturing firms provided these local carriers with equipment. In several major cities, systems competed side-by-side.<sup>2</sup> After a few years the independents were nearly equal in customer size to Bell, and covered a much greater geographic area. The main difference between the two segments, however, was interconnection. While the Bell telephone system was fully interconnected on a national level through its own long-distance network, AT&T, the independents operated on a fairly limited regional scale.

Several independent companies brought antitrust complaints against AT&T. As the number of lawsuits mounted, and as they were joined by Justice Department actions, AT&T entered into interconnection agreements with some independents, and chose in 1913 to negotiate an agreement with the US government known as the *Kingsbury Commitment*. The company guaranteed existing independent telephone companies interconnection to its long distance network, and agreed not to expand further geographically. It also promised to limit its activities to communications. This governmental action to constrain AT&T from total market dominance was part of a general trend of antitrust policy. Americans had become concerned with the enormous growth of business entities in the decades following the Civil War. There has always been a strong populist current in America opposing domination by big firms. This distrust was especially shared by the political left, farmers, small businesses, and Westerners.

This political constellation soon led to the establishment of a regulatory system of

utility commissions on the state level that supervised privately-owned utilities, including telephone companies. The private utilities were required to interconnect by state law. This arrangement contrasts sharply with the system of centralized state monopoly telephone administrations prevalent in most countries.

AT&T welcomed the new and weak regulatory structures, and embraced them with a bear-hug. Its market dominance grew. By 1934, the year in which the Communications Act codified the various federal regulatory powers, AT&T built and owned 80% of all telephones and access lines in the United States and operated the only national long distance network. Even so, the competing local services took a long time to disappear. In 1945 the last major competitive local loop service in the U.S., the Keystone Telephone Company in Philadelphia, was shut down.

AT&T's dominance remained under attack. The "Walker Report", authored by one of members of the new Federal Communications Commission, challenged AT&T's vertical integration. World War II delayed any follow-up to the Walker recommendations, but once the war was over, the Justice Department filed an antitrust suit in 1949.

In 1956, under a more supportive Justice Department, AT&T achieved a favorable settlement of the case. It was not forced to divest itself of its Western Electric manufacturing arm, but its activities were limited to telephony. AT&T succeeded in avoiding a possibly disastrous antitrust judgement, though it also, once again, had to close its routes of expansion.

In the early 1950s, universal service penetration in the U.S. was largely completed. The telephone reached most households, and an increasingly elaborate system of transfers



kept residential rates low. This soon led to pressures for change by those large business users whose contributions supported low residential charges, and from alternative manufacturers of equipment. In response, the United States hesitantly began a policy of liberalization of entry and interconnection. The FCC had already been authorized in the Communications Act of 1934 to mandate carrier interconnection when in the public interest. Under pressure from the electronics industry whose importance grew in World War II, the Korean War, and in the consumer prosperity of the 1950s, the interconnection of other terminal equipment, originally more restrictive than in Europe and Japan, was permitted. The two key decisions were *Hush-A-Phone* (1956) and *Carterfone* (1968), which allowed customer-owned and non-AT&T equipment to be connected to the network.

This interconnection policy was also extended to transmission. Military research, especially in the radar field, had opened the microwave spectrum to communications. In 1959, the FCC's *Above 890* decision permitted large users to operate in-house microwave long-distance service. These users felt that they were increasingly subsidizing local service and small customers, and they sought to move at least part of their traffic off the common system. By 1969, one microwave delivery company, MCI, won a court ruling against a reluctant FCC and an adamant AT&T to permit "specialized common carriers" to provide private line service for *other* users. From there it was an inevitable step to interconnection. MCI soon wanted to expand beyond private line services into general public switched service. To do so successfully, it had to be able to interconnect with AT&T's local networks in order to reach customers and be reached by them. This was permitted by the FCC in its *Execunet* decision (1978), which basically held that a common carrier such as AT&T has to

provide access to all users, whether they were small residential households or AT&T's own competitors. Thus, by 1975 AT&T found itself, after a long protected period, once again facing a facilities-based service competition.

In 1974, the FCC accepted applications for "enhanced service providers", which leased transmission and switching services from common carrier and added value with computer-based features. Following this decision, the FCC in 1976 went one step further and deregulated the resale and shared use of interstate private lines, even if they did not add value. Before, AT&T left it to its own judgement whose resale it approved. It prohibited the resale and shared use by some private companies, but it leased lines to others for resale, such as the telegraph company Western Union.<sup>3</sup> Through the FCC's actions, the reselling of domestic local and long distance transmission became allowed and extensive.

Liberalization policy eventually led to the break-up of AT&T. This momentous event was brought about by a 1974 Justice Department antitrust suit, (as well as a private anti-trust action by MCI) based on unfair business practices the firm allegedly employed to suppress its competitors, and resulted, after a 1982 consent decree, in 1984 in the most massive reorganization in business history. The divestiture agreement put AT&T's local Bell Operating Companies - approximately two-thirds of the company's assets and employees - into seven Regional Bell Holding Companies. These provided mostly traditional local exchange telephone service, but they increasingly and aggressively sought other opportunities inside and outside the communications field and their service territories, and are becoming global and diversified communications companies.

The government's main argument for the breakup of AT&T was that the company

was inherently incapable of reconciling the liberalized and monopolistic parts of its business. Since regulatory requirements did not work, it was necessary, the government argued and the court agreed, to split off the company's local operations, the source of its bottleneck power.

U.S. liberalization did not stop with domestic services. The FCC, in its 1974 *Domestic Satellite Decision* set an "open sky policy" which prevented AT&T from owning satellites but encouraged other companies to enter. In the spirit of initiating increased international competition, the FCC in 1983 began to approve the entry of other companies into international satellite communications, and soon thereafter into submarine cables. In the 1990s, the FCC's focus shifted from sectoral liberalization to a removal of barriers among segments of the communications field. Together with several states, the FCC also promoted service rivalry. Following the New York Public Service Commission's lead in 1989, establishing interconnected and collocated local competition, the FCC in 1992 extended these principles nationally for those services under its jurisdiction, though its efforts were slowed down by an unfavorable court decision in 1994. Other decisions, including those by federal courts, lowered the barriers between the telephone sector and cable television carriers, setting the stage for competitive entry and for a new merger movement.

In 1993, the Clinton Administration took office. Vice-President Albert Gore, in particular, took a lead in advocating a "national information infrastructure" (NII). However, despite much excitement and an extension of the concept to the "Global Information Infrastructure," little concrete change or initiative actually took place in the first two years of the Administration. Congress, in the meantime, worked on fashioning a compromise bill satisfactory to the various stakeholders. The House of Representatives passed nearly

unanimously bills sponsored by Reps. Markey and Fields, and by Reps. Brooks and Dingell. These bills further opened local competition in those states that had not yet made it possible. They also opened cable television service to local exchange companies, and long distance service to the Bell companies under some safeguards.

### III. REVIEWING THE RECORD OF LIBERALIZATION AND PROGNOSTICATION

A positive impact of liberalization was not a foregone conclusion, as evidenced by the vigorous political and academic disagreements accompanying it. Who was right in prediction of the future? To analyze this question it is helpful to organize the economic perspectives on telecommunications regulation along two dimensions -- market structure control and regulation.

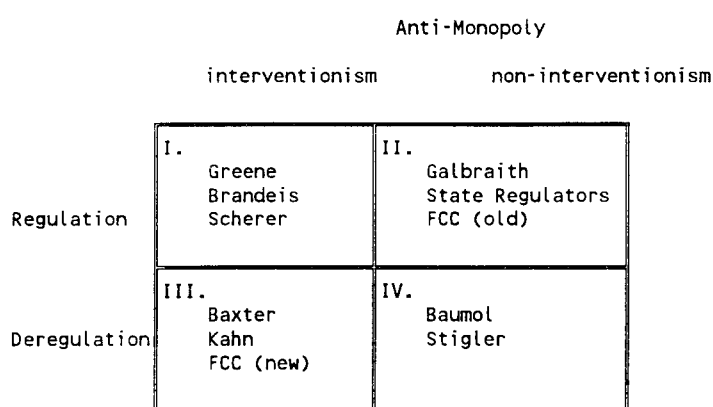
Along the market structure dimension, classic economic analysis suggested that a telecommunications monopoly would lead to incentives to set prices above marginal costs (unless constrained by regulation), and a failure to rapidly offer service and equipment options that corresponded to user needs. Others argued, however, that in certain situations a natural monopoly was efficient, and that as long as a market was *contestable* (that is, if new entrants could appear if the monopolist became inefficient) a monopolist would behave as if competition existed in order to protect its position. As a result, a monopoly was not *per se* inefficient. Yet even such contestability could be non-optimal under certain circumstances of "non-sustainability" of a multi-product setting.

The second dimension along which economists differed was that of regulation vs. deregulation, with the advocates of regulation arguing the need to protect the public interest,

and advocates of free markets pointing to the efficiency loss of unconstrained regulation and to the anti-competitive entry barriers that protected AT&T.

Together these two dimensions can be mapped into four distinct positions (Figure 1). They include several representative names of academics or policy-makers associated with them.

FIGURE 1



Category I: Pro-regulation, Anti-monopoly.

This category includes in the United States traditional "good government" advocates and populists in the style of Louis Brandeis or Judge Harold Greene (in charge of the AT&T case), and those economists who believe that market power may require a curb by both structural and regulatory intervention. In their view, while the powers of AT&T have been cut, the successor companies can operate with and against the public interest. They expected large residential rate increases, service quality reductions, attempts to create new monopolies horizontally and vertically, and continued control of the equipment market by AT&T through its technical dominance and traditional ties to operating companies.

Category II: Pro-monopoly, Pro-regulation.

This category includes traditional state regulators and those economists who believe in the necessity for large firms and who dismiss structural antitrust policy in favor of regulation, such as J.K. Galbraith. In their view, the efficient and socially redistributive AT&T system has been dismantled by zealots, who now let the successor companies run wild. They expected cost increases, price increases, technical incompatibilities, reduction in universality of service, and a reduction in research and development. Long-distance and equipment competition were unlikely to happen due to AT&T predominance.

Category III: Anti-monopoly, Deregulatory.

This group includes pro-competition centrists such as Alfred Kahn, or free market advocates who believe that competition is needed to be established by intervention, such as William Baxter, the government's chief advocate of the AT&T divestiture. Their expectation was that with the monopoly and its inefficiency broken, market forces and competition could assert themselves. The results would be dropping costs, cost-based pricing, innovation, higher productivity, and faster modernization.

Category IV: Pro-monopoly, Deregulatory.

This category includes many, but not all, members of the Chicago and Princeton Schools. The former believe that competition rather than bureaucrats should have reduced AT&T's power, if it was inefficient. The latter opposed attacking an efficient natural monopoly. Both expected actual government policy to lead to a reconcentration of the

industry, a loss of productivity, and a drop in R&D.

Of these four types of assessment, which has proved correct? Let us take a look at empirical evidence.

### Universality

Partly because of subsidized "lifeline" service to needy individuals and other protections, and partly due to its low demand elasticity for telephone service with respect to price, overall telephone penetration did not decline with liberalization, but actually increased, from 91.4% in 1983 to 93.6% in 1991.<sup>4</sup> Though the rate of change for penetration has slowed<sup>5</sup>, one would expect an asymptotic leveling off of growth rates as one approaches 100%. For the middle class (\$30,000/yr household income) penetration was 98% and higher.<sup>6</sup> For the poor (e.g., income of \$5,000 - 7,500), it rose from 82.7% to 84.9% in 1989 before sliding back to 82.8% in 1991. (The official poverty line for a household of 4 was \$11,012 in 1987). For poor Blacks and Hispanics (\$5,000-7,500), telephone penetration has historically been lower than that of the population as a whole or for whites with the same income. For Blacks in this income bracket, penetration rose from 74.7% in 1983, to 80.0% in 1988, and then slid back to 74.3% in 1991. For Hispanics at the same income level over the same period, it rose from 71.1 to 72.6% in 1989 before falling to 70.2% in 1991.<sup>7</sup> Senior citizens (over 65) are actually, in terms of telephone penetration, above the national average. Penetration among those aged 65-69 years old was at 96.9% in 1991, and an even higher 97.3% of those above 70 years.

Nor do rural telephone subscribers seem to have been pushed off the network. Rural

states such as Iowa, Nebraska and North Dakota have telephone penetration well above the national average (95.6%, 96.0%, and 96.6% in 1991, compared to the 93.6% national average). On average, 95% of all farms have telephones, according to the Rural Electrification Administration. Telephone rates for rural areas are often (but not always) lower than in urban areas, because flat rate service is cheaper for small exchanges, because of various subsidy mechanisms, and because of lower overheads.

### Prices

One of the major questions raised was the likely impact on residential subscribers. A tripling of rates was frequently predicted. But the reality has been different. Nationwide since the AT&T divestiture, the Consumer Price Index (CPI) for all telephone service rose just over half as fast as the CPI for all goods and services in the same period. Telephone service climbed from 99.8 in 1983 to 119.5 in 1991, a rise of 19.7%, while the CPI for all goods and services during that time rose about 34%.<sup>8</sup> Local telephone service increased from 98.3 in 1983 to 153.6 in 1991, an increase of 56.2%. During the same period, interstate toll service fell from 101.3 to 67.5, a decline of 33%. Thus, the greatest gains for consumers have been in long-distance, which would be expected, given its earlier above-cost pricing.

In absolute terms, the nationwide average for local monthly residential rates for unlimited local calling increased from \$11.58 in 1983 to \$17.78 in 1990, a change of \$6.20 or 53.5% over seven years. When the lowest available rates (not including lifeline low-income assistance rates) are considered, monthly rates rose \$4.42 in the same period, from



\$5.93 to \$10.35, a rise of 74.5%.<sup>9</sup>

If, however, we examine trends in real consumer price indices over a longer period, 1964-1989, we observe that costs had been declining through most of that period. Between 1977 and 1983 the index for residential telephone services declined at an average rate of 3.7%, whereas after divestiture, from 1983 through 1989, it declined at only .9%. The index, for local service, which had a -2.5% average annual percent change from 1977 through 1983, reversed itself and began to climb at an annual rate of 3.1% through 1989. The index for intrastate toll continued to decline, although slightly more slowly (-5.6% compared to -4.2%), while CPI for interstate toll, which had been dropping between 1983 and 1989 at an average annual rate of -5.0% accelerated to -9.8% in the years from 1983-1989.<sup>10</sup>

Throughout the period 1980-1989, an average household's annual expenditures as a percentage of its total expenditures remained remarkably constant 2.0%.<sup>11</sup>

### Equity

The benefits of liberalization and divestiture were not shared equally. Among residential subscribers, the extent of benefits enjoyed as a result of telephone repricing correlated positively with income. Crandall,<sup>12</sup> calculating both the direct and indirect effects of these shifting patterns in telephone prices, concluded that the overall effect has been "mildly regressive." By assigning values to the indirect benefits when business users enjoy lower telecommunications costs, he finds that the lowest income households paid approximately \$16.00 more per year due to telephone service repricing, while the wealthiest

saved close to \$15.00 per year.

### Service Quality and Reliability

Another projected impact of competition was a decline in service quality, and a number of well-publicized incidents have raised this issue again. The FCC's measures for national quality trends show that dial-tone delay has been kept reasonably constant; that technical transmission quality had generally risen; that the labor-intensive on-time service performance on orders for residences have suffered a steady if minor decay since 1987; and that intraLATA calls have maintained an admirably high level of call completions (over 99.5%), while interLATA completion rates have climbed steadily since 1986.<sup>13</sup> As for customer satisfaction, large businesses seem to have benefitted the most, rising from 91.5% of these customers reporting satisfaction in 1985 to 93.5% in mid-1989, while small businesses in the same period moved from 92.25% to 93.5% and residential consumers reporting satisfaction rates of 93.5% in 1985 to 94% four-and-one-half years later.<sup>14</sup>

While quality deals with regular performance, reliability deals with robustness to shocks. Here, we find that the vulnerability of the network has grown in recent years. There have been a series of large service outages, affecting million of users. Furthermore, with most financial and other transactions conducted electronically, society's vulnerability to outages has grown.

### Productivity

Productivity measures for the American telecommunications sector throughout the

1980s show steady improvement. For example, labor productivity for the seven Baby Bells, when measured in terms of lines per employee, show a cumulative gain from 1983 to 1988 of 34.9%.<sup>15</sup> The number of access lines per telco employee grew from 66.0 telephone employees per 10,000 access lines in 1984 to 44.4 in 1991.<sup>16</sup> At the same time, revenue per employee grew from \$115 in 1985 to \$144 in 1990, a gain of 25.2%. Annual average total factor productivity (TFP) growth between 1971 and 1983 in U.S. telecommunications, using total deflated real revenues for output, was estimated as 3.8%. Following divestiture (1984-1988), the Bell System's TFP growth slowed to 3.13, while the TFP growth for the total sector grew at 3.94.<sup>17</sup> A Morgan Stanley report measured annual productivity gains among the RBOCs in terms of annual growth in expense/line adjusted for inflation. It found an average of 2.4% compound annual growth for the RBOCs in the years 1984-1988, and a jump to 4.7% productivity growth for 1989.<sup>18</sup>

### Research and Development

Liberalization also raised the fear about a technological decline in that AT&T's research arm, Bell Labs, might be curtailed by profit-minded corporate management. But the opposite occurred. Total R&D employment rose from 24,100 in 1981 to 33,500 in 1985. (AT&T and the regionals' joint R&D firm, Bellcore, combined.)<sup>19</sup> By 1988, the regional companies were adding their own laboratories, and total R&D employment rose to an estimated 35,600. According to a 1991 *Business Week* survey, the telecommunications industry's average R&D spending per employee for the years 1986-1990 (\$9,858.20), or when figured as a percentage of 1990 sales (3.6%) outpaced the all-industry figures in those

categories (\$7053.5 and 3.4%, respectively). Bell Lab's R&D budget increased from \$2 bil. to \$2.7 bil., of which about 10% went to basic research.<sup>20</sup>

### Long Distance Competition

AT&T's long-distance rates were reduced about 45% in real terms between 1984 and 1991.<sup>21</sup> (However, the FCC's regulatory changes reduced long distance carriers' access charge payments by instituting an end-user line charge partly and cost-shifting from inter- to intra-state service, and they account for this saving.) Its share of inter-LATA long-distance service (all minutes) dropped from 84.2% in late 1984 to 62.9% by 1990.<sup>22</sup> As a percentage of all users, however, AT&T's share is higher because it has more small subscribers. If short-haul interexchange service is included in the market definition (i.e. including the local exchange companies regional (intra-LATA) service, AT&T share is about 60%.

Interstate switched access minutes grew from 37.5 billion minutes in 1984 to 79.1 in 1991, a very substantial increase of 111%. AT&T's volume increased 57.9%, but that of its competitors rose almost 400% from their much smaller base. Americans make substantially more phone calls per capita (1700) than users in other countries — two and three times as many in 1988 as the British (800), Japanese (550), Germans (500) and French (400).

The number of competitors (long-distance service providers with an FCC identification code) increased from 42 in 1982 to 451 in 1987 to 611 in 1990, before backing down to 597 in 1991.<sup>23</sup> Of these, most are only resellers rather than facilities-based carriers, and many concentrate on business customers. MCI, the strongest of AT&T's rivals, had

grown to a \$12 billion company in 1993 with an ever-increasing line of services. Its revenues grew after divestiture initially at 27% a year. US Sprint successfully completed a \$3 billion network, and got 40% of the large contract for the federal network, FTS-2000. Carrier profits looked healthy, and prices increased slightly in 1993, leading to complaints about a long distance oligopoly.

### Local Competition

Local competition for business customers is emerging principally through fiber optic-based metropolitan area networks (MANs), also known as alternative local telecommunications systems (ALTS) or competitive access providers (CAPs). CAPs revenues have been growing at a rate of about 22% per year. Residential competition in the local loop is likely to emerge from access based on cable television infrastructure, from cellular and micro-cellular telephony, and from other local telephone companies.

### Equipment Prices

Rates declined between 1984 to 1991, in real terms, by an average of 8.2% annually, whereas between 1972 and 1983, the decline averaged only 2.7% annually.<sup>24</sup> The US market for network equipment was fairly closed in the past. The vast Bell system and all of its customers -- comprising 80% of the total market -- were foreclosed to other suppliers in favor of AT&T's manufacturing subsidiary, Western Electric. Because of the divestiture, the BOCs no longer have any incentive to increase AT&T profits, since none of those profits are returned to the BOCs. Equipment prices fell as the BOCs and end users gained the

freedom to shop around. AT&T's national market share for central office switches dropped from 70% in 1983 to 51% in 1990, with Northern Telecom reaching 40%. Central exchange equipment costs declined from approximately \$325 per digital line in 1984, on an industry-wide basis, to \$244 in 1990, and to less than \$100 in 1992, with the steepest declines after 1989.<sup>25</sup>

### Equipment Trade

The flip side of liberalization of equipment is that US firms lost market share. The U.S. trade balance for telecommunications equipment, which had been positive although shrinking in 1981 and 1982, became a \$1.15 billion deficit in 1984, a \$2.3 billion deficit by 1989, though it improved slightly to \$2.1 billion in 1991. Official trade statistics suggest a small improvement to \$2.0 billion in 1992. Imports increased from \$1.6 billion in 1983 to \$4.7 billion in 1991, while exports grew markedly from \$.8 billion to over \$3.3 billion, a four-fold increase.<sup>26</sup> The amount of foreign equipment imported continued to be a dominant factor, in particular from Asian suppliers; in 1992, 52% of total telecommunications imports were from Asian suppliers, with Japan accounting for about a third.<sup>27</sup> All these tendencies created an unanticipated problem for U.S. foreign trade which is likely to be a major political issue for U.S. policy makers.

### Employment

The number of employees at AT&T and its successor companies fell. By 1990, AT&T had reduced its work force by 90,000 jobs, 25,000 of which were cut in 1989 alone,

from their pre-divestiture total of about 370,000. The RHCs dropped from 583,332 employees at divestiture to 542,170 by 1991, a loss of 41,162 jobs, or about 7%. The most dramatic RHC cuts were made in 1984 and 1985 (2.8% and 3.1%, respectively). In 1990 and 1991, RHC cutbacks continued,<sup>28</sup> and these trends are likely to go on.

Many of the employment losses were in manufacturing and are part of the more general decline of US-based electronics manufacturing. On the other hand, if equipment is defined more broadly to include also computers, "smart" office equipment, etc., the number of jobs has increased as the total pie becomes larger.

Many of the new jobs, however, are marketing and similar activities, and often not unionized. Thus, traditional telecommunications job categories, as well as labor unions, suffered as a result of liberalization.

### Summary:

How do these various developments add up? The reader may recall our four categories of prediction about the impact of deregulation and market structure policies. We have assigned "box scores" to predictive quality of the four categories for the eleven dimensions (price, quality, etc). And we aggregated the various dimensions discussed in the preceding section into an overall score of prediction. To do so, we make the following rather simplistic assumption:

(a) the predictions are ranked from +2 (substantially correct) to -2 (substantially incorrect)

(b) each dimension has equal weight.

This results in a summary score:

FIGURE 2

Summary of Prediction Quality

		Anti-Monopoly	
		interventionism	non-interventionism
Regulation	7	-14	
Deregulation	17	2	

Observations:

1. The prediction of those holding a pro-monopoly position as non-interventionist were basically incorrect. The lost benefits of the monopoly seem to have been small. And the extent of lowered barriers of entry due to AT&T restructuring was larger than predicted by those pure free market advocates that expected eventual entry. While they might be right in the long term, the divestiture gave entry a jump start.
  
2. Along the regulation vs. deregulation axis, deregulators were more often right in their predictions than the pro-regulators. However, the latter were also correct in a number of instances. Furthermore, their alarm often led to protective policies, such as lifeline service for the poor which provided at times the corrective that made



deregulatory policies viable.

#### IV. LIBERALIZATION IN OTHER COUNTRIES.

While much of the developed world embraced liberalization in the 1980s, such change had its limits. An infrastructure monopoly still predominates almost everywhere. Basically, only the US, Japan, the UK, Sweden, and New Zealand permit alternative domestic fixed infrastructure of any consequence. Almost everywhere else the monopoly in voice service is still strong, and even resale is rarely available.

The actual reduction of monopoly often tends to be exaggerated. An official Danish political agreement on liberalization illustrates the doublespeak: "There will be competition within all spheres of telecommunications in the next few years, apart from telex, ordinary telephony, radio-based mobile services, satellite services, the infrastructure and the use of the telecommunications network for broadcasting radio and television programmes."<sup>29</sup> In other words, "everything" is liberalized, except for 95 percent. Similarly, though the EU instituted in principle the right to offer value-added services in any country, the details in many countries tended to be restrictive. A similar treatment is likely to weaken the EU's directive of opening other services by 1998 to competition.

Another limit on liberalization is the pace of its actual implementation. After eight years in the U.K. market, Mercury had under 3 percent total market share and its core business remains serving firms in London's City as a second source for data transmission capacity and carrying trunk calls for businesses. Its residential service failed to gain even one percent of the market.<sup>30</sup> Where no entrenched incumbent existed, competition is better

developed. For example, BT's competitor in the cellular service duopoly, Racal Vodafone, holds over 50 percent market share. Because of the value of a head start, the launch of second cellular carriers in competition with the national PTTs (renamed PTOs, public telecommunications organizations) was delayed in Germany, Italy, and Spain. The EU has likewise suffered numerous delays in its efforts to implement liberalized rules for service provision. Thus, where competition with a monopoly exists, it is often a David versus Goliath contest.<sup>31</sup> In such a situation, deregulation strengthened the PTOs because restrictions on them were lifted while competition was still embryonic.

In the equipment market, the liberalization of procurement sources actually enhanced the power of the monopoly PTOs. By opening the public procurement process to additional vendors, PTOs are in a better bargaining position to obtain favorable contract terms and dictate technical specifications. They are less tied to the technology developed by national champion equipment firms.

Only the liberalization of terminal equipment has reduced PTO powers, but such liberalization was largely an accommodation to reality. The market had already liberalized itself by numerous consumers simply but illegally buying cheaper and more varied equipment outside the official PTO distribution.

Similarly, PTOs were not divided up. On the contrary, several countries increased barriers by consolidating carriers, such as Denmark, Italy, and Portugal.

What have been the impact of changes in ownership and control ? Here, too, reforms have increased PTO power. Corporatization substituted managerial and financial autonomy for the direct governmental operational control of PTOs and the political accountability that

came with it. At the same time, the government ministries which assumed regulatory power tended to be ineffective. These ministries have only a handful of experts to confront the huge telephone organizations. In Sweden, for example, Televerket had 42 thousand employees, and the regulative ministry a telecom staff of only six. Most of those perished in a single plane crash in 1989.

Similarly, privatization has strengthened PTOs. The presence of shareholders to which the PTO must answer has added new incentives for improved performance which were largely absent in the past. Privatization also curbed some market liberalization by creating a wide constituency of shareholders who oppose sweeping reforms. This used to be the case in the US in the past, and is now with Telefonica and British Telecom. Similarly, NTT's remaining shares have not been sold by the government in order not to depress the share price and hence hurt millions of investors.

The international strategies of PTOs, such as transnationalization and alliances have strengthened their position. Several of the PTOs are becoming far-flung global organizations, involved in numerous activities that cease to be transparent to governments. Competitors assert that these activities are supported by the monopoly profits from basic service. At the same time, many PTOs have also formed alliances among themselves, often as a market sharing arrangement.

Such cooperation is also manifest in policy harmonization, which also often leads to a continuation of the traditional stability. While harmonization may eliminate restrictive national rules, it is just as likely to be used to prevent competitive behavior by establishing a policy cartel.

Thus the modest steps of liberalization have not harmed the traditional telecommunications organizations, and indeed, have benefitted many of them. PTOs enjoy a dominant position in the market. They have been energized. Their competitors are tiny, their regulatory authorities are frequently underperforming, and their role is enhanced by national industrial policies. (This is not to say that some users and competitors have not also benefitted. Telecommunications are a growth field rather than a zero-sum game.)<sup>32</sup>

But will the present dominance last? Given the dynamic forces of a liberalized telecommunications market, this is unlikely. In time, PTO market share will decline as their competitors will grow in size and gain interconnection rights; presently unprepared regulators will become more effective; the PTO's national role in industrial development policies will be shared with other firms; PTO cartel collaboration will change to more head-to-head competition, sometimes prodded by anti-monopoly agencies. New domestic entrants will seek opportunities in specialized and general markets, as will foreign entrants, some of them PTOs themselves. Liberalization at home will become critical to PTOs seeking reciprocal market access abroad. Other entrants will be specialized carriers, such as cellular companies, cable TV providers, and VAN resellers.

The notion of the single territorially defined carrier for an entire country's electronic information flows is not sustainable in the long run. The strategies followed in the 1980s and 1990s have set forces in motion that will in time assert themselves. What we are witnessing today is the golden age of the traditional telecommunications organizations, but it will not last, as it did not in the United States or in Japan.

## V. THE FUTURE OF LIBERALIZATION: WHAT IS THE NEW MARKET STRUCTURE GOING TO LOOK LIKE?

What will be the forces of change in the coming decade. The conventional scenario for the evolution of telecommunications, offered by traditional state monopoly carriers around the world as their vision of the future, was the *integrated single superpipe* merging all communications links into a single conduit controlled by themselves, and interconnected internationally with similar territorially exclusive superpipes. This scenario of technological integration took no account of the simultaneous liberalization which was accompanied by considerable organizational centrifugalism. Instead of consolidating, the network environment keeps diversifying.

The various physical network elements become linked with each other through various interconnection arrangements, and form what can be described as the "network of networks".

Yet this is not the end of the story. Competition begets diversity; diversity begets complexity; and complexity leads to efforts at simplification. Thus, in order for the actual user of telecommunications to handle this balkanized environment that is so totally different and so much more complex than the technologists' model of the single superpipe, the numerous network pieces need be integrated into a usable whole. There are several ways to do so, but the most promising way is for a new category of 'systems integrators' to emerge which provide the end user (corporate, governmental, affinity groups) with access to a variety of services, in a one-stop fashion. These specialized integrators might typically assemble packages of various types of services and equipment, etc, and customize these packages to the specific requirements of their customers. The characteristics of "pure"

systems integrators -- for there will be various hybrids -- is that they do not own or operate the various sub-production activities but rather select optimal elements in terms of price and performance, package them together, manage the bundles, and offer it to the customer on a one-stop basis. They relieve customers from the responsibility of integration for which expertise is required.

Today, systems integrators exist only for large customers and customer groups. But tomorrow things may be quite different. The additional step would be for systems integrators to emerge that put together individualized networks for personal use, or *personal* networks, and offer them directly to endusers. This means individually tailored "virtual" network arrangements that serve individualized communications needs and providing access to frequent personal and business contacts, data sources, transaction programs, video and audio publishers, data processing and storage, bulletin boards, and personal information screening.

As these systems integrator-provided networks develop, they access and interconnect into each other and form a complex interconnected whole sprawling across carriers, service providers, and national frontiers. The telecommunications environment evolves from the "network of networks", in which carriers interconnect, to a "system of systems", in which systems integrators link up with each other.<sup>33</sup>

The structure of telecommunications, as far as endusers are concerned, will therefore change significantly. Instead of dealing with *carriers*, they will transact with *systems integrators*. In such an environment, what will happen to traditional regulation? How are consumer protection and universal service affected? What regulatory safeguards are

necessary?

In telecommunications, regulation by government existed partly to effect the balance of power between huge monopoly suppliers on the one hand, and small and technically ignorant users on the other hand. It inserted the political and administrative process to alter unconstrained market outcomes which might negatively affect consumers and competitors. In return, the dominant carriers received protection from competition. Even where competition emerged with rival carriers emerging, customers still had no expertise in dealing with a complex set of services and products. In a system of systems, on the other hand, the imbalance changes drastically. Now, systems integrators, competing with each other for customers, act as these users' agents toward carriers. They can protect users against carriers' under-performance and power, and get them the best deal. This should resolve many traditional problems of price, quality, market power, security, even privacy. Business communications should be more effective than ever. Technological innovation is likely to be accelerated by knowledgeable buyers and marketers of services. Thus, assuming that users have a choice among systems integrators and that systems integrators have a choice among non-colluding suppliers of underlying services and that market power by carriers and systems integrators is checked by competition, the need for government intervention declines substantially.

On the other hand, not all traditional policy goals are fully resolved in a system of systems. Let us turn to them now.

1. Universal service. The emerging systems of systems will exert competitive pressures on cost and therefore on many prices, thus making telecommunications more

affordable. But, it will be impossible to maintain the traditional redistributive system of generating subsidies and transferring them internally within the same carrier from one category of users to another category. Several things will disrupt this arrangement. In a network of competing carriers, an internal redistribution is not sustainable once other carriers without redistributive burdens target the users whose price is above cost as the most likely customers. Furthermore, residential users may end up paying a proportionally higher share than large users, because cost shares in the substantial joint costs may end up allocated inverse to demand elasticity -- the Ramsey pricing rule -- and large users have more options and hence greater elasticity. Thus, the trend which at present is described as a "rebalancing" of prices towards cost would go much further than that, burdening the inelastic customers. Nor can one expect to continue to rely on a system of access charges to provide the source of subsidies, since these charges imply access into "the" network, which will be a meaningless concept where alternative transmission is easily available.

Yet this need not spell the end of support schemes. If one wants to support some categories of service or users such as rural America or the poor -- either for reasons of social and regional policy, or for the positive externalities their participation offers to others who can reach them -- it is still possible to do so, only in different ways.<sup>34</sup> One alternative mechanism might eliminate the present invisible tax system and replace it with a visible charge system. It could draw on general government revenue or on specialized communications charges such as communications sales tax or value-added fees. The moneys raised might go to a "universal service fund" which would be used to support certain network providers, as well as categories of users, and give them a choice among carriers. This



charge would replace the present opaque system and would make it transparent and accountable. It would also uncouple the discussion of optimal industry structure from those of optimal social policy.

The advantage of systems integrators is that they pay to competing carriers a price based only on the latter's short-term marginal costs and can pass this low cost on to their customers. Yet a significant part of cost in a capital intensive industry such as telecommunications networks is fixed, and would not get compensated in such an arrangement. The long-term result might be either a gradual disinvestment in networks, or the reestablishment of monopoly, or price cartels and oligopolistic pricing. None of these scenarios would be desirable and they will prove to be a challenge to future regulators.

2. The free flow of information. In the traditional network environment, the granting of access and non-discriminatory content-neutrality is required of the general "public" networks by law, common carriage regulation, and even common law. But common carriage requirements do not apply to systems integrators. They can institute restrictions on their systems, and exclude certain types of information, subjects, speakers, or destinations.

Yet, the institution of common carriage, historically the foundation of the way telecommunications are delivered, will not survive in a system of systems. "Common carriers", i.e. telephone companies, will continue to exist, but the status under which they operate -- offering service on a non-discriminatory basis, neutral as to use and user -- will not.<sup>35</sup>

The blows to traditional common carriage do not come from rival telecommunications carriers such as MCI, but from two new directions. The first is the increasing overlap

between the common carrier system and well-developed mass media private contract carriers such as cable television networks, which in a remarkably short period have wired the nation with a second and powerful network system, and which are on the verge of entering point-to-point, switched, and mobile telecommunications services. The other challenge to common carriage are systems integrators.

In head-to-head competition between a common carrier and a private contract carrier or systems integrator, the former is at an inherent disadvantage:

- ▶ A common carrier cannot use differentiated pricing due to its non-discrimination obligation and because it cannot prevent arbitrage. Non-common carriers' rivals can offer services to some customers at a low enough price to induce them to sign up, and use their contribution to revenues to underprice a common carrier for low-elasticity customers.
- ▶ A common carrier must serve a contract carrier or systems integrator, but not vice-versa. There is no reciprocity. Competitors can use valuable parts of a common carriers operations, but need not share their own unique features.
- ▶ A common carrier cannot pick customers.
- ▶ A common carrier cannot manage the competition among its customers and benefit from it.
- ▶ In putting together a service package, the systems integrator can pick-and-choose among the lowest-price component providers, while the common carrier is likely to offer only its own.
- ▶ Competition for transmission and other services will lower their price for systems

integrators to marginal cost, which is likely to be lower than the average cost for both common and contract carriers of providing it.

As a result, a systems integrator may provide services more cheaply, even though they use the carriers' underlying transmission facilities!

It is unlikely that the common carriers will simply sit by in such a situation. They will operate their own systems integrators, and they will move to contract carriage themselves, such as price-differentiation of customers, partly based on the argument of "meeting competition." And that is, indeed, what is already starting to happen. The "deaveraging" of prices would become standard, and negotiated rates spread to many non-commodity services.

What are the implications? The system of systems might have the capacity for a large number of voices, yet it would still result in a narrower spectrum of information, because systems integrators and carriers would not want to be identified with certain types of uses and users. The need for the various systems to access each other, and for information to travel over numerous interconnected carriers, means that the restrictiveness of any one of the participants would require everyone else to institute content and usage tests before they can hand over or accept traffic, or they must agree to the most restrictive principles. Information travels across numerous subnetworks until it reaches its destination, and nobody can tell one bit apart from another bit. If each of these networks and systems integrators sets its own rules about which information is carried and which is not, information would not flow easily. Common carriage can be substituted by an alternative system -- third-party-neutral interconnection -- but it, too, is not self-enforcing.<sup>36</sup>

3. Interconnection and compatibility. The economic rationale behind the tension between the integrative and pluralistic forces is most pronounced on the front where they intersect: the rules of interconnection of the multiple hardware and software sub-networks and their access into the integrated whole. As various discrete networks grow, they must inter-operate in terms of technical standards, protocols, and boundaries. Yet interconnectivity is not normally granted by incumbent firms. That is the lesson of decades of American experience. Regulatory requirements such as open network architecture, comparably efficient interconnection, or collocation were part of the evolution towards competition. In effect, these provisions regulated in order to deregulate.<sup>37</sup>

4. International asymmetry. The system of systems works as long as it is competitive in each of its stages, or as long as regulation establishes non-discrimination. However, in an international setting neither of these conditions is likely to be met. Most countries lag behind the U.S. and Japan in the evolution of networks. The traditional monopoly carrier is still almost always firmly entrenched, and operating in all stages of communications. In consequence, systems integrators cannot truly compete against these PTOs in full-line systems integration. This might be considered to be an internal issue for these countries, except that it has a global anti-competitive impact. This is because some of these PTOs are aggressively pursuing international systems integration themselves, while at the same time holding gate-keeper powers over entry into their own home markets. Thus, for example, the PTO of an important European country could restrict the effectiveness of an American systems integrator to offer global services, while at the same time entering the more liberalized environment in America.

Of course, other countries' PTOs can play the same game, and as a result, a new trend of international carrier collaboration has emerged in which major PTOs enter into joint ventures of systems integration. Potentially at least, these alliances of dominant national carriers could create international cartels, and barriers to competitive entry of other systems integrators, whether in their home countries or internationally. It has the anti-competitive potential of "whip-sawing" in which a one-sided liberalization across frontiers permits the remaining monopolist to fully appropriate the previously shared monopoly profits. To prevent this it is essential to reach international non-discriminatory access, lease, and interconnection arrangements that are neutral as to the nature or the nationality of the systems integrator. The U.S., being the largest and most interesting market for systems integrators, can exercise leadership in pressing for such reciprocity.

## VI. CONCLUSION

The preceding analysis leads to the conclusion that liberalization will not be the "end of history" as far as telecommunications regulation is concerned, and that government is not likely to disappear from this area. In the 1980s, telecommunications policy was centered on liberalized entry. This was correct then and now. The empirical evidence provided in Section III demonstrates the generally positive trends in telecommunications during the phase of liberalization. But in the 1990s second-generation liberalization or issues involving the integration of the various partial networks and services will be at the forefront. Liberalization leads to network pluralism, which in turn generates the incentives for systems integration. Systems integration resolves many of the traditional regulatory issues of

traditional telecommunications market structure. But it leaves others unresolved, and it creates new ones. Thus a new set of regulatory questions may be upon us, requiring new approaches. None of the developments anticipated in this article will happen overnight, though some are already manifest. But this should not lead us to ignore and avoid understanding them. The present policy efforts in Washington and Brussels still deal largely with liberalization. The Markey-Fields and Brooks-Dingell legislative initiatives and their counterparts by Senators Hollings and Inouye are efforts at dismantling some barriers to entry and competition. As useful as these changes are, the main issues for the future still need to be tackled. The FCC's (and the New York PSC's) Open Network proceedings were one such effort. The White House's "Title VII" proposal for switched digital broadband services is another. But this is only the beginning. Technical convergence leads to business and global overlap, and both require legal integration. Liberalizing telecommunications competition will prove to have been the easy part. Dealing with the consequences, and protecting traditional policy goals in the new environment by fashioning new tools will be the next and more difficult challenge. To paraphrase Thomas Jefferson: "The price of liberalization is eternal vigilance."

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