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**The Effect of Deregulation on Market Concentration: an Analysis of the Telecom Act of 1996
and the Industry Meltdown**

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I. The Issue

For several decades, US policy in telecommunications and electronic mass media focused on the encouragement of competition. This policy, usually known as *deregulation* but more accurately described as *liberalization*, aimed at an opening of market to competitors and a reduction of market power. There were numerous elements and proceedings to this policy by the Federal Communications Commission (FCC), the states' Public Service Commissions and legislatures, the Courts, and Congress. Of these actions, none was more comprehensive than the Telecommunications Act of 1996.¹

What has been the impact of this policy? In this paper I will focus on one dimension: the impact of liberalization on competitive market structure.

This question has acquired some urgency in light of the recent meltdown in the telecom sector. It is hardly a secret that the telecommunications industry – traditional and new network operators, equipment suppliers, and Internet service providers – is in the midst of an unprecedented and worldwide crisis. Since the beginning of the year 2000, the industry has shed

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¹ Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996).

worldwide hundreds of thousands of jobs, lost trillions of dollars in stock market capitalization, endured a continuous stream of bankruptcies, and been besmirched by scandals.

According to the *Economist*², the telecom crash – ten times bigger than the better-known dotcom crash – may qualify as the largest bubble in history. Losses have been much greater than for the savings and loan debacle of the late 1980s. In the US, most of the new competitive firms are in various stages of bankruptcy. All long distance companies are on the ropes and probably for sale. Investment has come to a standstill. As network firms sought survival rather than expansion, the telecom equipment-manufacturing sector all but collapsed. The safest place to work for in the entire telecom sector, it seems, is at the deregulating FCC.

2. *Industry Volatility and Industry Response*

The present downturn is perhaps only temporary and the industry will recover, though not at the hyper level of the bubble years. But such a one-time recovery from a one-time boom and bust does not address the real problem of the industry. The more fundamental problem is the telecom industry's entry into a pattern of chronic volatility, with boom-bust patterns becoming a common occurrence rather than an aberration. The network environment is leaving linearity and entering volatility, and maybe even cyclicity.

While business cycles are not new to many industries, in telecom they are a new phenomenon. Telecom used to be less volatile than the economy as a whole. It grew steadily, with long planning horizons hardly ruffled by the business cycle. But today, in sharp contrast, the telecom sector may well have become more volatile than the economy, more like the topsy-turvy construction business, less like the stable water utilities.

It would be easy to blame specific telecom firms for managerial mistakes. But the downturn happened broadly and its causes, therefore, go beyond a particular management team (or of a particularly creative team of accountants).

² "The Great Telecoms Crash," *The Economist*, July 18, 2002, also available at http://www.economist.com/printedition/displayStory.cfm?Story_ID=1234886.

Perhaps the major reason for instability has been the fundamental economic characteristic of many network industries with high fixed costs and low marginal costs. The telecommunications industry is characterized, on the supply side, by huge investments followed by tiny costs of serving additional customers, plus positive network externalities on the demand side, as the users of a network gain benefits from other users joining and becoming reachable. This creates economies of scale, scope, and networking. The resultant incentives to be large and to expand early create industry-wide over-capacity. Price competition then drives down prices to unprofitable levels. In telecommunications, price differentiation and asset redeployment are difficult, much harder than for airlines where tickets cannot normally be transferred and excess airplanes can be rapidly moved to other locations. Bust cycles follow. We have encountered the first of these cycles, but surely not the last, because the factors of instability will remain: low marginal costs, high fixed costs, inelastic demand, positive network externalities, lags in regulation, and a Wall Street short-term perspective that amplifies industry cycles. If instability will be part of the environment, what will telecom companies do? The textbook responses are to cut costs, lower prices, and increase innovation. But these strategies will quickly be matched by competitors and will leave every supplier firm even worse off.

The other major strategy, therefore, will be to raise prices above competitive levels, to reduce competition and the commodification that lowers profitability and future investments. To do so requires market power by a single firm, or a tacit industry oligopoly. There is probably no other way to escape the industry's fundamental structural problem.³

3. *The Changing Industry Structure*

We have, so far, concluded that industry concentration is a likely response to the enablers of competition. Let us now turn to the empirical evidence for such concentration in telecommunications and related information industries.

³ In some cases, the creation of such market power can even be efficiency-enhancing, at least in the short run. The airline industry with its hub-and-spoke system is an example

Based on our analysis, one would expect industries whose competitive equilibrium was changed by policy action to adjust through increased concentration. Has this indeed been the case?

To provide an empirical answer, we looked at the market concentration trends in the American information sector for 72 separate industries. Examples for such industries are long distance telecommunications, cellular mobile, broadcast TV, cable TV, film distribution, daily newspapers, as Internet service providers. For each of these industries, we tracked and calculated individual firms' market shares (and revenues) in this particular industry, using a variety of sources, for a period of 20 years. The resultant database is unprecedented in its scope.

These market shares were then used to calculate concentration indices and to follow them over time. The major concentration index used was the Herfindahl-Hirschman Index ("HHI"), of the US Department of Justice.⁴

$$HHI = \sum_{i=1}^f S_i^2$$

Where f = number of firms participating in an industry, S_i = each firm's market share, i = firm in a given industry

The US government's Antitrust Enforcement Guidelines classify market concentrations according to their HHI score:

HHI < 1,000 Unconcentrated Market

1,000 < HHI, Moderately Concentrated Market

1,800 < HHI, Highly Concentrated Market

⁴ A second index was also used to cross-check the HHI. The "C4" index is the combined share of the top four firms in a market.

$$C4_j = \sum_{i=1}^4 S_{ij}$$

Where: S_i = firm's i market share of a given industry j , where firms are ordered by size of market share.

The study tracked these indices of concentration over time, from the years 1983 and 1984, just before and just after the AT&T Divestiture. 1984 was also a major liberalizing milestone year for the cable TV industry, which experienced a significant deregulatory law.⁵

We then proceed to aggregate the industries along the dimensions of broader sectoral categories such as telecommunications, and along the dimensions of regulated industries, such as whether they are regulated telecom industries or not. The weighted aggregate HHI is defined as

$$WAHHI = \sum_{j=1}^n \frac{m_j}{\sum m_j} \sum_{i=1}^f S_{ij}^2$$

Where j = an industry

m_j = total revenue of an industry

S_i = each firm's market share of an industry

n = number of industries in a specific subset of the information sector

f = number of firms in an industry.⁶

We look at the three major information industry sub-sectors

1. Telecom
2. Mass Media
3. Internet

For each of those sectors, we define three categories of industries

A. Regulated

Examples: local telecommunications; TV stations

B. Unregulated but closely affected by regulation

Examples: fiber optic cables; Cable TV channels

C. Unregulated

⁵ Where the industries do not go back 20 years, a shorter time series is used.

⁶ The formula for the C4 aggregation that is used as a cross-check

$$WC4_k = \sum_{j=1}^n \frac{m_j}{\sum m_j} \sum_{i=1}^4 S_{ij}$$

Where j = a industry j within a larger segment

m_j = total revenue of an industry j .

M = total revenue for the segment industries k

i = firm in an industry

S_i = market share of firm in a given industry

k = segment of industries

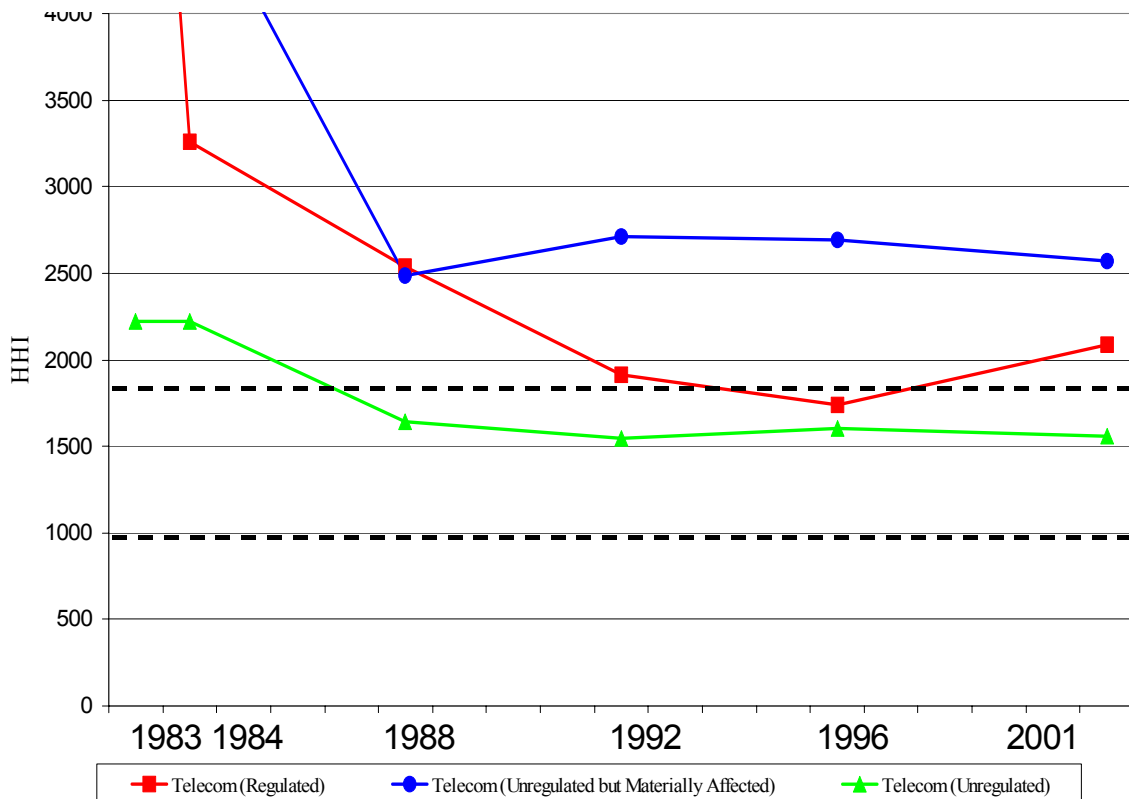
n = number of industries

Examples: film distribution; fax machines

4. Empirical Findings

The results can be seen in Graph 1.

Graph 1. HHI Concentration of All Telecommunications Industries⁷



Points below the lower dotted horizontal line are below HHI of 1000, i.e., in the range of unconcentrated industries. HHI points above the upper horizontal line are in the concentrated range of >1,800. Unregulated telecom industries decline in concentration in the 1980s, post-divestiture and the trend is flat in the 1990s. Their concentration is intermediate in size. But

⁷ Regulated Telecom Industries are: Local Service; Long Distance Service; International Service; Mobile Telephony; Radio Dispatch; Paging; Backbones and Broadband Providers. Unregulated Telecom Industries are: Handsets; Fax Machines; and Mobile Handsets. Industries unregulated but materially affected by regulation are: PBX; Central Office Switches; Multiplexers; Fiber Optical Cable; Copper Wire & Cable; Microwave Equipment; Cellular Infrastructure; and IP Telephony Providers.

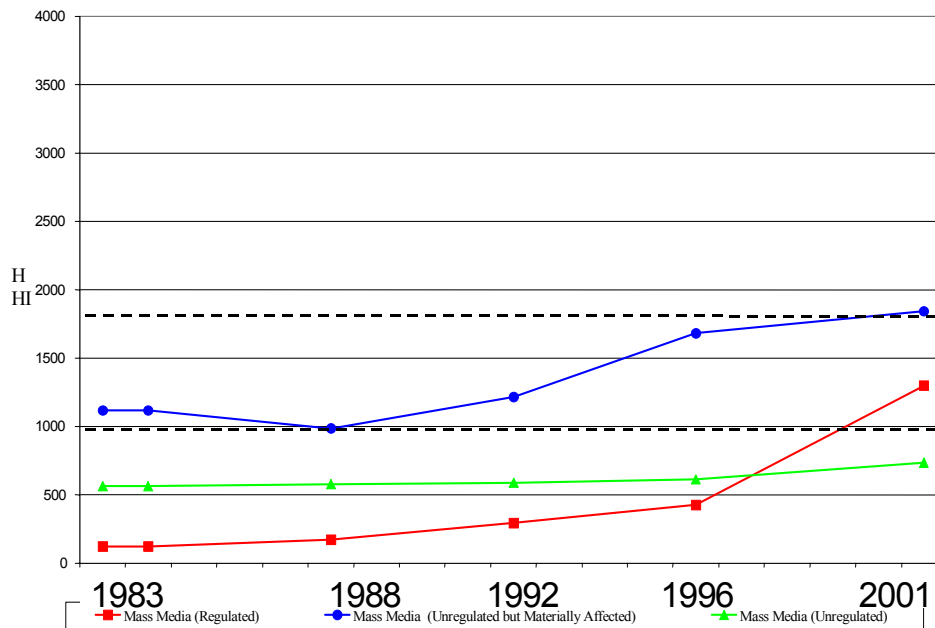
their number is small and thus not conclusive. Unregulated industries that are materially affected, mostly in equipment markets like fiber optics and wireless infrastructure, show roughly the same trends, except that their concentration level is much higher, they drop rapidly after 1984, due to the AT&T divestiture that opened the equipment market. Most of these industries are providing telecom equipment, and they are dominated by a handful of vendors.

Most interesting is the concentration trend of the regulated telecom industries: starting at highly concentrated levels in the early 1980s, overall concentration declines, especially with the 1983-84 AT&T Divestiture, but also thereafter, until 1996 – the year of the deregulatory Telecommunications Act. In that year, the concentration level is at its lowest, though barely touching the bottom range of high concentration, and it thereafter turns back to higher concentration levels.

To put these telecom concentration trends in context, we now conduct similar calculations for the Mass Media industries (Graph 2)⁸.

Graph 2. HHI Concentration in All Mass Media Industries

⁸ The category ‘regulated’ entails the following industries: TV Prime Time Production; Radio Stations, TV Stations, DBS Providers, Cable TV Operators, TV Networks. ‘Unregulated but materially affected industries’ consists of: DBS Equipment, Cable TV Set Top Converters, Radio Networks, TV Syndication, Cable TV Channels, Pay TV Channels, Music Cable Channels. The category ‘unregulated’ consists of: Video Game Hardware, PC Entertainment Software, Games Software, Television Sets, VCR Players, DVD Players, PVR Players, Camcorders, CD Players, Audio Systems & Radio, Movie Production & Distribution, Movie Theater Chains, Home Video, Video Rental, Music Publishing, Performance Rights, Record Labels/Distributors, Music Retailers, Daily Newspapers, Educational Books, Trade and Paperback Books, Other Books, Books Retailing, Magazines, Academic Journals, Printing Services, MP3 Players, Media Player Software, Online Book Retailing, and Online Information Services.

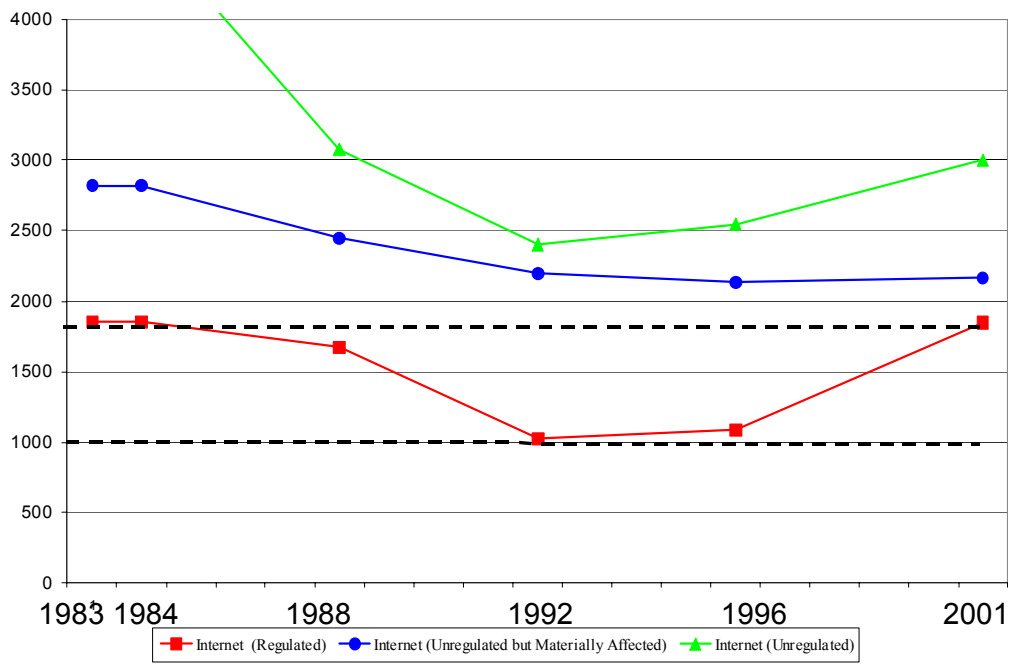


Here, the concentration of unregulated mass media industries is almost constant over time, with low levels throughout. Much higher concentration exists for those unregulated industries that are materially affected by regulation. Here, concentration levels have increased steadily throughout the 1990s, from unconcentrated to highly concentrated levels. Finally, regulated mass media industries' concentration increased steadily, from low levels in the 1980s and early 1990s – maintained low mostly by regulation – and rose rapidly after 1996 an intermediate level of concentration.

We conduct the same analysis for the Internet sector (Graph 3).⁹

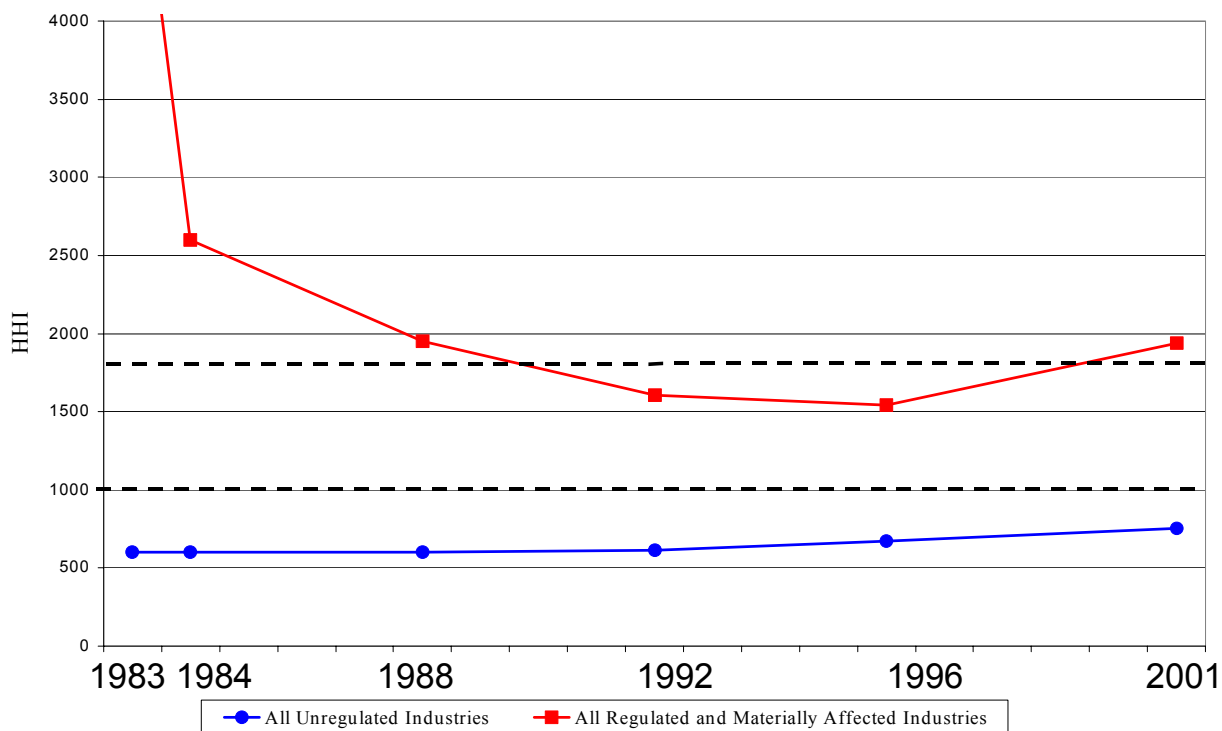
Graph 3. HHI Concentration of All Internet Industries

⁹ Regulated industries include Backbones and Broadband Providers. Unregulated industries are: Media Player Software; Internet Search Engines; Portals; Browser Software. Industries that are unregulated but materially affected by regulation consists of: ISPs; IP Telephony Providers; and Internetworking Equipment.



Here, unregulated industries decline in concentration, while industries that are regulated or affected by regulation increase in concentration after 1996.

Next, we aggregate the concentration trends for *all* regulated information industries from all three sectors, and compare them with the unregulated information industries. In doing so, we assign the intermediate category of “unregulated but materially affected” industries in two alternative ways: The first assignment groups it with other unregulated industries, and the second groups it with other regulated industries. The first assignment follows a “black letter” legal definition and includes only those industries that are directly regulated in the regulated category. The second assignment follows a more economic definition in which the actual regulatory incidence is considered. It groups the intermediate category of industries together with those that are directly regulated. The results of the two alternatives are almost identical, except as to the level of concentration of unregulated industries, which is a bit higher in the first – legally oriented – definition. Due to the similarity, we will show the second graph.

Graph 4. HHI Concentrations of Regulated vs. Unregulated Information Industries

What the results show is that the concentration level in unregulated information industries is (a) low, and (b) almost flat. For regulated industries, on the other hand, concentration is (a) high, and (b) declining in the 1980s and early 1990s, and rising after 1996. It is still lower than it was after the AT&T divestiture. (This is also true for the regulated Telecom sub-sector itself)

6. *Interpretation of Results*

Thus, we find that regulated communications industries are substantially more concentrated than unregulated ones, and increasing in concentration after 1996.

Why is that so? In general, regulated industries are often concentrated, which is part of the reason, after all, that they are regulated: to protect the public from the negative results of market power. But the causality flows both ways. Regulation has traditionally also protected firms from competitive entry, especially in telecommunications and television. The process of regulation, often captured, has been used to stabilize industries.

But, the data also show that concentration is not merely high, but that it has increased after the deregulatory 1996 Telecommunications Act. This was certainly not the intended effect.

There are two non-rival explanations for this trend:

- (a) The Act enabled expanded ownership by relaxing restrictions.
- (b) The 1996 Act and its FCC implementations, by encouraging entry, created pressures on companies to merge in order to re-establish stability in their markets.

There is little in the 1996 Act supporting the first explanation. The law eliminated the national cap on concentration by radio stations, and raised it somewhat for TV stations, but that was all in terms of relaxation of horizontal merger restrictions. The 1996 Act, on its face, was not so much pro-concentration as pro-competition. However, the effect of such competition was to drive companies to defensive moves along the lines of the second explanation, and concentration became a major strategy.

But why does government acquiesce? First, due to a laissez-faire attitude to leave it to the dynamics of market place to deal with market power, and, second, because a volatile market is not something that can be easily accepted by the political process. Volatility raises uncertainty, and therefore raises the cost of producing telecom services, which is an essential and universal input. It has also some distributional implications such as fluctuations in employment. And through network effects, everybody is negatively affected. Those most directly affected, investors, and unions, then pressure to government for stabilization.

These are reasons for government to fear volatility and to engage in countervailing stabilization policies, even though government policy may also be a contributing cause, for example through regulatory delay. The potential stabilization tools of government range from tax policy to industrial policy, and from regulatory price setting to spectrum allocations. But the simplest policy tool is *competition policy*, because it does not usually require positive action.

There is a conflict between pro-competition and pro-stabilization policies. Given the realities of the policy process, and the undesirability of essential industries with a high failure

rate, the result of this policy choice is clear: stability will win. And if we look at the concentration trends from our data, this choice has already been made.¹⁰

7. *Conclusion*

For governments to moderate competition in favor of stability would require a fairly radical departure in regulatory philosophy. For a generation now, liberalization, deregulation and competition have been the keystones of telecom policy.

One business cycle later, competition is giving way to consolidation. The traditional system of regulated market power and concentration is returning to some new equilibrium level which is not the hoped-for competition but some market power, maybe a “natural oligopoly” instead of a “natural monopoly.” And with it, inevitably, comes some regulation of the negative effects of oligopoly, at least on the consumer level. Such a regulation of oligopoly will be much harder to conceptualize or implement, and lead to a new round of policy disputes. This scenario will look more like the old telecom than the new, but we must face reality rather than engage in denial.

Thus, the 1996 Telecommunications Act might end up more of a stimulus to concentration than to competition.

¹⁰ We can see similar developments in Europe, too. Earlier in 2002, the European Commission published the commissioned recommendations of McKinsey and Co., which advocate a reduction of competition in the wireless field in order to increase profitability through higher prices.