

**Can We Avoid
Repeating the Mistakes of the
Past in Telecommunications
Regulatory Reform?**

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Executive Summary

In October 1978, Congress passed, and President Carter signed, the Airline Deregulation Act (ADA). The Act created immediate fare flexibility, and put in place a series of “dates certain” for rapid and complete deregulation of prices and entry, ending with the abolition of the Civil Aeronautics Board itself at the end of 1984. Since the passage of the ADA, traffic and innovation have skyrocketed in the airline industry as consumers have saved in excess of \$15 billion annually. Despite the recent turmoil in the industry, airline deregulation generally is regarded as a major success.

Other deregulation experiences have not gone as smoothly. Railroads, for example, remained regulated for more than three decades after long-haul trucking and the Interstate Highway System began to erode their monopoly power. The delay in deregulation of the railroads cost the economy billions of dollars and led ultimately to the virtual meltdown of the industry in the 1970s.

In this paper, we examine the implications for economic welfare of the *speed* and the *scope* of industry deregulation. Based primarily on case studies of five industries – railroads, natural gas, banking, airlines and mobile telephony – we find that when strong competitive conditions existed, the slow and incremental approach to deregulation in these industries not only delayed the benefits consumers ultimately reap from deregulation, but also created economic distortions and dislocations.

As shown in Table One, the delayed, piecemeal deregulation of railroads, natural gas and banking led to severe economic dislocations. By contrast, quick and complete economic deregulation (i.e., deregulation of prices, as well as elimination of product and market restrictions) in the airline and mobile telephony industries yielded immediate benefits for consumers and far less severe and protracted transitions.

TABLE 1:**Summary of Findings**

Industry	Disruption	Costs of Continued Regulation	Type of Deregulation	Result
Railroads	Invention of Efficient Long-Haul Engines; Interstate Highway System; Rise of Trucking as Competitor	Regulation prohibited price adjustments, long-run contracts, introduction of new technologies, exit from unprofitable markets.	Delayed, Piecemeal Followed by Complete Economic Deregulation	<u>Delayed and Partial Deregulation:</u> Deteriorated Infrastructure; Bankruptcies; Bailouts and Government Subsidies <u>Complete Deregulation:</u> Renewed Innovation and Investment; Rising Productivity; Falling Prices
Natural Gas	Oil Shocks; Volatility of Energy Prices; Increasing Demand for Natural Gas	Imbalances between intrastate and interstate market; insufficient investment in exploration; shortages; inefficient investment in power generation facilities	Delayed, Piecemeal Followed by Complete Economic Deregulation	<u>Delayed and Partial Deregulation:</u> Shortages; Inefficient Exploitation of Natural Resources; Plant Closings; Consumer Costs In Excess of \$13 Billion. <u>Complete Deregulation:</u> Unbundling of Production and Transportation; More Efficient Contracts; Consumer Savings in Excess of \$2 Billion
Banking	High Inflation/Volatile Interest Rates; New Entry by Money Market Mutual Funds	Banks and S&Ls unable to respond effectively to competition, adjust rates, diversify product lines	Delayed, Piecemeal Followed by Complete Economic Deregulation	<u>Delayed and Partial Deregulation:</u> Widespread Bankruptcies; Massive Bailout <u>Complete Deregulation:</u> More Competitive Markets for Financial Instruments of All Kinds; Industry More Diversified, Financially Sound
Airlines	Unstable Energy Prices; Charter Airlines; Jet Aircraft	Inefficient route structures; imbalance between interstate and intrastate fares; non-price competition and low load factors; inability to respond to oil price volatility and deep recession	Timely, Complete Economic Deregulation	<u>Complete Deregulation:</u> Discount Fares and Loyalty Programs; More Efficient Route Structures; Rapid Increase in Passenger Volume; Improved Ability to Respond to Economic/Energy Price Shocks; \$15-18 Billion in Consumer Benefits
Cellular Telephony	Innovations in Digital Mobile Telephony, PCS	Relatively low rates of innovation and market penetration; high prices; insufficient capacity	Timely, Complete Economic Deregulation	<u>Complete Deregulation:</u> Dramatic Increase in Subscribers, Usage; Price Declines; Innovation and New Services

See text for additional notes.

Our research may indicate the way forward for telecommunications policy. The telecommunications industry has experienced technological and market disruptions that seem to be similar to those that drove the need for deregulation of the other industries we studied. Stimulated by technological convergence of voice and data services, and of wireless and wireline capabilities, new competitors have emerged, including cable telephony, wireless, and the Internet, to erode the market power of the incumbent firms. New entrants, as any rational entrants in a new industry, generally focus their efforts on the most profitable segments of the business, leaving low-margin, low-growth segments to the incumbents. Some have argued that incumbents, hampered by regulation, have been hindered in their ability to respond.

The Telecommunications Act of 1996 represented a classic example of partial deregulation. While it repealed the Bell companies' statutory monopoly over local telephone service, most other aspects of regulation remained in place – including wholesale and retail price regulation and the statutory “obligation to serve” that prevents incumbents from exiting unprofitable markets.

The resulting pattern seems to be a familiar one: Rather than competing on the merits of their technologies and product offerings, incumbents and new entrants alike seek to “game” the regulatory process for strategic advantage; investment incentives are distorted, resulting in misallocation of billions of dollars in capital; regulatory uncertainty translates into economic uncertainty, with high rates of bankruptcy; consumers are denied the full benefits of competition, including new products and services as well as lower prices; lawyers and lobbyists, rather than inventors and engineers, absorb the attention spans of senior management.

In adopting a “go slow” approach to telecom deregulation, policymakers risk repeating the mistakes of the past. Quick and complete deregulation may not be risk free, but our research in other industries indicates it is preferable to stretching deregulation out over many years through a piecemeal and incremental process if vigorous competition already exists.

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1. Introduction and Framework

Economic regulation (i.e., price-entry regulation) has played a central role in the American economy since the late 19th Century. Among the industries that at one time or another have been subject to such regulation are airlines, apartments, banks, barges, buses, cable television, electricity, insurance, mobile telephony, natural gas, oil, railroads, real estate sales, securities brokerage, taxicabs, telephones and trucking. Some of these industries remain regulated today. Others have been deregulated, in whole or in part.

In this paper, we explore the process by which deregulation takes place and the implications, for economic welfare, of that process. Based on in-depth case studies of five industries, we conclude that (a) the timing and scope of deregulation have important implications for economic welfare and (b) welfare can be harmed significantly when policymakers wait too long to lift regulations, or do so in a piecemeal manner. If similar kinds of technological and economic shocks -- and competitive and regulatory responses -- that took place in other industries are taking place in telecommunications, an application of our framework to the telecommunications sector will likely lead to the conclusion that the delayed deregulation of this industry will dramatically limit welfare-enhancing competition.

Generally, economic regulation has been justified on the basis of network externalities and/or economies of scale. In the absence of government intervention, lack of competition in such markets may suboptimize economic welfare. For example, a profit-maximizing monopolist will set prices above the economically efficient level, resulting in too little production of the monopolized good – consumers pay too much for too little. Since only a single firm can efficiently serve a market characterized as a “natural monopoly,” new entry also creates inefficiency in the form of excess capacity, insufficient profits and, ultimately, exit.

Economic regulation deals with these market failures for industries characterized as natural monopolies by replacing the market mechanism with a government regulatory agency. Typically, the agency grants to a single firm the exclusive right to serve a particular market (i.e., it restricts entry). In return, the grantee is required to serve all customers at prices and conditions set by the regulator.³

Economic regulation has always been controversial, but in the 1970s U.S. economists and policymakers began to question broadly whether it was achieving its goals. They argued that regulation had problems of its own – that regulatory agencies were prone to “capture” by regulated industries, that regulation by its nature limits

incentives to reduce costs or introduce new services, and that regulators, no matter how well intentioned, often cannot respond quickly enough to changes in costs and other market conditions. Moreover, the critics suggested, some regulated industries lacked the characteristics of natural monopoly, perhaps because technological changes had reduced or eliminated economies of scale.⁴

These critiques led to a sweeping reexamination of the appropriate role of economic regulation. As a result, many of the industries mentioned above have been deregulated in whole or in part. Airlines, banks, barge companies, bus lines, cable television providers, railroads, securities brokers and trucking companies, for example, generally are now permitted to enter and exit markets without the prior approval of government regulators, and to charge whatever price the market will bear. There is a general consensus, at least among economists and other policy analysts, that deregulation in these industries has benefited consumers and resulted in substantial gains for the U.S. economy – even, as discussed below, where it has been carried out imperfectly.

In other sectors, including telecommunications, deregulation remains incomplete. Telecommunications regulation has important economic effects because communications technologies affect productivity in many other industries. Therefore, if a nation does not get communications policies right, the entire economy can suffer. Conversely, a robust communications sector can give a positive boost to the entire economy.

The U.S. telecommunications industry has been very closely regulated at the national as well as state levels since the passage of the Communications Act of 1934, which established the Federal Communications Commission (FCC) and laid the ground rules for interstate telecommunications regulation, while authorizing state public service commissions to regulate local and intrastate long distance service. For the fifty years following the Act, the industry (dominated by AT&T) grew robustly, providing a telecommunications network that was the envy of many parts of the world.

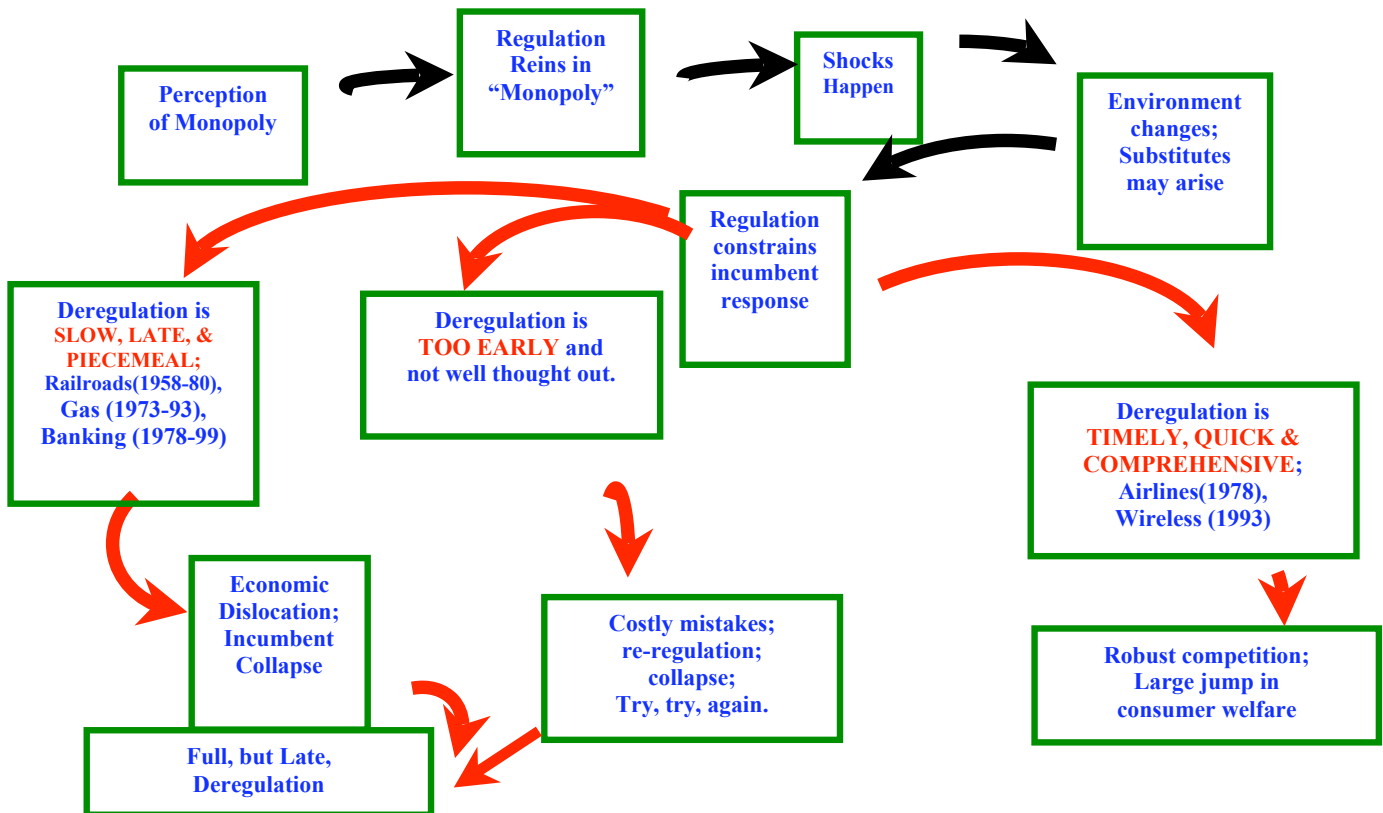
Over time, it became clear that some elements of the telecommunications business were ripe for competition. Competitors (notably MCI) and policymakers eventually opened up telecom equipment and long distance markets to competition, leading ultimately to the breakup of AT&T in 1984 (and with it the deregulation of long distance service) and to the Telecommunications Act of 1996, the first major U.S. telecom legislation since the 1934 Act. However, the 1996 Act represented at most partial deregulation in many subsectors. It repealed the monopoly status of the local telephone companies, but left in place their obligation to serve, state and local regulation of both retail and wholesale prices, and a “universal service” program that involves large cross-subsidies between and among various customer groups and geographic areas.

In this paper, we seek to illuminate the debate over telecommunications deregulation by examining critically the processes and outcomes of deregulation in other industries. In particular, we have examined the deregulation histories of freight railroads, gas pipelines, banking, passenger airlines, and wireless telephony. Based on this examination, we develop a conceptual model addressing the dynamics of regulatory

reform. We believe this model and the supporting case studies provide a useful lens through which to view regulatory issues facing telecommunications policymakers. Moreover, we view this as a timely moment for the examination of our theory by policymakers as they consider the need for regulation in the telecommunications sector.

The patterns we see from the record of regulation and industrial competition in these five industries suggest a common dynamic process illustrated in Figure 1. In particular, the historical analyses illustrate that the logic and benefits of economic regulation typically depend upon an assumption of industry stability and/or low rates of innovation. Over time, however, economic or technological “shocks” occur which disrupt the status quo and trigger industry changes. Such shocks typically give rise to (or are the result of) new competitors, who exploit new technologies, develop new business models, and/or invent new products that serve as economic substitutes for the products or services offered by the regulated incumbent(s).⁵ Such disruptions also place strains on the regulatory regime itself, as the new entrants, and their products, often escape the reach of the existing regulatory regime.⁶ The result is a “regulatory mismatch,” under which the new entrants are able freely to adjust prices and service offerings, and enter and withdraw from markets, while incumbents are unable to respond effectively due to regulatory constraints.

Figure 1. Three paths to deregulation: *Too early, too late, on time*



As industry shocks play out and give rise to competitive alternatives, policymakers eventually respond by eliminating economic regulation of incumbent providers. Our case studies suggest that from a social welfare standpoint, the two pivotal variables in deregulation policy are (a) timing and (b) scope. With regard to timing, when new, unconstrained entrants begin to enter a regulated industry and provide competition where it was previously absent, one of three outcomes may prevail. First, at least in theory, deregulation could come “too early.” For example, a prematurely deregulated monopolist might seek to forestall (or punish) entry in newly competitive markets by cross-subsidizing prices in those markets, thereby deterring economically efficient entry by making it unprofitable (while sending a message to potential entrants in other markets where competition might otherwise break out). In this case, continued regulation – which would prevent the monopolist from raising price in the still-monopolized markets and from reducing prices below costs in the newly competitive ones – might be needed for a time to facilitate the development of competition. While such an outcome is theoretically possible, our five case studies did not identify any examples of such “premature” deregulation.⁷

Indeed, our research shows that it is far more common for deregulation to arrive “too late,” i.e., after the economic preconditions for competition have emerged. The consequences of delayed regulation include not just opportunity costs, such as the lower prices and better products competition it would have produced, but also the crippling of regulation-constrained incumbents and associated economic dislocations, inefficiencies and losses in social welfare. However, we have also seen instances in which policymakers have dismantled outdated or obsolete regulatory structures “on time,” that is, “in the zone” for creating significant social and economic value, as illustrated in Figure 2.

Figure 2: Finding the right time for deregulation

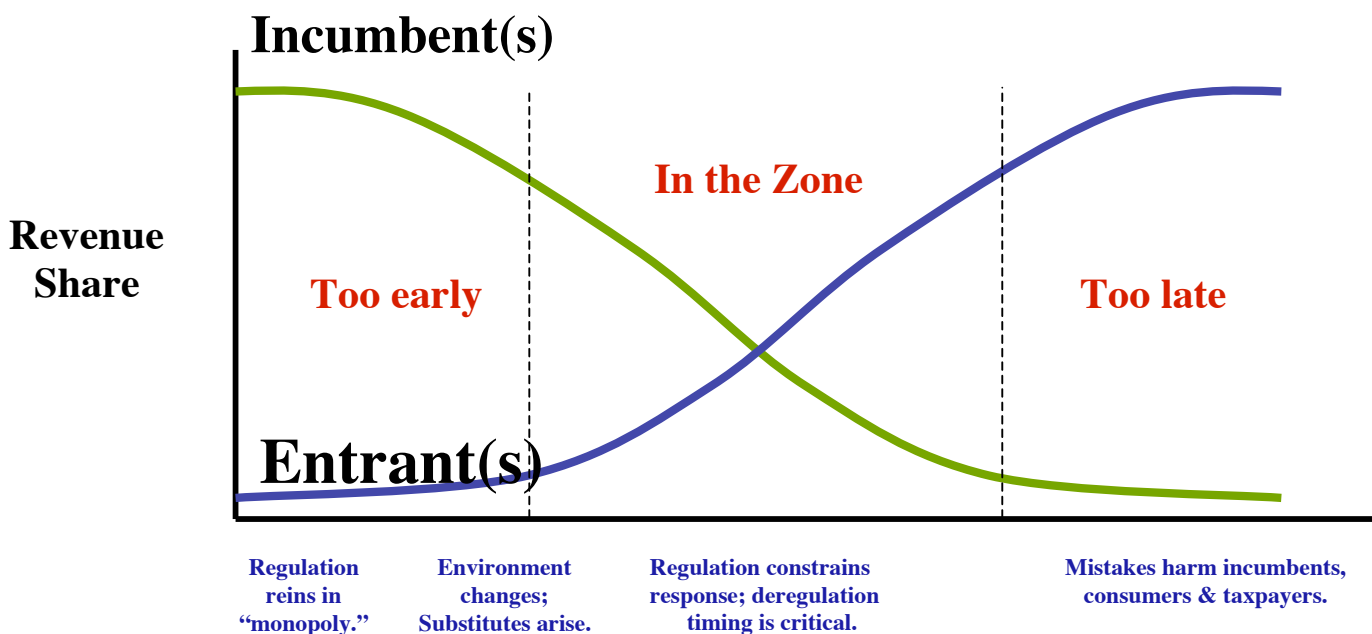


Figure 2 shows how the fortunes of regulated incumbents and unregulated entrants can evolve over time, overlaid by the timing implications for appropriate deregulation. In particular, it suggests that when the incumbent(s) are lopsidedly bigger and more powerful than the entrants, deregulation might be considered premature (“too early”). When entrants have established themselves to be economically viable and have begun to take market power and share from incumbents, the industry is “in the zone” for timely deregulation. Finally, when unconstrained entrants have been able to leverage their advantaged regulatory position to drive incumbent(s) into decline, then deregulation can arrive “too late” for welfare maximization, but is appropriate “as soon as possible” to minimize additional welfare losses.

This pattern is consistent with what seems to be unfolding in today’s telecommunications marketplace. Consumers are confronted with an increasingly wide array of communications options from wireless providers, from cable TV operators, and from new entrants offering low-cost (or free!) VoIP service. The prices and conditions offered with these plans change frequently as competitors vie for the affections of increasingly price- and service-conscious consumers. Unlike many of these competitors, incumbent telephone companies must often seek state regulatory approval and sometimes engage in protracted tariff proceedings if they wish to respond to the price changes of unregulated rivals. That is, the incumbent’s natural competitive pricing and product portfolio response to entrants can be delayed because of these regulatory proceedings.

The second key variable for deregulation processes that we examine is scope – i.e., whether deregulation is complete and comprehensive, on the one hand, or partial and piecemeal, on the other. Our case studies show that partial or piecemeal deregulation has proven far less successful than more comprehensive approaches, in part because of the unavoidable opportunities for non-productive strategic behavior by all parties (entrants, incumbents and customers) that are inherent in a “partially regulated” environment.

The costs of late, slow, or piecemeal deregulation can be quite high. Obsolete regulations diminish social welfare by encouraging both the incumbent(s) and entrant(s) to act strategically in the face of the regulations, optimizing profits subject to the regulatory constraints instead of optimizing profits in competition for customers and revenues. This behavior can decrease consumer welfare substantially. These losses in social welfare are paid not only by consumers in lower quantity and quality of products, foregone innovations, and lower consumer choice, but often by taxpayers as well, as the government may end up bailing out failing incumbents industry and their attendant workforces. Ultimately, deregulation that is too late can drive the incumbent(s) into bankruptcy, and bestow monopoly power on the newly dominant former entrant(s).

We present in Section 2 very brief outlines of the regulatory histories of the railroad, natural gas, banking, airlines, and wireless telephony industries – the latter in the context of the broader communications marketplace. These case studies underlie our conceptual model and conclusions. We close the paper in Section 3 with a discussion of

our framework applied to today's communications industry to address the appropriate timing and scope of regulatory reform in that sector.

2. Industry Case Studies

We examined five industries that went through deregulation in the U.S. during the last Century, including freight railroads, banking, natural gas, wireless telephony, and airlines.⁸ None of the cases encompass all elements from the conceptual framework we provide, but each provides an important component to building a conceptual model of the dynamics of deregulation. These industries followed very different paths in their timing and scope of deregulation, with dramatically varying effects on social welfare. The case studies lead us to three principal conclusions:

- *Regulations change much more slowly than do markets and technology, and delayed deregulation can have large negative consequences for social welfare.*
- *When outmoded regulations are relaxed or eliminated piecemeal, partial reforms can exacerbate the economic distortions, to the point of diminishing rather than increasing social welfare.*
- *Whenever it comes, comprehensive deregulation invariably gives rise to an increase in innovation, growth, and social welfare gains.*

A. Railroads

1. History

In response to abuses of market power and “unfair pricing” by the U.S. freight railroad industry, the Congress in 1887 established the Interstate Commerce Commission to establish and oversee a regulatory regime for railroads that was designed to create a level playing field for industry participants and a sense of fair rate-making for freight customers.⁹ Through a series of Acts in first half of the 20th century, the regulatory regime became increasingly strict, not only in terms of closely regulating rates and earnings, but also requiring regulated carriers to serve certain low density, unprofitable routes that unregulated carriers would not serve at going regulated rates. Extensive regulation limited market power by the railroads, but also constrained the ability of railroads to respond to changing market and technological conditions. In particular, regulation did not anticipate the creation, growth, and government subsidy of a new technological alternative to freight railroads: highways and trucks. The trucking industry grew very rapidly in the United States after the close of World War II. As early as 1955, President Eisenhower called for the deregulation of the railroads, in part because they were constrained from competing vigorously with their ascendant competitors. Full deregulation of freight railroads did not come until 1980, however, several decades late, by which time the railroads were effectively decimated.

By the end of WWII, the importance of trucking for long-haul transportation had come to the fore for American industry. President Eisenhower committed the U.S. to a long-term investment in interstate highways, engine technology advanced to support for long distance hauling, and innovation in carriages and frames allowed heavier loads to be carried.

As part of the ICC policy to foster and develop the trucking industry, railroads were constrained with respect to prices, entry and exit, and innovation. Where the trucking industry was nascent, rail prices were often set high, so that trucking companies could offer lower prices to win business and avoid being driven out by the railroads. When inflation ravaged the economy in the 1970s, rail prices were kept too low too long, preventing companies from realizing compensation for their higher costs. When competition from trucking rendered some markets unprofitable for the railroads, they were often not allowed to exit those markets, causing losses to pile up. Broadly, the regulatory pricing system for railroads, which was based at least as much on politics as on economic reasoning, constrained the industry's ability to price according to their costs or their competitors' prices. The ICC repeatedly rejected proposals for both rate hikes and rate decreases. Moreover, the ICC delayed the pricing of, or prohibited outright, new innovations developed by the railroads to transport grain and coal more efficiently.¹⁰ As railroad profitability withered, so did capital investment, creating a downward cycle of diminished capabilities, diminished market share, and diminished profitability.

While railroads were hamstrung by regulations, the unevenness of the playing field was exacerbated by government-supported highway construction. In this environment the trucking industry grew substantially from its infancy in the early 20th century. Protected for decades as a "nascent industry," the trucking industry today earns approximately 80% of all ground U.S. domestic freight revenue, while railroads capture approximately 11%.¹¹ The extreme and prolonged regulation of the freight railroad system in the United States played a major role in the industry decline. Pricing, service, and market constraints were sustained long after the "monopoly" of rail had been undermined by competition from a robust trucking sector.

By the 1970s, every major Northeast railroad had gone bankrupt, the number of track miles operating declined from 254,000 miles to 99,000 miles, the number of railroad companies decreased from 230 to just a handful, billions of dollars in track maintenance was deferred, and standing derailments (a condition when a rail car is parked on a track, and the car falls over because the track gives way) were increasingly common. By the time freight railroads were fully deregulated in 1980, the industry had suffered severe decline for many years.

The Staggers Act in 1980 deregulated most of the industry, allowing rate flexibility subject to certain guidelines. Nearly two-thirds of rates became free of regulations; the remaining regulations applied to specific commodities on routes that lacked competition. The legalization of service contracts encouraged innovation previously stifled by fear of antitrust litigation. Long-term contracts allowed railroads to project future car usage and revenue, providing for on-going investments in capital

equipment, facilities, and tracks. Easing regulations for mergers and abandonments increased competitiveness and revenues.¹² The era of intrusive government regulation of the railroad industry ended completely in 1985, arguably 30 years too late, with the ICC Termination Act (ICCTA) and creation of the Surface Transportation Board.

2. Application of the Framework

Figure 2 above is helpful for visualizing the deregulation timing issue in the railroad industry. In this case, the incumbents are the railroads and the entrants are trucking firms. The graph depicts (albeit crudely) the estimated market share trajectories (measured by revenue percentage) for land-based, long distance surface freight of the U.S. railroad and trucking firms.]

From this figure, we can see clearly the three time epochs of railroading during the 20th Century, when, respectively, deregulation of the railroads might have been, “too early,” “timely,” “or “too late.” In the early 20th Century, the regulation of rail contributed to the ability of the infant trucking industry to grow and thrive. Railroads had attracted regulation in the late 19th Century due to extreme acts of predation. In the absence of regulations restraining such behavior, the railroads might have acted with similar aggression in the early 20th Century towards trucking firms and stunted significantly the growth of this new technology for overland shipping. Thus, we propose to label the time of trucking’s infancy and adolescence (roughly until the end of World War II), as “too early” for railroad deregulation.

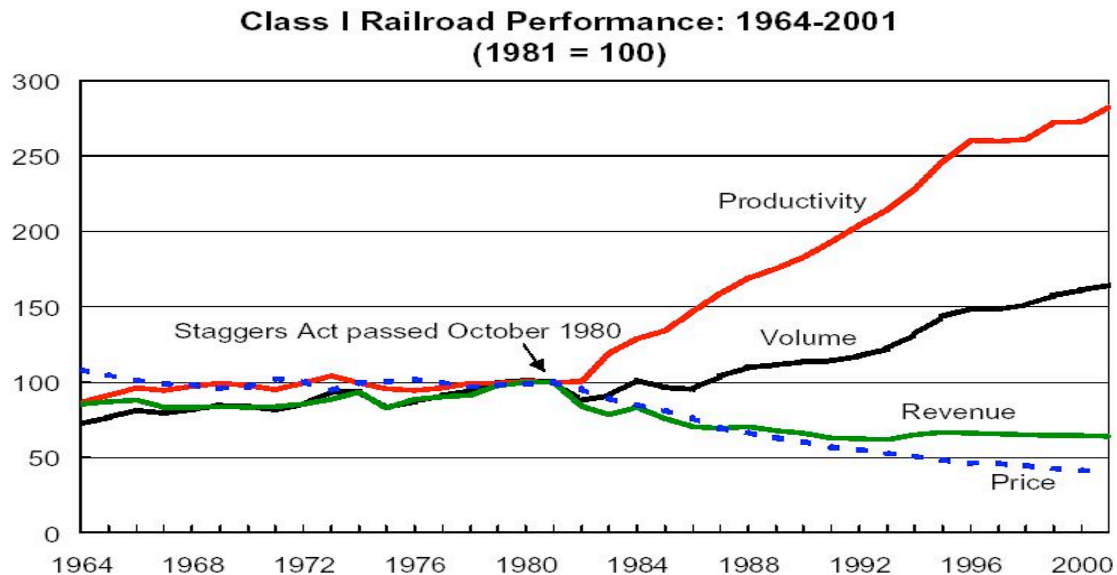
By the late 1940s and mid-1950s, this situation had changed, and the industry entered a period we would characterize as “timely for deregulation.” Freight rail played an important role in World War II, but by the War’s end trucking was a well-established alternate transport mode. Deregulation of a still healthy freight rail system might have been accomplished without fear for the survival of a newly strong trucking industry. Certainly by 1956, with the passage of the Federal-Aid Highway Act, which authorized \$24.8 billion to build the Interstate Highway system, one might have asserted with reasonable confidence that trucking was here to stay. Had such deregulation occurred at that time, the U.S. would likely have witnessed more aggressive competition on a reasonably level playing field for overland freight transport, with investment in track, competitive pricing, more innovation flowing from both transport sectors, fewer trucks on congested interstate highways, and fewer fatal accidents involving trucks on those highways.

However, by the time freight railroads were fully deregulated in 1980, the industry had suffered severe decline for many years. Investment in the freight railroad system came to a virtual standstill after WWII. Heavy regulation on the railroads, combined with a rapidly growing, less-constrained trucking industry traveling on publicly subsidized highways, made capital investment in rail extremely unattractive. Certainly by 1970, when the huge Penn Central Railroad went into bankruptcy (and six other eastern rail services were already under bankruptcy protection), deregulation was “late” relative to any measure of social welfare. By the time freight railroads were fully

deregulated, the industry had suffered severe decline for many years.

Railroad deregulation came more than two decades after President Eisenhower called for relief. The trucking industry lobbied to keep rail regulated long after they no longer needed the protection to compete effectively, but obviously benefited by its continuation. The railroad industry was decimated in the meantime. Partial deregulation of freight railroads in 1976 enabled little improvement, but productivity improved and prices dropped significantly after 1980 when nearly full deregulation was put in force (Figure 3). Before deregulation, consumers benefited in the short-term as regulated, artificially low prices transferred surplus from railroads to consumers. However, these transfers were not sustainable. Providing services at artificially low prices, the railroads were unable to sustain investment and attract investors. Over time, the railroads' collapse reduced social welfare and cost taxpayers billions of dollars in repeated bailouts. The railroads improved performance after 1980, but one can only imagine what they might have accomplished had they been deregulated a generation earlier.

Figure 3:
Deregulation triggers Railroad innovations and performance improvement
(Association of American Railroads, Ed. 1999)



B. Natural Gas

1. History

In 1938 Congress passed the Natural Gas Act, which delegated authority to the Federal Power Commission (FPC) (now the Federal Energy Regulatory Commission) to guarantee a reliable and secure supply of low-cost gas while assuring a reasonable and fair rate of return to the producer and transport companies. The logic underlying the Act was that pipelines, with high fixed costs, had natural monopoly characteristics. The new

act restricted entry in gas pipelines, effectively assuring a monopoly structure, while imposing price regulation to prevent the extraction of monopoly rents by these same companies. Later, stimulated by a 1954 Supreme Court decision,¹³ regulation was extended to the natural gas production process as well. Between 1954 and 1960,¹⁴ the FPC attempted to set prices based on “historical cost of service” (an average of the historical cost of finding and producing gas) on an individual well basis. However, with more than eighteen thousand gas wells to regulate, the FPC could simply not handle the massive amounts of cost data that had to be processed in order to determine each individual well’s cost structure. By 1960, the FPC had decided only ten producer rate cases, with 2,900 cases outstanding.¹⁵ The FPC estimated that it would take until 2043 to process all requests.¹⁶

Faced with an insurmountable workload, the FPC gave up the case-by-case approach and decided to set rates for natural gas producing regions. Five producing regions were identified and interim ceiling prices were set based on the average price of gas paid during 1959-1960 for a given area. However, determining the price for a basin meant processing the cost data for each of the firms in the basin, a project that proceeded very slowly while prices were still frozen at 1959 levels,¹⁷ far below prices that the market would bear. Although consumers were happy with the resulting low prices, gas companies had little incentive to explore for new gas for reserve creation. Given the multi-year delays between the exploration for new reserves and production from those reserves, the effect of low prices was not immediately felt. Demand for natural gas grew, but these demand increases were not met with commensurate increases in supply because there was not sufficient investment in exploration, new production facilities or sufficient reserves to commit to new pipelines, as was required by the extant regulations. (These regulations stipulated that pipelines could only be built if there were supplies available to assure the full utilization of the pipelines for many years to come.)

The oil shocks of the 1970s, following twenty years of failed price regulation, took a severe toll on consumers and the gas industry. In 1973, when the OPEC oil embargo triggered an explosion in demand for natural gas, wellhead prices were still regulated at 1959 levels. Shortages, which became pervasive in the Midwest and Northeast, were felt most acutely by industrial plants, the first sector to lose gas supplies. Many factories in the Midwest were forced to close or suspend operations simply because they could not acquire gas. The FPC did not control intrastate wellhead prices or pipelines, so gas-rich states such as Texas and Louisiana had ample supplies, while areas in the Northeast and Midwest often faced acute shortages. The hidden costs of low gas prices were finally clear. MacAvoy has estimated that the total loss to consumers exceeded \$13 billion.¹⁸

In response to the energy crisis, Congress moved to deregulate the sector. The first of three failed attempts, in 1977-78, partially deregulated prices and created a two-tier pricing system – low prices for “old” gas and higher prices for “new” gas, to help stimulate the development of new gas fields and new gas supply. This “jury-rigged” system created additional distortions and inflexibilities, as gas companies took advantage of the artificial price differential created by the regulation. Indeed, the very low prices for

“old” gas incentivized the owners of “old” gas fields to stop pumping from these fields and concentrate on developing new fields, yielding an overall result of a gas market heavily tilted toward new gas, high prices, and restricted supply.

In recognition of the failure of these new price regulations, Congress eventually abandoned the system of old and new gas, culminating in 1989 with the Wellhead Price Decontrol Act (WPDA), which removed all remaining price regulations on old gas by 1993. Long delays and incremental steps in the deregulation process -- twenty years between the first oil embargo in 1973 and final deregulation -- contributed significantly to economic losses to the gas industry, its customers, and the economy as a whole.

In the natural gas industry, the reforms that allowed wellhead deregulation and unbundling of long-haul gas transport from local distribution, combined with release of pipelines from expensive contracts, stimulated innovations that fundamentally changed the natural gas industry in three ways. First competitive prices took hold that resulted in incentives and growth for new exploration. Second, the industry underwent a major restructuring through value chain innovation that created market hubs, new intermediaries, and retail unbundling. Third, in this more competitive environment, the industry made substantial investments in infrastructure.

Through much of the second half of the century, natural gas moved from exploration to production to transportation to distribution in a straightforward, sequential manner. Transitioning the pipelines from merchant carriers to common carriers, coupled with deregulated prices, had a significant impact on the value chain in the industry. New intermediaries, such as marketers, arose to unbundle the components of the value chain and rebundle them in customized forms for different kinds of customers. Power plants had relatively steady needs for gas, while some types of manufacturing facilities operated on less predictable energy schedules. These new intermediaries could buy, store, and/or transport gas to compete with traditional pipeline firms.¹⁹ Simultaneous with the rise of marketers and bundlers of gas, came a secondary market in gas trading. When pipelines changed from merchant carriers to contract carriers, market hubs began to function as small regional stock markets for physical gas and financial instruments.²⁰ Energy trading firms grew to trade gas across different elements of the value chain, bundling or unbundling gas and services as needed to provide value to intermediaries, local distribution companies, and industrial consumers.

This, in turn resulted in spot and futures markets for selling gas and reselling excess capacity in the pipelines. The rise of these markets led to shorter-term contracts,²¹ with a decline of nearly 40% in the average contract length under deregulation. Thus pipelines become integrated into a single market/network; gas was “switched” at intersection points (hubs) of individual pipelines.²² In this new system, storage was also unbundled and handled by independent providers.²³ Deregulation precipitated many of these changes: pipelines were no longer required to own the gas, no longer needed to engage in very long-term contracts, and were no longer subjected to regulated prices. These developments allowed the freer exchange of gas amongst intermediaries and entrants into parts of the value chain.

The effects during the 1990s, from the deregulation and resulting innovations included 18 new gas pipelines built in the U.S. as well as a decline in transport price mark-ups. The total decline in transportation charges between 1986 and 1997 was approximately \$2.18 billion.²⁴ Transportation price reductions in a sample of nine major city gates resulted in consumer savings of almost \$200 million per year.²⁵

2. Application of the Framework

As with railroads, the natural gas industry faced three regulatory phases or time periods in its history, but unlike the railroads, these three time periods were not defined by a competitor industry (except for perhaps oil), but by exogenous shocks to the industry. Early in the history of the industry, there were at least two plausible reasons to regulate the industry: pipelines were thought to have some natural monopoly properties and the industry required high rates of returns to build out the pipeline infrastructure. However, over time, this regulatory mandate began to creep to a wider and wider domain until it reached the point in the mid-1950s that the FPA/FERC was regulating prices for natural gas extraction as well as pipelines. Natural gas extraction did not exhibit either of these properties.

By the late 1950s and early-1960s, the industry was well within the window for timely deregulation. Regulators, however, were still struggling to devise appropriate cost rules on which to regulate prices. The delays in price revisions kept natural gas prices at artificially low levels, enhancing short-term consumer welfare but destroying producer welfare and incentives to invest. Under these conditions, we observe the recurrent theme of stifled investment due to a regulation-induced absence of financial incentives. Low reserves due to lackluster exploration because of artificially low prices made the system highly vulnerable to any exogenous shock.

By the time the OPEC embargo hit, deregulation was already late. Partial solutions by policymakers after OPEC oil price increases were not only too late, but were incremental and counter productive. Separating categories of old gas and new gas prices (the latter with higher regulated prices in the hopes of encouraging exploration) led to a strategic response by firms who stopped pumping old gas. This unforeseen consequence to the incremental legislation by Congress and administrative actions by the regulators only exacerbated the problems.

It was not until the entire wellhead and pipeline system was deregulated that most of the innovations and investments began to flow, and gas prices equilibrated completely. Note, however, that consumers and the overall economy paid a substantial price for these late actions due to shortages, firms with negative producer surplus, and costs to pipeline companies in covering their required merchant carrier contracts.

The failure of natural gas regulation illustrates how micromanaging complex pricing structures creates at least two problems. First, technologies and external factors move much more quickly than regulators' abilities to adjust prices appropriately. Second,

firms respond strategically to regulated non-market prices in ways that can cause further dislocations and an acceleration in the decline. In this case, consumers were left substantially worse off in the long-term, despite some short-term savings.

C. Banking

1. History

Prior to the Great Depression, banks in the United States engaged in risky lending practices, maintained insufficient reserves, and skirted soundness regulations. Following the stock market crash of 1929, the public lost confidence in banks, and “a contagion of fear” spread among depositors in the fall of 1930.²⁶ In that year 1,350 banks closed, followed by another 2,293 the next year, leading up to the bank rush of 1933, during which millions of depositors tried simultaneously to withdraw their life’s savings from banks that no longer had the confidence of the nation. In the wake of this disaster, the Roosevelt administration implemented industry regulations that severely limited a bank’s flexibility in the areas of pricing, product scope, and geography, as well as safety and soundness. Artificial distinctions between commercial banks and Savings and Loans (S&L’s) institutions were devised and maintained. The net effect of these regulations was to emphasize stability over competitiveness, essentially freezing the banking system structure in place for almost fifty years.²⁷ According to one industry observer: “Right up to 1980 ... a time traveler from 1935 would easily have recognized the different types of financial institutions, most of their products and their principal activities.”²⁸

The inflation shocks of the 1970s proved these regulations to be too restrictive as bank deposits rapidly lost out to a new entrant -- Money Market Mutual Funds (MMMFs), which gave depositors much higher interest rates than the S&L’s could legally offer.²⁹ “Once MMMFs took hold, their deposits skyrocketed as consumers pulled money out of their savings accounts in favor of the new entrants.”³⁰ With their own interest rates frozen, S&L managers complained that they could not compete for depositors’ funds.

In response to these complaints, bank regulators permitted companies to grant high-risk loans, yet lowered net worth standards for S&Ls, while still offering non-risk adjusted federal insurance on deposits in the banks and S&Ls. S&Ls responded by engaging in much more risky lending behaviors in attempts to enhance their assets, but could not compensate for the core problem of regulated interest rate differentials. These risky lending practices contributed to a boom in real estate, as financing of various real estate ventures that would previously have been sub par, now found favor with bank and S&L lenders. Ultimately, the 1980’s recession and real estate market collapse brought down nearly one-half of the thrift industry and a large number of commercial banks. From 1986 to 1995, about 1,300 S&Ls closed³¹, representing close to 50% of the industry.³² The cost to the government of closing insolvent institutions has been estimated at between \$160-500 billion.³³

Throughout the 1970's and 1980's, Congress and the FDIC/FSLIC responded in a slow piecemeal fashion to the ramp-up of inflation. Small regulatory adjustments as a response to a massive dislocation led to a further decline in the banking sector. Non-bank financial services firms had an interest in seeing banks stay regulated well after the regulation was clearly counter productive. More substantial responses by Congress, in lowering bank soundness standards, only accelerated the decline. It was only after the severe collapse of the S&L sector that Congress engaged in more thoughtful, complete, and comprehensive deregulation. During the 1990s, Congress continued deregulation of the banking industry through two primary acts. The Riegle-Neal Act effectively eliminated geographical regulations by permitting interstate banking. More recently, the Gramm-Leach-Bliley Financial Modernization Act of 1999 eliminated the wall between commercial and investment banking by repealing key provisions of the Glass-Steagall Act and the Bank Holding Company Act, which dated to the 1930's. This legislation represents a significant step in dismantling the last vestiges of pricing, product, and market regulations for banks, while maintaining key soundness regulations. However, relative to the timeliness needed to avoid the bankruptcies and bailouts of the S&L's, deregulation in banking came many years too late.

2. Application of the Framework

The case of banking (especially the S&L's) provides a useful lens for examining different types of regulation. Regulation can cover prices, product scope, geographic scope, safety and soundness. In the banking industry legislation from the New Deal, all of these areas received stringent regulation.

Similar to what we saw in the railroad industry, where a technological shock (the automobile) created a new competitor (freight trucking), in banking an economic shock (rampant inflation) also created a new competitor: money market mutual funds (MMMMF's). MMMF's had many of the same properties as simple savings and checking accounts offered by banks and S&L's, but offered higher interest rates to depositors compared with what the S&L's were allowed to pay. The primary response of policy makers to the resulting distress to the banks was NOT to allow banks to respond directly to the competitive threat from the MMMF's and pay higher interest rates to depositors. From the 1970s to the 1990s, Congress and the bureaucracy painstakingly tinkered with the regulations hoping to resolve the regulation-induced problems with incremental regulatory changes. By the 1970s, the banking industry was largely ready for deregulation of prices and geography, and probably product scope. Much more substantial deregulation at that time might have been timely. Instead, Congressional and bureaucratic tinkering with prices (deposit rates) did little to save the industry. With the loosening of soundness regulation, Congress pulled precisely the wrong lever. Rather, it should have kept soundness regulations and loosened the other forms of regulation such as pricing, products, and market restrictions.

The strategic response of banks and S&Ls to looser soundness regulation exacerbated the economic dislocations that ultimately took hundreds of billions of dollars of taxpayer money and a decade to repair. When comprehensive deregulation was finally

passed, it came far “too late” by any standard of social welfare maximization. The bailouts had already cost taxpayers hundreds of billions of dollars.

D. Airlines

1. History

Economic regulation of the airline industry began in 1938 with the creation of the Civil Aeronautics Board (CAB), which controlled routes, rates, entry, and exit. Since airlines were not allowed to compete on price, they invested heavily in service enhancements and “frills,” employing many gimmicks to entice passengers and achieve high load factors (percent of seats filled per flight), which were the key to profitability. Service competition included offering more capacity and frequent flights between destinations. However, offering more flights tended to depress load factors (and profits), so achieving equilibrium between demand and capacity proved difficult despite the desires of both regulators and airlines to do so. Dynamics of business cycles, technological innovation in jet aircraft, and (especially in the 1970s) fuel prices made these challenges all the more difficult.

Maintaining a profitable balance between supply and demand became extremely difficult as ticket prices skyrocketed after the oil price shock and deep recession of the mid-1970s. Furthermore, innovations outside the regulated mainstream began to crop up. For example, although the total domestic capacity of charter airlines never grew beyond a very small fraction of that of the majors, the late 1960’s saw the growth of these airlines whose services were a substitute to regularly scheduled flights by the majors. These entrepreneurial firms used older aircraft and ran full flights, which enabled them to keep their prices low, perhaps serving to limit the prices that could be charged by the majors.

A fortuitous alignment of political forces, combined with the economic distress of the airlines in the 1970’s enabled rapid passage of the Airline Deregulation Act of 1978. Compared with the incremental, trial-and-error deregulation patterns in railroads, banking, and natural gas, the deregulation process in the airline industry was swift and comprehensive. Entry, price, and route regulations were swept away, opening a free market to new and established players alike. A dramatic industry restructuring followed. Fares plummeted, while traffic and passenger travel soared. Inefficient carriers were weeded out and successful innovators flourished. The new competition stimulated huge growth in air transportation innovations, including a new route structure as well as new pricing plans. The hub-and-spoke model, in which an airline would fly passengers into one central “hub” and then out to their final destination along “spokes,” replaced city-pair routes. This system increased load factors and capacity utilization to drive down per-passenger and per-mile costs, while allowing more flights to more cities, including smaller “spokes” that would have been left out of a regular “city-pair” match up.

Point-to-point service was revamped as an efficient way to operate within under-served markets and secondary airports. Passengers could avoid congested airports and

move from one small city to another with new, low-cost, no-frills companies. No-frills service was pioneered by Southwest Airlines, and has been copied widely. For even smaller markets, regional jet services, using small planes and providing frequent service to hub cities, helped connect passengers to the major hubs. The regional airlines focused on shorter, less heavily traveled routes that the major and no-frills airlines overlooked. Non-unionized labor and smaller planes helped reduce operating costs for these services. Growth in this sector, in turn, stimulated new innovations in passenger jet design, by lower-cost entrants like Embraer of Brazil

Average domestic airfares dropped significantly following deregulation. The GAO reported decreases in the average fare per passenger (adjusted for inflation) of 9% at airports serving small communities, 10% for medium communities, and 5% for large communities between 1979 and 1988, and an overall decrease in real prices of 21% between 1990 and 1998.³⁴ As important as the airfare reductions per se, was the shift in pricing structure. After deregulation, the majority of travelers began flying at discount rates as new forms of pricing emerged. The number of travelers traveling at a discount jumped from 37% to 91% between 1977 and 1987.³⁵ While market segmentation by price had begun prior to the 1978 Act, segmentation became much more sophisticated after deregulation, utilizing aggressively the customer and flight data generated by the computerized reservation systems developed in the 1960s and 70s. Standard discount fares were replaced by a system of flexible airfares that were organized by myriad categories. In 2003, it was estimated that the industry generated 20,000 new fares per day³⁶ as “yield management became the *sine qua non* of airline marketing.”³⁷

Another marketing innovation, frequent flyer programs, also sprung up in the early 1980s. These programs tied discounting to customer loyalty as a way of retaining existing customers while attracting those of competing airlines. American pioneered frequent flyer awards with its AAdvantage program and eventually enrolled over 6.3 million subscribers.³⁸ American’s computer reservation system, SABRE, automated the system while generating additional customer data. Frequent flyer programs became enormously popular with consumers and a key marketing tool for the airlines.

Overall, the consumer benefits of deregulation have been estimated at \$15-\$18 billion per year.³⁹ The availability of cheap air travel has caused passenger volume to grow at a rapid pace (see Figure 4). The contours of the industry change much more rapidly now, but the lasting feature seems to be intense competition in the nonstop effort by the members of the industry to create more value for consumers.

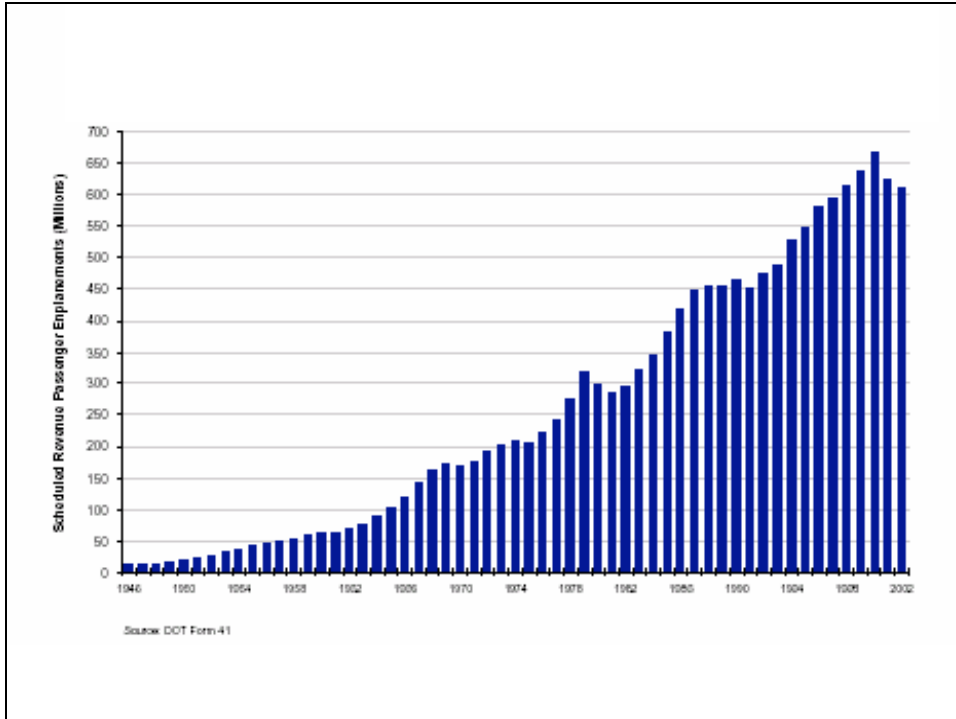


Figure 4: Post-WWII Growth in passenger enplanements – US scheduled airlines

2. Application of the Framework

The airline industry, like the natural gas and the banking industry, was buffeted by two “shocks”. First, the rise of economic substitutes, charter flights, though never obtaining significant market share, did begin to threaten scheduled carriers and resulted in changes in those carriers’ behaviors. Second, the oil shocks of 1973 and 1978 made clear to regulators that geographical and price regulation were inefficient. An even more important insight on the part of regulators was that the logic of scheduled carriers as natural monopolies or requiring protection from price competition, no longer held (if it ever did) with the rise of competitive markets for airline passengers.

By the 1970s, with advances in technology such as wide-body planes, the threats of charters, and the true and potential price competition between carriers, it seemed like a ripe time for deregulation. In this regard, the political establishment did a remarkable job of comprehending the severity of the energy and inflation spikes on the airline industry and rapidly and completely sweeping away virtually all regulation on prices, products, markets, and entry. Despite the extreme and sudden change in the *economic* regulation of the airline industry, safety regulations were not loosened. In fact, fears that competition would lead to the neglect of safety seem unfounded in that fatalities per million departures in the United States have continued to trend downwards since the Airline Deregulation Act.⁴⁰ Just as in banking, we see in airlines that economic regulation can be successfully separated from the regulation of safety and soundness. Indeed, the deregulation of the airline industry illustrates how timely deregulation coupled with

comprehensive deregulation can serve to expand consumer welfare substantially while still promoting investment and retaining some producer surplus, although with a strong tilt to the most efficient and innovative firms.

While there have been enormous benefits to consumers, tremendous innovation in the industry, and vibrant cycle of entry and exit for firms, the airline industry has not been entirely without trouble in the post-regulation period. Managing an airline company in the United States in the 21st Century is an extremely challenging task because profit margins are razor thin and new entrants continue to innovate to displace established firms. Although this post-deregulation state of affairs often looks chaotic and cruelly Darwinian, this feature of capitalism is exactly what generates the innovation and consumer welfare that are the hallmarks of vibrant, growing economies. Furthermore, throughout the entire period of deregulation, U.S. airline safety has gotten progressively better, with death rates continuing downward throughout the period. These results suggest that vigorous competition in products, markets, and prices can be successfully engineered through deregulation while retaining safety and soundness at the industry level.

E. Mobile Telephony

1. History

In 1993, Congress directed the FCC to auction off the “Personal Communications Service” (PCS) spectrum for wireless telephony. These auctions began in 1994, and the first commercial PCS system went “live” in 1995. In the same timeframe the limitation of two wireless carriers per market was lifted. By 2003, 97% of U.S. consumers had three or more wireless service providers to choose among and 80% of consumers had access to five or more competitors.⁴¹ The 1993 Congressional act also began a process that led to removal by 1995 of cellular price regulation in all states. Competition and technology has since driven prices substantially downward, with the real consumer price index of cellular services dropping approximately 40% between 1997 and 2002.⁴²

As prices dropped, usage exploded. Consumer adoption grew from 350,000 subscribers in 1985 to over 140 million at the end of 2002.⁴³ Even during 2002, a year of weakness in the overall economy, the number of subscribers grew 9.7%. Furthermore, many wireless consumers use their cell phones extensively and increasingly as a substitute for their traditional wireline phone.— the wireless industry reported over 600 billion minutes of use in 2002, up over 35% from 2001. Meanwhile, wireline usage declined by an average of five billion person minutes per month between 2001 and 2002.⁴⁴

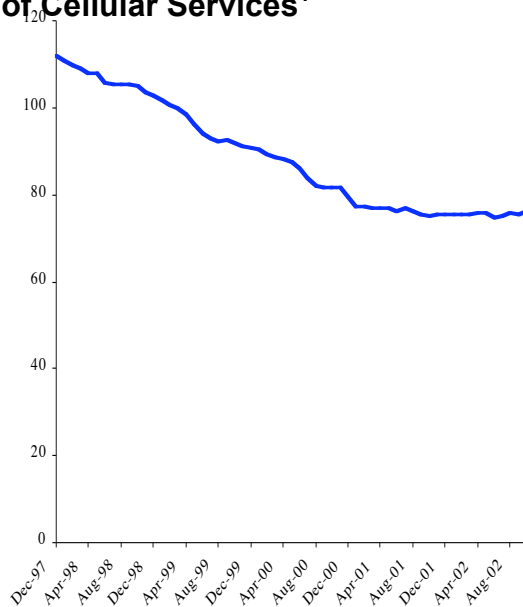
As a result of the rapid and comprehensive opening up of mobile telephony markets, an explosion in innovation, competition, adoption, and consumer choice, accompanied by sharp reductions in prices to consumers, resulted. (See Figures 5 and 6.) Wireless consumers have benefited from a high degree of innovation. Technology improvements, such as the shift from analog to digital, have improved voice quality and

enabled the introduction of new features, from caller-ID and text and video messaging to email, web surfing, and international roaming.

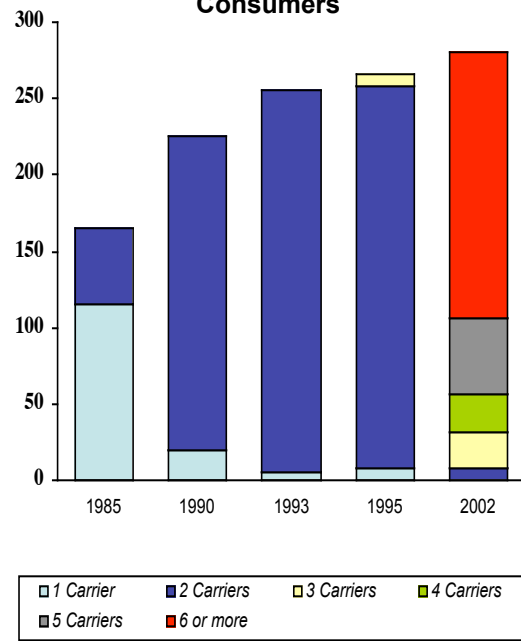
Complementary innovations in handsets have driven adoption by lowering the price, improving the quality, and expanding the range of differentiating features of the phones available to consumers. Pricing innovations have been especially significant, including the elimination of roaming and long-distance charges and the introduction of prepaid calling. Furthermore, competition spurred marketing innovations such as flat rates, free roaming, and free long distance, “friends and family” plans, as well as discount bundles with wireline, entertainment, and /or broadband services.

Figure 5: Price Reductions and Increased Competition in Wireless after deregulation

Real Consumer Price Index of Cellular Services¹

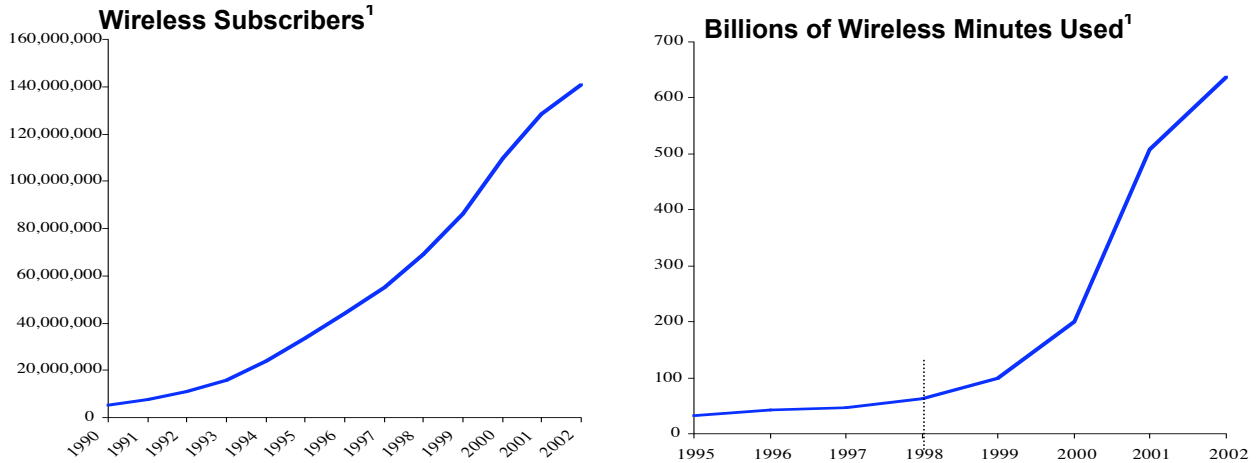


Increased Wireless Competition: Number of Carriers Competing for Consumers²



(1) Relative to 2002; based on Victor Glass, “Wireless Drags Down Wireline Service”, NECA Working Paper 2003 (using data from Bureau of Labor Statistics)
 (2) CTIA

Figure 6: Post-deregulation growth in wireless penetration and utilization



- (1) CTIA
 (2) CTIA and AT&T Wireless Investor presentation (www.attws.com)

2. Application of the Framework

As wireless telephony arose, it was in effect an entrant to the existing telecommunications industry, competing with wireline voice service provided by regional Bell operating companies and other wireline telephone companies. Whether 1993 was the “right time” to allow spectrum auctions and subsequent free competition in wireless sector is not completely clear. Hausman and Tardiff⁴⁵ (1995) argue that the FCC delayed significantly the entry of cellular technologies, costing consumers billions of dollars in potential consumer surplus.

Whether wireless technologies should have been introduced earlier is debatable, but the decision to not withhold these technologies any further has clearly benefited consumers substantially. Seemingly, deregulation did not come “too late” to bestow significant consumer welfare. High adoption rates and steadily declining prices suggest that consumer surplus is high in this industry, in part because the wireless industry is not subject to economic regulation. Moreover, the post-deregulation, free-market environment has allowed wireless companies to innovate and invest in their business models and infrastructure networks, much to the benefit of consumers.

3. Conclusions and Application to the U.S. Telecommunications Industry

The five case studies outlined above are summarized in Table One, and we believe the implications are clear: When technological or market shocks make it appropriate to remove price-entry regulation from an industry, it is best to do so quickly and comprehensively. Each of the industries we studied exhibits elements of a common pattern. Economic regulation is in place and appears to be working reasonably well. Then, a market or technological disruption occurs, upsetting the regulated “equilibrium” and creating the potential for new competition.

In three of the cases we examined, policymakers responded slowly and in a piecemeal fashion to the shocks and need for deregulation, with very poor results: Both the railroad and banking industries experienced large bankruptcies, and ultimately required large government subsidies or bailouts; in the natural gas industry, partial deregulation led to shortages that resulted in temporary closings of manufacturing plants and other customer facilities that depended on natural gas for power and heat. In all three cases, policymakers ultimately enacted comprehensive deregulation – but only well after significant damage was done. In the other two cases, airlines and mobile telephony, policymakers acted relatively quickly to enact comprehensive deregulation. The results were, in both cases, highly favorable: Prices dropped, output increased, and new products and services were introduced.

Industry regulation is often triggered by a perception that government constraints are necessary to protect consumers from firms with significant market power. These regulations typically constrain the rates, terms and conditions that regulated providers offer service to retail as well as wholesale customers, as well as ensure safety and soundness. When a technological or market shock impacts a regulated industry, industry and competitive dynamics can shift dramatically, with new firms and/or technologies entering to compete with the regulated incumbents. In such environments, legislative and regulatory response, its speed, its thoughtfulness, and its thoroughness, can have a significant impact on social welfare.

In some instances, regulators recognize that industry changes have occurred, assess the opportunities from a less constrained market, and relax the industry constraints in a dramatic, timely manner. We believe this occurred in the airline industry in 1978 and in wireless telephony in 1993. In both cases, measures of industry innovation and consumer adoption leapt dramatically as prices plunged following deregulation.

However, experience teaches that the opposite is more likely to occur. That is, when a severely disruptive shock occurs in an industry, regulators are either slow to respond or try to manage industry change with a sequence of piecemeal, incremental regulatory or deregulatory steps. When the regulators are slow to respond, new competitors who are not constrained to follow regulations imposed on the incumbents may debilitate healthy incumbents. We believe this describes well the competition

between railroads and trucking and the competition between Savings and Loans and Money Market Mutual Funds .

Alternatively, when policymakers engage in piecemeal, incremental legislative or administrative control -- each new regulation or law attempts to patch a problem created by the previous patch. In such cases, each regulatory increment often arrives too late and adds delay to the ultimate need to let competitive forces shape the industry rather than having government planners do so. In such an environment, industry participants have powerful incentives to make business decisions that game the regulatory environment rather than to optimize their businesses as they would in competitive markets. This kind of behavior seems to have occurred in the natural gas industry -- well operators held their "old gas" off the market, ultimately driving regulators to allow higher prices for this gas.

In freight railroads, natural gas, and banking, dramatic shocks transformed the respective industrial landscapes and regulators acted slowly or not at all, while dislocations lead to huge losses in social welfare. In all three cases, although full economic deregulation was enacted, it came far "too late" to avoid dramatic welfare losses.

We further observe from our case studies that regulation in pricing, products, and markets can effectively be separated from regulations enforcing safety and financial soundness. For example, the airline industry illustrates that safety regulation can be productively retained while rate and entry regulations are relaxed. U.S. airline safety measures have shown continuous improvement since 1978, despite the dramatic changes triggered by the Airline Deregulation Act of 1978, which eliminated virtually all constraints on pricing, products, and markets.⁴⁶

We believe these case studies, in railroads, natural gas, banking, airlines, and wireless telephony, can be helpful in shaping the understanding of the regulatory issues to be addressed in the telecommunications industry today. The principal shocks to hit telecom in the past decade have been technological and have converged upon each other: the emergence of the Internet and the rise of ubiquitous wireless communications networks for mobile telephony and data exchanges. These new technology platforms have triggered the development of both a completely new communications infrastructure that enable competitive alternatives to traditional voice and data telephone services. Each of these technologies has enabled new entrants to compete with traditional telephone companies whose primary business had been to offer voice and data services over networks built with copper wire. Increasingly, copper, fiber, and wireless networks compete with each other and are substitutes for each other, with copper networks being subject to the most stringent regulatory constraints.

We think that the history of trucking and railroads has the potential to become an apt analogy for the communications sector today: In the mid-to-late 20th Century, the less flexible rail networks and the companies that owned them were prevented by law from seeking their most efficient use in the national economy, resulting in severe damage to the rail transport network. That network was denied the full opportunity to reconfigure

itself for a world of competition with new and better technologies and strategies. The results of severely delayed regulatory relief were felt by hundreds of thousands of rail workers, communities that were denied competitive alternatives, and shippers looking for competitive options. The failure of Government to respond to change and foster rail deregulation proved a “lose-lose” situation for railroads, their industrial customers, and consumer welfare generally.

If wireless and cable broadband networks obtain and retain substantial market share and compete vigorously with the traditional copper-based networks of the incumbent phone companies, then the time would be ripe for comprehensive deregulation. Further, since the technologies and business models in the telecommunications industry today operate at much faster clockspeeds⁴⁷ than those of the rail industry fifty years ago, the window of opportunity for timely (“in the zone”) deregulation in telecommunications is likely to be short compared to that for railroads. Although 1996 may have been “too early” for such deregulation, when the conditions are right, deregulation should be comprehensive and quick. Delaying regulation beyond this zone could well prove to be “too late,” resulting in severe and unnecessary losses in social welfare, causing the incumbent telephone carriers to go the way of the railroads.⁴⁸

There are always risks in changing policy. Industry regulation is almost always crafted in an environment of uncertainty and conflicting interests. Legislators and regulators are called upon to seek solutions that maximize social welfare, knowing that our competitive economic system will always produce losers as well as winners. In this context, decision makers have to balance competing risks in setting industrial policy. Fortunately, a long historical record provides confidence that energetic competition among firms and technologies virtually always creates the most wealth in aggregate, providing resources to ease the adjustment of the displaced when necessary.

If policymakers move too early to deregulate, consumers will not witness the benefits of deregulation. If this is the case, legislators can always choose to re-regulate the industry.⁴⁹ If policymakers enact swift and comprehensive deregulation when an industry is “in the zone,” then social welfare is enhanced substantially. However, if policymakers move too late, the incumbent industry may die off—not because of healthy competition, but because of misguided regulation—and there will be little opportunity to bring the incumbent back from the ashes. Deregulating too late is often the path of no return.

To the extent that viable substitutes exist and the entrants and competitors are healthy, competing vigorously, and unlikely to disappear in a truly competitive communications sector, then our framework would suggest that one should engage in a quick and comprehensive deregulation of telecommunications markets to enhance the welfare of America.⁵⁰

Endnotes

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³ All three levels of government – federal, state and local – have engaged in economic regulation, with states and localities focusing on regulation of intrastate markets and Federal agencies such as the Civil Aeronautics Board, the Federal Communications Commission and the Interstate Commerce Commission focusing on interstate markets.

⁴ See George Stigler, “The Theory of Economic Regulation,” *Bell Journal of Economics and Management Science* 2;1 (Spring 1971), pp. 3-20; Richard Posner, “Theories of Economic Regulation,” *Bell Journal of Economics and Management Science* 5;2 (Autumn 1974), pp. 335-58; and, Sam Peltzman, “Toward a More General Theory of Regulation,” *Journal of Law and Economics* 19;2 (August 1976), pp. 211-240.

⁵ The telecommunications industry arguably has witnessed two such “shocks” since the passage of the 1996 Telecom Act: the explosive growth of cellular telephones, and the emergence of the Internet and related applications like VoIP.

⁶ Indeed, new entrants sometimes seek explicitly to exploit weaknesses in the regulatory system, e.g., by “cream skimming” – i.e., charging prices above cost but below the regulated prices imposed by regulators. See e.g. F.M. Scherer, *Industrial Market Structure and Economic Performance* (Boston: Houghton Mifflin, 1980), p. 484 (mentioning MCI’s strategy of “cream skimming” profitable high-volume business customers, leaving the Bell System “the low volume traffic”).

⁷ It should be noted, however, that many economists are skeptical that predatory pricing is an effective means of deterring entry. Moreover, it might well be argued that exclusionary behavior of the type described here would run afoul of the antitrust laws, even in the absence of continued economic regulation. On both points, see Richard A. Posner, *Antitrust Law: An Economic Perspective* (Chicago: University of Chicago Press, 1976), pp. 184-196.

⁸ The histories provided here represent summaries of longer, more extensive papers that we have written on each industry. These case studies are available from the authors. They include more detail and citations.

⁹ The main sources for this section are: American Association of Railroads (Various). “Ten Year Trends, 1990-2000.” Annual Publication; Carpenter, Daniel P. (2001, July). *The Forging of Bureaucratic Autonomy: Reputations, Networks, and Policy Innovation in Executive Agencies, 1862-1928*. Princeton: Princeton University Press; Keeler, Theodore (1993). *Railroads, Freight, and Public Policy: Studies in the Regulation of Economic Activity*. Washington, D.C.: Brookings Institute; MacAvoy, Paul and Ernest W. Williams (1950). *Economics of Transportation*. New York: Harper; MacAvoy, Paul and James Sloss (1976). *Regulation of Transport Innovation*. New York: Random House; Rothenberg, Lawrence (1994). *Regulation, Organizations, and Politics: Motor Freight Policy at the Interstate Commerce Commission*. Ann Arbor: University of Michigan Press; Schiffman, Daniel (2001). “Political-Legal Institutions and the Railroad Financing Mix, 1885-1929.” Bar-Ilan University, Department of Economics Working Papers, 16-01. Available at: <http://www.biu.ac.il/SOC/ec/toolbar/main/wp/16-01/16-01.pdf>; Stone, Richard (1991). *The Interstate Commerce Commission and the Railroad Industry: A History of Regulatory Policy*. New York: Praeger Publishers. In addition, more detail and more extensive citations are provided in the underlying case study document available from the authors.

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- ¹⁰ Unit trains and Big John Hopper Cars
- ¹¹ <http://www.aar.org/PubCommon/Documents/AboutTheIndustry/Overview.pdf>
- ¹² (Wilson and Bitzan 2002).
- ¹³ *Phillips Petroleum Co. v. Wisconsin (1954)*
- ¹⁴ Natural Gas Supply Association (www.naturalgas.org)
- ¹⁵ (Michaels 2003).
- ¹⁶ (MacAvoy 2000: 45)
- ¹⁷ Natural Gas Supply Association
- ¹⁸ MacAvoy, Paul (2000). The Natural Gas Market: Sixty Years of Regulation and Deregulation. New Haven: Yale University Press.
- ¹⁹ *ibid.*, p. 80.
- ²⁰ (Tobin 2002).
- ²¹ These markets competed with the pipelines' primary market and had prices averaging 57% of maximum rates. (Energy Information Administration, 1998). "By the winter of 1996-97, firm contracts accounted for 80% of capacity, but 20% had been released... In the spring of 1994 in California, the major shippers offered release capacity at 75% of the average tariff rate and then at 30 percent of the tariff rate in August... In April 1994, more than 50% of El Paso's throughput was carried at discounts of 20% on the tariff rate, and 40% was carried at discounts of 55% or more." (MacAvoy 2000: 79). See MacAvoy p. 87-88 for more information on capacity release pricing.
- ²² (MacAvoy 2000: 81).
- ²³ (Tobin and Thompson 2001).
- ²⁴ (MacAvoy 2000: 81)., Barfield (2002: 9)
- ²⁵ (MacAvoy 2000: 81).
- ²⁶ Richard Vietor, *Contrived Competition* 1994: p. 245.
- ²⁷ *Ibid.*, p. 253.
- ²⁸ *Ibid.*
- ²⁹ Ely & Company Inc., 1992
- ³⁰ (White 1991: 68-69).
- ³¹ (FDIC 1997: 4 ff)
- ³² (Curry and Shibut 2000: 26)
- ³³ The \$160 billion is an estimate of the total direct and indirect costs based on the U.S. General Accounting Office's audit of the RTC's 1994 and 1995 financial statements. Cited in FDIC, History of the Eighties, \$500 billion are based on White's (1991) estimates which include undiscounted cash flows and thirty-year to forty-year time horizons. See White (1991) p. 197.
- ³⁴ (GAO 1999: 4)
- ³⁵ (Vietor 1994: 85)
- ³⁶ (Cohen and Pogorelsky 2003)
- ³⁷ (Vietor 1994: 85)
- ³⁸ (Vietor 1994: 73)
- ³⁹ (Morrison, Steven A. and Winston, Clifford (1995). The Evolution of the Airline Industry, Washington: The Brookings Institution, quoted in Cohen and Pogorelsky 2003).
- ⁴⁰ National Transportation Safety Board data
- ⁴¹ Berry 2003
- ⁴² Calculated from nominal price index in (Glass, 2003) which is based on data from CTIA and the U.S. Bureau of Labor Statistics.
- ⁴³ CTIA conducts a semi-annual survey of the wireless industry and publishes selected results on their web site at www.ctia.org. The data reported in this section are from the year-end-2002 survey available at http://www.wow-com.com/pdf/CTIA_Survey_Yearend_2002.pdf.
- ⁴⁴ (1). The Yankee Group, "Landline Displacement Fuels mobile Growth but Market Still Cries Out for Wireless Carrier Consolidation", October 30, 2002 (Note: Includes business calls on mobile phones and business calls at home. All network minutes are counted twice, once for each person on call);
- ⁴⁵ "A Cost of Regulation: Delay in the Introduction of New Telecommunications Services," J. Hausman and T. Tardiff, 1995 ed. A. Dumort and J. Dryden, *The Economics of the Information Society*, 1997.

⁴⁶ Banking provides another example of this. After the mass bankruptcies during the Great Depression, Congress imposed significant restrictions on the banking industry, both in the arenas of prices, product and markets, as well as in the domain of safety and soundness. Unfortunately, when deregulation was first tried after the inflation shocks of the 1970s, regulations on safety and soundness were relaxed – while prices were kept under tight control – with disastrous results. After the S&L debacle, regulations were re-structured so that constraints on price, product, and market decisions were loosened considerably, while safety and soundness rules were strengthened, with much better results.

⁴⁷ For definition and exposition of industry “clockspeed,” see Charles H. Fine, *Clockspeed: Winning Industry Control in the Age of Temporary Advantage*, Perseus Books, 1998.

⁴⁸ It is important to note that have not considered how the fact the many of the ILECs own a wireless provider affects the

⁴⁹ Cable television deregulation and reregulation of the the 1980s and 1990s provides an example of this. Re-regulation will be possible provided legislators are sufficiently independent of the inevitable politicking that will occur to prevent re-regulation.

⁵⁰ The ownership structure in the telecommunications sector is somewhat complex. Most major incumbent local exchange carriers not only own the copper networks in the ground, but also hold large ownership positions of both long distance and wireless carriers. This ownership structure is unlike any other industry we have studied. In essence, one substitute that challenges the traditional phone carriers is actually owned by the traditional phone carriers. Our paper and our theory are silent on this complex ownership structure, though policymakers will need to consider how this affects legislation and regulatory decisions. We leave this to future academic work.