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The impact of legislative change on the behavior of telecommunications carriers

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Abstract

This article examines the effect of the behavior of carriers on the legal arrangements that regulate them. Using James Buchanan's theory of constitutional contract, the paper shows that weaknesses in US telecommunications law have led carriers to engage in unproductive activities that move them closer to the "state of nature" instead of toward a superior outcome for all parties. This paper focuses on the period before and after the Telecommunications Act of 1996, a law with such a broad scope that there were many ambiguities and contradictions. Affected parties attempted to take advantage of these to design a constitutional contract that would favor them over their rivals. The paper focuses on the interconnection aspects of the law and presents recommendations for reducing unproductive activities.

Keywords: FCC; PUC; Regulation; Legislation; Interconnection; Constitutional contract; Lobbying; Telecommunications Act of 1996

1. Introduction

Information and communications technologies (ICTs) are reaching levels of convergence previously unimaginable. As the industry continues to evolve, the Telecommunications Act of 1996 could be an impediment to further innovation and provision of converged services. As greater pressure emerges to amend the law, policy makers can learn from the experiences of the

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past to minimize the delays, confrontation, and uncertainty that prevailed before and after the enactment of the law.

The purpose of this paper is twofold. First, to identify the factors that prompt carriers to try to influence the content of laws and regulations in their favor, specifically the weaknesses of the 1996 Telecommunications Act that made this type of unproductive activity more prevalent. The second objective, which is realized in the conclusions and recommendations of this paper, is to provide some guidelines to help alleviate this problem. The theoretical framework for the paper is James Buchanan's theory of constitutional contract (Buchanan, 1975). Applying this theory to the particular case of the Telecommunications Act can help explain why carriers have spent substantial resources on lobbying and the factors that lead to these activities.

The telecommunications industry has undergone substantial changes in its recent history. It is no longer an isolated industry with companies benefiting from monopolized markets. Technological innovations in computing have led to the convergence of content, transmission, and computer-related industries (García-Murillo & MacInnes, 2001, 2003). This transformation began in the early 1990s when the Internet was also transforming itself into a mainstream network with a graphical user interface. As companies became aware of opportunities they pressured regulators to change rules. The old legislation and the rules that had been developed since the Federal Communications Act of 1934 were posing restrictions on companies, thus limiting their ability to venture into new markets and to offer new services. The legal framework that existed was no longer adequate and existing players were attempting to bring about changes in regulation at the state and federal level. The pressure that incumbent local exchange carriers (ILECs) and competitive local exchange carriers (CLECs) exerted was an effort to change the existing distribution of rights and to move toward a more favorable constitutional contract.

This paper analyzes news events to determine the factors that contributed to the lobbying efforts of the carriers before and after the Telecommunications Act of 1996. See Appendix A for an explanation of the coding of news. The paper concludes with recommendations for future attempts to modify the law.

2. Theoretical framework

Rules are crucial for a society to function. According to Pejovich: "[r]ules are necessary in a world of uncertainty and incomplete knowledge. They arise from the complexity of the environment; the computational limitations of the individual to understand, process, and utilize information about that environment … A major function of the rules of the game is to reduce the transaction costs of human interactions through making human behavior predictable. To accomplish this objective, institutions must be credible (i.e. enforced) and stable" (Pejovich, 1998, pp. 23, 24).

While rules are important to guide human interaction they are even more crucial for business activities. These formal laws and regulations provide guidelines in the market and help prevent anticompetitive behavior. Many of these rules are created because of market failure, as was the case in the early years of telecommunication networks when policy makers believed that only a monopoly could guarantee universal access.

To understand the importance of rules, how they are transformed, and the role of the affected parties in this transformation, it is useful to begin with a metaphor. Under the Hobbesian "state of nature," before the development of rules, life is considered to be "solitary, poor, nasty, brutish, and short" (Hobbes, 1651). From this view of the world Buchanan (1975) begins his analysis. Imagine, he suggests, that there are two entities, A and B, each of which has access to everything in an environment where resources are abundant, with the exception of one good. In the original state of nature the distribution of this good was perhaps an accident. There is inequality in the initial distribution of resources or privileges. In this lawless world each individual "would find it advantageous to invest effort, a 'bad,' in order to secure the good X. Physical strength, cajolery, stealth—all these and other personal qualities might determine the relative abilities of the individuals to secure and protect for themselves quantities of X, which may be quite different from the relative quantities that were arbitrarily assigned by the initial disposition" (Buchanan, 1975, p. 24).

If both A and B, for which ILECs and CLECs could be substituted, mutually acknowledge each other's rights, then they would not need to spend resources on defense and instead would reallocate them to more productive activities. This initial agreement is what Buchanan calls the constitutional contract. Once this initial agreement has been established, the parties can engage in trade, further increasing their resources. Buchanan defines this second stage, in which transactions are taking place, as the post-constitutional contract.

The fact that the rules of the game have been established does not mean that the players will not try to change them or that they may comply with them in a way that favors them. This desire to influence is facilitated because aside from its protective role the state also takes a productive role. It makes decisions with respect to the allocation of resources for the provision of public goods. Because preferences vary substantially across sectors of the population there will be some who will have an interest in shaping those decisions and thus will be willing to spend time and resources to assure themselves a better position. The political investments that players make impede production of additional goods and are net losses to society. These are, to a certain extent, similar to the resources that the parties under the state of nature spend on defense. The lobbying and counter lobbying activities that happen will, in turn, result in a backward movement away from the initial constitutional contract and toward the state of nature. Fig. 1 shows the advances from the constitutional and the post-constitutional contract as well as the drawbacks that result from the use of resources for lobbying and counter lobbying.

While it is known that the productive role of the state allows its agencies to issue rules that will have distributional effects, it needs to be questioned whether there are some circumstances that lead to more unproductive behavior than others.

Theoretical contributions identify a few factors. The incentive to lobby is fostered by parties knowing that the state suffers from asymmetric information. New institutional economists have recognized the existence of asymmetric information in bargaining agreements between buyers and sellers (Akerlof, 1970). Although Akerlof's piece on asymmetric information was not set within the context of legislation, his insight is pertinent to this process because of the wide gaps in information that legislators encounter in the drafting of laws. The regulated have more information and are more knowledgeable about the industry than government officials (Marino, 1998). Regulators thus have to make an extra effort to avoid being influenced by carriers who can

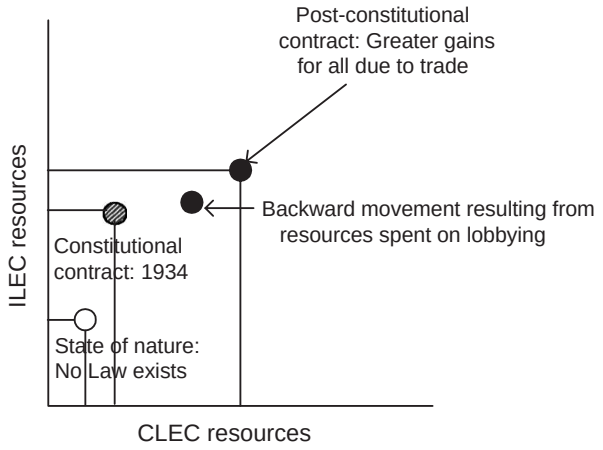

Fig. 1. Movement from the state of nature to the constitutional contracts.

take advantage of their information limitations, something that is not easy to accomplish given the complexities of the industry.

In addition to the lack of information, the costs of acquiring it is another factor. Simon (1982) states that individuals, although rational, cannot evaluate or even know all of the options facing them. He argues that there are two reasons why this occurs: (1) lack of information; and (2) the costs associated with the evaluation of options. Individuals cannot obtain all of the information they need. This is because each additional piece of information entails a cost. The more detail required, the greater the cost of gathering information. This is not a trivial matter in the context of the Telecommunications Act, where legislators had to develop regulation for five industries with long and distinct technological and regulatory histories.

Because of the lack of information about the industries regulated and the body of law preceding the Telecommunications Act, there is a great incentive on the part of the carriers to try to influence legislators by providing them with information that could tilt the emerging regulation in their favor. This happened in the context of the Act because it was clear that Congress was not going to eliminate rules altogether. There would be some rules aimed at protecting competitors by curbing the power of incumbent carriers.

A third factor is the changing circumstances in the market over time, which makes rules obsolete. When a time dimension was added the initial contract may have been somewhat advantageous to everybody present at that time but circumstances change. The fact that an earlier generation agreed to a certain set of rules does not mean that later generations will have to acknowledge them without question (Lessnoff, 1990, p. 89). With the entrance of new parties, such as CLECs, a change in the original rules may be necessary. Once again players will spend resources in lobbying and counter lobbying to secure a superior position.

The following sections make an evaluation of the industry environment and the elements in the law that created an atmosphere conducive to lobbying. The following sections describe the situation that prevailed before the 1996 Act and then discuss how carriers took advantage of the uncertainties before the Act, as well as the ambiguities and contradictions in the law, to lobby the FCC and improve their positions.

3. Industry changes after the first constitutional contract

While the state of nature is simply a metaphor and not an actual situation, it can be thought of, in this case, as the situation that prevailed in the industry before any laws were in place. The first constitutional contract for the industry was established in 1934. With the emergence of this law the "state emerges as the enforcing agency or institution, conceptually external to the contracting parties and charged with the single responsibility of enforcing agreed-on rights and claims along with contracts which involve voluntarily negotiated exchanges of such claims" (Buchanan, 1975, p. 68).

In the years between the first and second constitutional contract, or between the 1936 and the 1996 telecommunications laws there were many changes in technology, industry and market. This section focuses in the five years prior to the 1996 Act. It presents the circumstances that prevailed in the industry before the Act and the opportunities that emerged in the market for carriers not only to offer new services but also to try to change laws and regulations to favor their commercial interests.

The changes that happened in the market during the period after the 1934 Act and more importantly closer to the time when the 1996 one was enacted made the first constitutional contract obsolete. The pressure to change the law came from both the incumbent carriers as well as those operators that wanted to enter the market. The restrictions of the law, which limited potentially profitable opportunities, contributed to the lobbying efforts that happened during that time.

In the early 1990s computing technology was evolving rapidly and, with the emergence of the graphical Internet browser, carriers began to see additional revenue opportunities. Additionally, at the beginning of the Clinton administration, Vice-president Al Gore was a strong supporter of the development of an information superhighway. Part of this vision included the widespread ability to exchange computerized video images, sophisticated graphics, sound, high-speed data transfers, video-conferencing, and video on demand. In the summer of 1992 Al Gore and George Brown introduced the Information Infrastructure Technology Act and in 1993 the Clinton Administration issued a report called "Information in the 21st Century." The enthusiasm and support that the administration showed for technology, and specifically telecommunications, led to a heightened interest in investments related to advanced services. It was at this time that telecommunications companies began trials of video-on-demand and telecommunications companies became more interested in expanding their services beyond their own markets (Zitner, 1993).

It was becoming clear at that time that technology was evolving at such a speed that it was enabling an inexpensive and reliable alternative telecommunications network to emerge, making the idea of natural monopoly obsolescent. Because it was, to a certain extent, possible for new carriers to develop an infrastructure able to compete with the incumbent carrier, regulators then had to consider the ability of the law to accommodate such changes. Technological advances and support from the Clinton administration led to a general sense of optimism in the industry (*Communications Daily,* September 15, 1994). It attracted the attention of non-traditional carriers, such as companies that served private corporations exclusively, and cable operators. In a market with many opportunities, it was natural for these carriers to want to expand their services to residential customers. This required the cooperation of incumbent carriers that would have to allow them to interconnect with their facilities.

Table 1
Number of interconnection agreements reported in the news

Timing	Interconnection agreements reported in the news
Before the 1996 Act	25
After the 1996 Act	50
Total	75

Under the 1934 law, the new players were placed at a disadvantage and many of them had begun efforts to foster changes that could lead to modifications to the constitutional contract that ideally would be more favorable to them. One could thus argue that one of the factors that contributed to the lobbying efforts of that time was the obsolescence of the 1934 Law.

There were attempts by incoming carriers to obtain interconnection even before 1996. Teleport, for example, was one of the first companies to request interconnection with a regional Bell holding company (RHC). This allowed it to expand services offered to its New York clients (Boiler, 1991). Companies like Teleport and others pressured public officials to issue regulations that would make it easier for them to obtain access to the incumbent's infrastructure. Potential profits from new markets motivated companies to enter. Table 1 shows that several interconnection agreements had already been negotiated among companies before the 1996 Act.

Because the existing constitutional contract prohibited RHCs' entry into certain markets, companies had to present their plans either to state commissions or, occasionally, to the FCC. Decisions then had to be made on their requests regarding provision of enhanced services or entry to the long distance market. Before the 1996 Act the news reported 28 requests for review (see Table 2). These evaluations pertained to companies' petitions to expand their services.

The original constitutional contract, the 1934 Act, was also becoming quite restrictive for incumbents. Advances in technology had opened opportunities for them as well and they believed that a change of laws could move them to a Pareto superior point. The RHCs thus became interested in offering new services. Because it would have been difficult for incumbents to accomplish their service and market expansion objectives without giving some concessions, they had to be willing to open their networks. Although they were restricted by the Modified Final Judgment to providing long distance services, they pursued their interests by petitioning state public utility commissions (PUCs) to allow them to provide this service. In exchange, they offered to allow access to their networks (*Communications Daily*, May 18, 1993). Even though this would have facilitated their expansion of services there were also some RHCs that made it difficult for entrants to gain access to national networks. From 1992 to 1996 eleven news events reported denied interconnections (See Table 2). At that time the rationale from incumbents was that it would cost them too much to fulfill these requests (*Communications Daily,* November 13, 1992).

It can be seen from these efforts that there have been attempts from both potential new entrants and the existing incumbent carriers to modify rules in their favor. Fig. 2 shows the type of adjustments that these two parties would have liked to be able to accomplish. ILECs wanted laws and regulations in the sector to move from point A to A′ where there could give up some of their privileges to competitors but still give greater benefits to themselves. The competitors wanted to reduce the privileges of the incumbents and significantly improve their own circumstances.

Table 2
Record of news events

	Company refusal for interconnection	Federal rules established	Federal rules to be determined	State rules established	Court challenge	Organizational challenge	Individual company review	Total
Before the 1996 Act	11	21	68	11	5	9	28	178
After the1996 Act	40	8	16	12	25	38	29	218
Total	51	29	84	23	30	47	57	396

$\chi^2 = 91.01$ Sig. = .000; Kappa = .43.

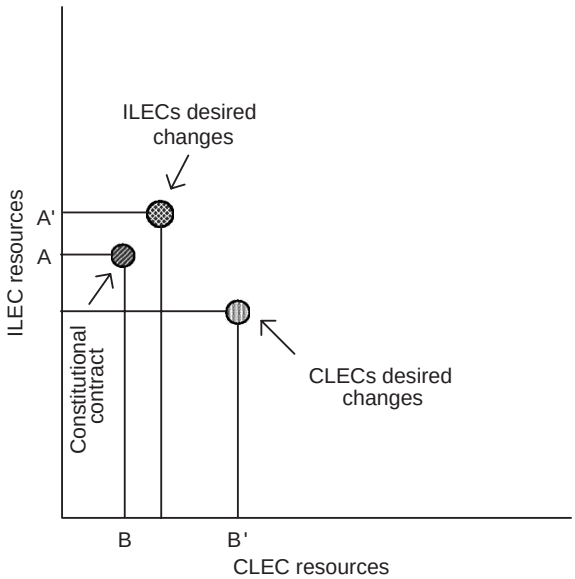

Fig. 2. CLECs and ILECs preferences for the constitutional contract.

Because the lobbying efforts to change the law itself are quite high, most interconnection requests by competitors were submitted to state PUCs. These entities were more sympathetic to these companies because they believed that competition would help modernize and provide greater choices to consumers (Lindstrom, 1992).

These efforts point to a second factor that contributes to lobbying by these companies—the existence of multiple forums to influence regulation. Because state regulators are able to issue rules for the industry, it can be easier to lobby commissioners at the state level than trying to convince multiple and more diverse players at the national level. Smaller battles could then be fought with PUCs.

In the interest of fostering competition, several PUCs issued regulations. There were also some local authorities, such as the city of Chicago, which proposed in 1992 a "Telecommunications Free Trade Zone" (*Communications Daily*, February 4, 1992), an initiative that was suggested by Ameritech. That year there were 17 states that already allowed competition in local exchange

service, while 18 were formally considering it and four allowed it informally (FCC, Common Carrier Bureau, 1995). When state commissions decided to issue regulations to address these requests, it created at the same time additional problems for carriers as the rules of one state are likely to be different from those issued by another. In addition to raising operating costs for carriers, this can also lead to greater lobbying from carriers trying to obtain the same favorable rules from another state (García-Murillo & MacInnes, 2003).

While there were some states that issued regulations, others refused to address the subject and requested instead that the FCC resolve it. From 1991 to 1996, when the Telecom Act passed, there were 68 unique news reports about companies wanting the FCC to issue regulations regarding interconnection and opening of markets (see Table 2). This to a certain extent is an indication of the efforts that these companies were making to try to change a law that was obsolete at the time.

Because of the pressure from some states, the FCC became involved with interconnection. When the issue was brought to the FCC for consideration, the commission was already working on issues of interconnection concerning portability for 800 numbers. There was not much debate with respect to 800 numbers, but carriers were more reluctant to allow interconnection for competitive operators. They stated that interconnection threatened networks due to technical difficulties (*Communications Daily*, December 16, 1991). Table 2 presents data about the number of interconnection denials reported before and after the Act was passed. Before the Act there were 11 news reports of interconnection denials. This lack of cooperation that incumbents exhibited is evidence of the resistance they were posing to prevent the erosion of the privileges they were granted under the first constitutional contract.

While the FCC was being pressured by competitive carriers to mandate interconnection, Congress was instead debating whether or not they should remove MFJ restrictions so that RHCs could enter the long distance market. In May 1992, the House Commercial Law Subcommittee passed the Brooks MFJ Bill (HR-5096) that was intended to slow the entry of RHCs to information services, manufacturing, and long distance by implementing waiting periods on the RHC before entering those services (*Communications Daily*, May 29, 1992).

Unlike Congress, the FCC saw advances in technology as a tool to foster competition and was more willing to deregulate. In 1992 the FCC issued an order requiring "LECs with revenues of over $100 million annually to offer expanded interconnection to all interested parties, permitting competitors and high volume users to terminate their own special access transmission facilities at LEC central offices" (*Communications Daily*, September 21, 1992). This is one of the earliest attempts by the FCC to require interconnection, which included mandatory physical and virtual collocation. Soon afterward, the carriers challenged this order in court, arguing that the FCC had exceeded its authority. In their challenge they also contended that compliance with the order would entail large costs associated with site surveys and tariff-related activities, among others (*Communications Daily*, November 13, 1992). This reaction on the part of RHCs is to a certain extent unjustified because, even before the interconnection order was issued, some carriers had already negotiated collocation agreements with competitors. At the state level there were mixed reactions with some commissions asking for waivers to delay while others continued issuing their own laws. For example, Arizona's Corporate Commission issued a rule in June 1995 that allowed local carriers to offer intrastate long distance service (*Communications Daily*, 23, 1995).

In the years immediately before the Act, some companies were signing interconnection trials while others were still contesting and refusing to interconnect with competitors. An early sign of

the changes to come was the decision by the Department of Justice to allow US West to offer out of region telephone services as long as the company provided local services in those states as well (*Communications Daily*, October 12, 1995).

The regulatory environment before the Act, was too restrictive for both incumbents and incoming carriers. This, along with the pieces of regulation that both PUCs and the FCC were issuing, was creating uncertainty that did not provide stable expectations for companies in the industry. To a certain extent there was a regulatory vacuum with state and federal rules that were not consistent with each other. Without standards, competition would have been difficult. Ideally a national standard would have helped settle these issues. It was clear that the original constitutional contract of 1934 was falling apart. Affected players were spending resources to modify the allocation of privileges in their favor. This created an environment dominated by rent seeking.[1] Companies were engaged in unproductive activities such as lobbying to redistribute wealth from competitors to themselves.

4. The second constitutional contract: the Act of 1996

The Telecommunications Act was an effort to update the original constitutional contract, the law of 1934. Advances that had occurred in the industry required major changes in the law. Given the complexity and scope of the changes, the Act had a number of weaknesses that provided opportunities for lobbying. It is an ambitious and lengthy document of 333 pages including seven titles/chapters and 714 sections. It regulates many aspects of telecommunications, including landlines, satellite, microwave, and radio; cable television, which is now able to provide broadband access to the Internet; and broadcasting, which is moving toward a digital format. Because the Act covers many issues, it does not provide specific rules for most of them. Given such limitations, the law gives the FCC responsibility for the implementation of rules on issues that could only be outlined in the 1996 Act. The power that is given to the regulator to implement the law provides yet another opportunity to lobbying. It gave companies incentives to spend resources in unproductive activities to improve their position under the second constitutional contract.

The Act was a demanding document because of the amount of information that people responsible for drafting it needed to assimilate. This was also complicated by the uncertain state of rapidly evolving technology. Problems of asymmetric information and lack of information made it difficult for legislators to address all of the issues that needed to be changed. This, in addition to lobbying efforts during the draft of the new law, resulted in a document that contained some contradictions, as well as economic and legal problems. Economists find weaknesses in the economic models underlining the regulation (Economides, 1997; Kahn, Tardiff, Weisman, 1999) while legal scholars identify the FCC as the source of the problem (Beynon, 2000).

An example of a problem with the law is the scope of decision-making powers that is given to regulators. In some instances it limits their powers while in others it leaves the door open for them to make adjustments. The Act contains clauses that are aimed to prevent regulators from overstepping

[1] Rent seeking presupposes that if there is value to be gained through politics, persons will invest resources in efforts to capture this value. These are inherently unproductive activities that are aimed at pie redistribution rather than pie enlargement.

their powers against the regulated. There are thus a number of clauses that indicate what the commission or state agencies can or cannot do. An example is Section 271(d)(4) pertaining to the competitive checklist, which states "The Commission may not, by rule or otherwise, limit or extend the terms used in the competitive checklist set forth in subsection (c)(2)(B)."

Just as there are clauses that limit agencies' demands to companies, there are also ones aimed at extending their privileges. While the former type of clause is intended to prevent regulatory abuses, the latter provides mechanisms for regulators to issue additional rules in case the existing ones fail to address a problem. The existence of clauses intended to extend the rights of regulators could pose problems in the future because companies, knowing the discretion of these government agencies, will have an incentive to spend resources to lobby to have rules written in their favor. An example of a rule that extends the privileges of the commission is Section 273(g) which pertains to manufacturing by Bell Operating Companies: "The Commission may prescribe such additional rules and regulations as the Commission determines are necessary to carry out the provisions of this section, and otherwise to prevent discrimination and cross-subsidization in a Bell operating company's dealings with its affiliate and with third parties." While in some instances limiting their power can reduce wasteful lobbying efforts this also limits the ability of regulators to make adjustments as the environment changes.

The Act also includes clauses that give the Commission discretionary powers to regulate over the content of the law but, at the same time, gives state commissions similar powers. Even though the Act specifies that states can only issue regulations pertaining to intrastate services, the physical infrastructure of telecommunications is the same regardless of the final destination. This is problematic today when regulators were determining the nature of a call that is made using the Internet Protocol. While the intent of these clauses is to preserve the federalist spirit of the law, they lead to many problems. Having states outline their own rules can give carriers multiple forums to play commissions off against each other in order to influence regulators to establish rules that most benefit them (García-Murillo & MacInnes, 2003). Alternatively, assuming that they are unable to obtain what they want, they may simply operate at a minimal level in that state and leave their most innovative initiatives for states that have less stringent rules, effectively forum shopping.

As described above, Congress did not provide detailed rules for many issues. In telecommunications, the areas that Congress left undefined were Section 227(c), Protection of subscriber's privacy rights; Section 227(d), Technical and procedural standards for facsimile, artificial or prerecorded messages; Section 228, Regulation of pay per call services and the possible extension of rules to data per call; Section 229, Communications assistance for law enforcement; Section 245, Universal Service rules; Section 251(d), Interconnection implementation rules; Section 257, Elimination of market barriers; Section 259, Infrastructure sharing regulations; and Section 276, Provisions for payphone services. These sections correspond only to Title II Common Carriers.

Many of the issues to be defined were highly complex and controversial, which must have left the staff at the Commission thinly spread, considering the limited time they were given to develop regulations.[2] This time constraint, along with the asymmetric information that these agencies suffer, enables yet another possibility for the private sector to try to influence regulation. They can

[2]The Telecommunications Act included 29 statutory deadlines varying from 30 days to 18 months.

provide the agency with data and models that will advance their interests. Of all the issues, the most controversial and contested has been that of interconnection. The debate over it clearly illustrates Buchanan's constitutional contract and the incentive of companies to lobby.

4.1. Interconnection, the Act and its implementation

This paper focuses on interconnection because the allocation of rights or privileges on this issue was crucial to the survival of all of the players. These decisions could ultimately determine the allocation of privileges for each of the parties in this second constitutional contract.

After the Act passed, regulations became more complicated rather than easier. Prior to the Act, state PUCs were handling some of the interconnection issues and were even able to mediate some disputes (*Communications Daily,* June 19, 1998). This was far from ideal considering that without national rules, states had to devise their own criteria for interconnection. The Act therefore seemed like a solution to the complications created by differing state rules and carrier interconnection negotiations.

In the telecommunications industry, rules pertaining to interconnection had the greatest impact on the way each of the players would be affected once unsettled issues related to the second constitutional contract were determined. Interconnection alone was complex. Among the things that needed to be determined were: (1) the establishment of standards to allow networks to interconnect; (2) the specification of the elements of the network that were to be leased to competitive carriers; (3) the costs for the network elements and the collocation rents for the physical use of facilities; (4) jurisdiction of the states with respect to interconnection regulation; (5) the specification of criteria for carriers that would be exempted; (6) the procedures for negotiation; (7) standards for arbitration; (8) charges for termination and transport of traffic; (9) determination of wholesale prices; and (10) the specification of rules for incumbents. These were the issues that pertain only to interconnection in the Act, which was a small portion of the many issues that needed to be decided in the law.

Before the 1996 Act interconnection denials as well as the lack of national standards on this issue appear to have prompted carriers to request the FCC to issue rules for interconnection. As shown in Table 2, news reporting federal rules established were reduced after the Act from 21 to 8. Similarly the number of rules that parties affected believed still needed to be determined also declined substantially from 68 to 16. Fig. 3 shows the number of news events where carriers and public utility commissions lobby the FCC to issue regulations. The decrease in the number of news events regarding requests for rules indicates that the Act settled some of the interconnection issues.

Although it was no longer necessary to lobby for rules, carriers now have an incentive to interpret the rules in their favor. The second constitutional contract, the 1996 Act, opens the door for new competitors. It requires incumbents to negotiate, whereas before each new entrant had to lobby state regulators to force the incumbents to negotiate. This task would have been difficult to overcome for smaller carriers without the backing of the law. Following Buchanan's framework, the modified constitutional contract facilitated the entry of the new players. It also allowed the existing carriers, the ILECs, to provide services and expand their markets into areas where they were prohibited from entering. Overall the allocation of privileges tended to benefit competitors. Incumbents were required to prove that competition was present in their home

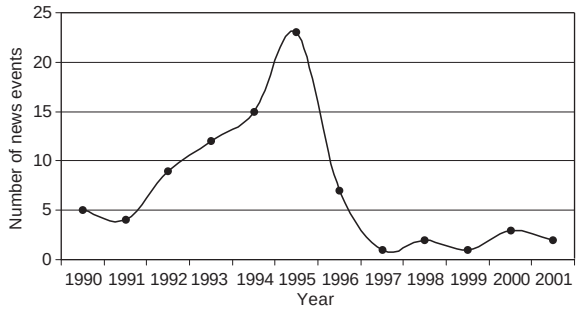

Fig. 3. News events pertaining to requests by PUCs and carriers wanting the FCC to issue regulation on interconnection.

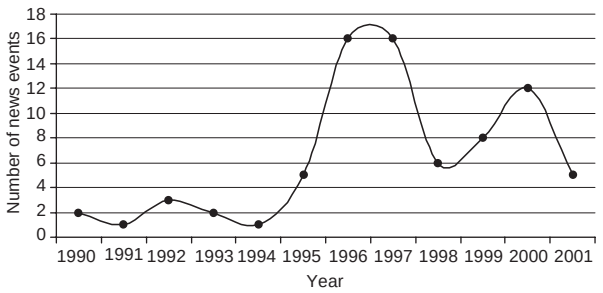

Fig. 4. New events about challenges to laws and regulations.

markets before they were allowed to enter new markets. While the law itself tended to favor competitors, the implementation made it considerably more difficult for CLECs to achieve the expected benefits.

Given the many issues that were left undefined regarding interconnection, ILECs and CLECs that felt that they could be potentially negatively affected had an incentive to challenge the law. Fig. 4 shows that challenges to regulations, as reported in the news, substantially increased after the 1996 Act. Similarly the column about organizational challenges in Table 2 records the number of news events before and after the Telecom Act that make reference to lobbying and ex parte communications that companies and state commissions had with the FCC. There was an increase from 9 to 38 in the number of events regarding these challenges. It is not surprising that petitions to the FCC, state regulators, and lawsuits took, in some instances, years to be settled. This gave carriers the opportunity to lobby and counter lobby to ensure themselves greater privileges than their competitors.

The interconnection order was important because of the high stakes associated with the opening of markets and the potential reduction of incumbent market share. It was on this issue that both players, having conflicting interests, were so willing to defend and enhance their position in the market by pressuring for an interpretation of the law that could favor them.

An example of the type of activities that carriers utilized to try to influence regulators is a document entitled *Handbook for the FCC*. The Association for Local Telecommunication Services (ALTS), an organization representing competitive access providers (CAPs), issued the document.

It outlines its interpretation and the things that it wanted the FCC to do (*Communications Daily*, March 18, 1996).

Once the order for interconnection was issued, (FCC, 1996) there was considerable debate from both the CLECs as well as the ILECs. Initially it appeared as if the ILECs were willing to cooperate on interconnection agreements, although they expected the authorization to provide long distance service to be almost automatic. Bell Atlantic and Ameritech were among the first to submit their applications to both PUCs and the FCC to obtain approval to begin providing long distance service (*Communications Daily,* June 16, 1998). This happened after only one competitor had signed an interconnection agreement in each case. These companies believed that this was enough to fulfill the interconnection requirements of Sections 521, 252, and 271. The applications were quickly denied because, according to the PUCs and FCC, they were premature (*Communications Daily,* September 12, 1997).

Although it is not something that they explicitly recognized, it is possible that the frustration of not having the application approved contributed to ILECs' reluctance to facilitate interconnection. Table 1 indicates that the number of events related to interconnection agreements increased from 25 to 50 but so did the number of rejections for interconnection, from 11 to 40. There were also numerous court challenges and several of them favor the incumbents. Since the FCC tended to favor new competitors, the implementation of the Act led to regulatory challenges that became increasingly complex and confrontational.

It is not entirely surprising to have lawsuits after a major law such as the 1996 Act. It covered so much ground that regulators were bound to make mistakes due to their lack of experience about the technicalities and economics of interconnection. All of these actions were thus an indication of the defense, tactics, and resources spent for each of the affected parties to influence the details of the second constitutional contract.

Further analysis of the events reveals other points of contention. Among the most controversial issues were the regulations for unbundled network elements (UNEs). The language in Section 251(c)(3) is as follows:

> UNBUNDLED ACCESS.–The duty to provide, to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point on rates, terms, and conditions that are just, reasonable, and nondiscriminatory in accordance with the terms and conditions of the agreement and the requirements of this section and section 252.

The Act provides a guiding framework but does not specify implementation issues such as what is technically feasible, just, and reasonable. This means that the FCC and state commissions were left to make these decisions. Court tests on this issue began challenging the formula used to calculate the rates and escalated to include issues such as property rights for third party equipment on collocation agreements (*Communications Daily,* March 18, 1997), the quality of the networks to be leased (*Communications Daily,* August 2, 1996), the network elements included in the UNEs list (*Communications Daily,* October 13, 1998), the obligations and rights of wireless carriers (*Communications Daily,* April 29, 1998), and the impact of leased networks on access charges and universal service (*Communications Daily,* June 20, 1997). It was clear that Congress and the FCC underestimated the complexity of interconnection. Table 2 presents information regarding the number of news items that alluded to court challenges before and after the Act. It

shows that lawsuits associated with interconnection after the Act passed increased from 5 to 25. The lengthy disputes have impeded entrants.

Specific disputes are, for example, a lawsuit against the FCC, which had issued a ruling mandating that incumbents recombine unbundled network elements for competitors. The court decided in favor of ILECs citing that the law was intended to encourage competitors to build their own infrastructure not simply to resell existing services (*Communications Daily,* December 10, 1997).

The list of network elements that incumbents were obliged to lease was yet another point of contention. Carriers challenged the original list that the Commission prepared. Since the Act did not have guidelines, incumbent carriers had incentives to challenge the list to increase the number of privileges to themselves under the modified constitutional contract. This would limit the amount of competition that would otherwise come into their markets and perhaps slow entry. The Supreme Court reviewed the list and requested that the Commission revise it to take into consideration the standards for "necessary" and "impair" in the Act, which were not defined. Rather than reducing the list, the FCC instead lengthened it by including conditioned loops as well as line sharing.[3] The list was challenged once more at the Eighth Circuit, where the court stated that the Act only required the unbundling of existing network elements and not of elements that may exist in the future. They also reasoned that incumbents are not obliged to "cater to every desire of every requesting carrier" (AT&T Iowa Utils Bd., 1999). FCC officials at the time claimed that the Supreme Court had already decided on this issue and did not change their position.

Related to UNE rates, was the issue of de-averaging. Because the Act did not specify the term "just and reasonable," carriers, state officials, and the Commission were left to debate an issue. Some commissioners were concerned that rural communities would face considerably higher rates than their urban counterparts if de-averaging were used (*Communications Daily,* October 16, 1996). This was an unforeseen event because the aim of de-averaging was to allow carriers to have lower rates for those areas where the cost of providing services was lower. This implied that some areas of the country would have lower rates for UNEs than others.

Given that the Commission established rules tending to favor competitors over RHC incumbents, one of the strategies that ILECs used to prevent these rules from prevailing was to accuse the FCC of overreaching its authority by imposing rules at the national level when the Act had specified that states had the authority to devise their own interconnection rules.[4] Thus the incumbents, unable to persuade the FCC to the interconnection terms that they preferred began to put pressure through the PUCs. They were able to do this because clauses in the Act gave both the FCC and state commissions power over regulation. Regarding interconnection, Section 251(c)(3) of the Act states:

> PRESERVATION OF STATE ACCESS REGULATIONS.–In prescribing and enforcing regulations to implement the requirements of this section, the Commission shall not preclude the enforcement of any regulation, order, or policy of a State commission that–
> (A) establishes access and interconnection obligations of local exchange carriers;
> (B) is consistent with the requirements of this section; and
> (C) does not substantially prevent implementation of the requirements of this section and the purposes of this part.

[3]Line sharing refers to the unbundling of high frequency spectrum on a telephone line that is above the voice-band. This portion of the line is generally used to provide x-DSL services.

[4]See Section 251(d)(3) Preservation of State Access Regulations.

The problem nonetheless occurs when the telecommunication infrastructure is used for both intra and interstate communication and rules of interconnection will affect both. If an interconnection agreement were negotiated at the state level, it would not make sense for an interexchange carrier to negotiate it only for intrastate traffic. This Act further exacerbates this problem by allowing the FCC to preempt state jurisdiction if the state fails to issue regulation (Section 251(e)(5), or if the rules that they issue violate the Act (253(d)). This means that the FCC would have to develop interconnection regulation for states even though the Act gives them jurisdiction.

Before the Act and interconnection orders were issued, the establishment of national rules was welcome. Once they were issued, states had to decide which rules to apply: their own or those issued by the FCC. This was the case in Florida, Ohio, and California, which had to put on hold their ruling processes to wait for the FCC to issue its interconnection order. Although the ILECs were the first to challenge to the authority of the FCC to determine pricing rules for the entire country, state commissions followed up with similar complaints. In the lawsuit against the FCC concerning the pricing guidelines that it had established for states to follow, the court decided against the FCC, arguing that states were entitled by the law to determine their own rates for interconnection, resale, and unbundled network elements (*Communications Daily,* September 12, 1997). States that already had passed interconnection rules were concerned about the validity of their laws when compared to those of the FCC.

Court challenges took such a long time to be resolved that PUCs had to resort to interim rates while waiting for cases to be sorted out. This means that, in addition to the uncertainty in the law, the court cases added to the lack of rules on many interconnection issues.

In summary, the second constitutional contract and the way it was implemented provided carriers with opportunities to lobby. The ambitious scope led to a law where many issues were left undefined, such as privacy rights, universal service rules, interconnection implementation rules, and infrastructure sharing regulations. It also strained Commission employees because they had to issue orders on many of these issues and had little time to analyze all factors. It is thus not surprising that they made mistakes in the implementation. Carriers, in turn, faced with the possibility of ending in a constitutional contract that could potentially reduce their privileges, attempted to influence and challenge the rules that the FCC had established. FCC decisions that were against the interest of both ILECs and CLECS led to lengthy court challenges, creating further opportunities to influence the final outcome.

5. Conclusions and recommendations for regulation

Formal rules enforced by the government are crucial for economic activity. In the telecommunications industry the Telecommunications Act of 1934 and subsequent rulings and court decisions created an environment dominated by monopolies.

By the early 1990s changes in the industry and technology had made the 1934 Act obsolescent. These included innovations in computing that led to convergence of content, transmission, and computer-related industries. This enabled new opportunities that caused companies to seek entry into previously monopolized areas. The 1934 Act impeded this market entry.

Buchanan's theory of constitutional contract provides some explanations to the reasons why companies engage in lobbying activities. The main motive is that each of the parties wants to

assure themselves of better resources or privileges. While lobbying is a normal and expected activity, the content as well as the implementation procedures of the Telecommunications Act made these activities more prevalent. This paper identified several factors that contributed to the lobbying efforts of both CLECs and ILECs.

The pressure for change is greater as time passes. The affected parties realize that the existing constitutional contract becomes a limiting force to their economic interests and will try to change the rules. The process of change itself is a contributing factor to lobbying. Change is not possible unless there is pressure from the affected parties. Scholars identified asymmetric information, cost of information acquisition, and lack of information as factors that contribute to lobbying. The experiences from the changes to the Telecommunications Act elucidate additional factors contributing to lobbying such as the existence of an obsolete law that required major changes, the ambitious attempt by Congress to address the issues while providing the FCC little time to design the regulation, and the conflicting jurisdictional privileges that the law granted to both state PUCs and the FCC on the same issues.

The first constitutional contract was written more than 60 years ago even before computers existed. Advances in technology had been so dramatic that the set of rules outlined in the 1934 Act was limiting business interests. These limitations then prompted both incumbent carriers and would be competitors to pressure regulators for change.

Another factor that contributed to lobbying was the scope of the Law. Congress aimed at providing an all-encompassing law that covered all industries in information and communications. This second constitutional contract was going to define the rights and privileges of the players, which naturally led to many lobbying efforts.

The ambitious schedule provided to the FCC to draft rules for the various sections of the law made the problems of lack of information and asymmetric information more acute. This naturally gave carriers an incentive to lobby knowing perhaps that the information they were providing to the agency would not be verified given the little time that its officials had to learn about all of the implications of the rules they were drafting.

The law also provides multiple fora of influence. Although not intended this way companies took advantage of the privileges and responsibilities given to the FCC, state PUCs and the courts to influence the content of rules or the interpretation of the law. This was particularly true for the very controversial subject of interconnection. Because the FCC was in general more favorable to competitors, the rules of interconnection that it designed tended to favor them. Incumbents trying to limit the negative effects on their established market share utilized these three fora to make sure that the law advanced their interests as well.

The findings of this study lead to several recommendations for the process of formulating laws that reduce the level of resources that companies spend on rent seeking. First, the law should be broad in scope in order to more easily accommodate changes that take place over time. Because it is not possible for legislators to modify constitutional contracts every few years, it is better to design broader laws and then allow regulators to determine the specifics at shorter intervals. Congress may wish to eliminate the highly detailed sections of the existing law and move toward a more integrated one that takes into consideration the convergence that has occurred in information and communication technologies.

Secondly, regulators should be involved in developing detailed rules that are more frequently updated than the guidelines provided by the law. While this will require another major

modification of the constitutional contract, Congress should design a law from which regulators can update pieces occasionally as the market evolves. This will give them time to analyze and understand the problems involved. Because Congress is more likely to suffer from information asymmetry, regulators are better positioned to design the details left undefined in the law. They can request information from all parties including those that do not have a direct stake in the issue but are aware of the problem and can provide inputs. With less complex issues to be regulated, and having better-informed regulators, companies will have less incentive to engage in pie redistribution through lobbying as the stakes are much smaller.

Thirdly, changes should be made gradually so that regulators can better familiarize themselves with each issue and reduce the stakes and thus incentives for lobbying. With regular updates of the portions of the law that are out of date, information needs for regulators would be much lower and it would be easier for them to regulate consistently. In this way, there would be a lower probability of assigning regulators the task of assimilating complex information.

Fourthly, when a new change is necessary in the constitutional contract, there should be attempts to integrate successful regulations that are developed in the period between laws. Because the FCC issues orders, Congress could instead incorporate into the law the essence of those rulings that have already been successfully implemented, rather than designing everything from scratch. In this way less information is required and perhaps better laws can be developed.

Fifthly, because ICT industries are becoming less tightly integrated, Congress may consider limiting the rights of states to issue regulations for the industry. Such an approach would be controversial, as many states would not want to lose their authority. It is now difficult to differentiate local from national or international traffic. This will be even more so with the use of Internet Protocol when packets of data can be routed all over the country. While these recommendations appear to be common sense they are not always attainable because legislators are often concerned about giving greater power to regulatory authorities. Congressional review of the FCC should mitigate potential abuses.

"Communications Daily"—References

1992, February 4, *12*, 4	No Title	*Communications Daily*
1995, June 23, *15*, 7	No Title	*Communications Daily*
1996, March 18, *16*, 5	No Title	*Communications Daily*
1991, December 19, *11*, 2	Callers Won't Notice Change; Phone Industry Drafts Transition To 800 Portability	*Communications Daily*
1997, December 10	CLECs Revenue and Market Share Predicted to Grow 60% Next Year	*Communications Daily*
1995, October 12, *15*, 1	Court Approval Needed; DoJ Supports US West Plan to Offer Out-of-Region Long Distance Service	*Communications Daily*
1993, May 18, *13*, 4	'End to Balkanization'; Ameritech Asks For Unity in Opening Local Loop, Intralata Competition	*Communications Daily*

1994, January 12, *14*, 1	Endorses Brooks-Dingell; Gore Endorses Lifting MFJ Restrictions	*Communications Daily*
1997, May 16	Federal-State Joint Board Members Critique Universal Service Order	*Communications Daily*
1997, September 12	Hundt Criticizes States and Bells on Planned Lawsuits	*Communications Daily*
1993, August 4, *13*, 1	Most Large Carriers Affected; FCC Calls For Expanded Interconnection Opportunities in Switched Transport	*Communications Daily*
1992, May 29, *12*, 1	Markey Gearing Up; Brooks MFJ Bill Passed, 10-6, By House Judiciary Unit	*Communications Daily*
1996, August 7, *16*, 2	Might Encourage <96>Gaming'; Industry Praises, Pans GTE Auction Proposal.	*Communications Daily*
1991, January 7, *11*, 6	Pacific Bell Forms Separate Affiliate For Voice Mail	*Communications Daily*
1992, November 13, *12*, 1	Permanent Physical Occupation; 4 RHCs And Large Independents Ask Stay Of Interconnection Order	*Communications Daily*
1993, April 13, *13*, 1	Rate Impact Minimized; TCI to Hike Capital Spending 2/3 To Boost Local Fiber Installations	*Communications Daily*
1996, August 2, *16*, 3	Warning of Legal Action; Telecom Industry Cautiously Sees FCC Interconnection Order As First Step	*Communications Daily*
1998, October 13	Supreme Court Hears Interconnection Arguments Today	*Communications Daily*
1996, October 16, *16*, 1	Supreme Court Next Stop; Appeals Court Stays FCC Interconnection Pricing Rules	*Communications Daily*
1994, September 15, *14*, 2	Universal Service Progress Needed; Administration Claims Progress On NII Goals	*Communications Daily*
1992, October 7, *12*, 4	Vote Seen As 3-1/2 to 1-1/2; Physical Interconnection Issue Creating Conflicts	*Communications Daily*
1997, June 20	Section: Telephony	*Communications Daily*
1997, March 18	Section: Telephony	*Communications Daily*
1998, April 29	Section: Telephony	*Communications Daily*
1998, June 16	Section: Telephony	*Communications Daily*
1998, June 19	Section: Telephony	*Communications Daily*

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Appendix A

The coded news events came from *Communications Daily* because it was the only periodical reporting on US telecommunications regulation published over the entire period from 1991–2001. The sample size for the number of news to be coded was determined using a formula from Hinkle, Wiersma and Jurs (1998). The news events were coded into eight groups: (1) interconnection agreements reported, (2) company refusal for interconnection, (3) federal rules established, (4) federal rules to be determined, (5) state rules established, (6) court challenges, (7) organizational challenges, and (8) individual company evaluations. These codes were selected because they give an indication of the activity level of interested parties. Each news event was coded and considered a data point. Appendix B includes a sample of news events and corresponding codes. Intercoder reliability was analyzed by drawing a random subsample of news events from the overall sample, based on a formula by Lacy and Riffe (1997). The two authors coded the sub-sample. The percentage agreement and the kappa value are indicated in the table produced for this research.[5]

Interconnection agreement	An agreement is signed between two companies or with the help of a regulator. An incumbent carrier reports about its interconnection agreements. A carrier or PUC reports about interconnection agreements being made to date.
Federal rules established	The FCC issues an order related to the implementation of interconnection-related issues. The FCC successfully clarifies an issue of contention. Congress passes a bill pertaining to interconnection. When the FCC sets up organizations to manage the US fund. When there is a decision in the Senate or House about universal service.
Court challenge	Companies file a lawsuit against either the FCC or PUCs.
Organizational challenge to the FCC	When an individual company, an association representing carriers, or a consumer group sends letters of concern to the FCC about its policies on interconnection. When members of congress challenge the actions of the FCC this is considered an organizational challenge because they are seeking to protect the interests of their constituencies.
State rules established	A PUC clarifies or determines rules to be followed by carriers that provide services in that state.
Company refusal of interconnection	When, as reported by third parties to a government agency, a carrier does not facilitate interconnection with competing companies. When it is necessary for a government agency to intervene in a complaint about a denial for interconnection. CLEC complaints about failure to obtain

[5]As pointed out by one of the anonymous reviewers one of the problems of this type of methodology is that the news items do not indicate their weight.

	interconnection under Section 251. High rates are considered unwillingness to allow interconnection. Interconnection disputes among companies are considered unwillingness to provide interconnection.
Individual company review	When the FCC or a PUC reviews a company's application for interconnection-related issues such as requests for certain networks or tariffs for interconnection to be exempted. When an issue arises that only pertains to the company under review. Section 271 approval is considered an individual company review. The review can include satellite companies. When companies complain about another company that obtains certain conditions of which they disapprove.
Federal rules yet to be determined	Companies complain about an issue that the FCC has not yet decided. When state legislation is still being written or there is debate around an issue that regulators have not settled.
Not coded	Administrative information such as data requests from carriers is not coded. Journalist opinions are not coded. Speeches are not coded. Studies by consulting companies are not coded.

Appendix B. Sample of news events and their codes

Date	News event	Code given
December 5 1995	Mich. Gov. John Engler (R) on November 30 signed bill to open local telephone loop. State legislature had approved it November 9. Law grants telecom entrants access to public rights-of-way on terms similar to those of incumbents, and requires municipalities to process entrants' applications within 90 days.	State rules established
November 21 1995	The case concluded that Elkhart has made persuasive showing that SWB's failure to provide it interconnection to its CCS/S7 network under a meet point billing arrangement is contrary to Commission rules and orders and in violation of the Communications Act; denied Elkhart's claims that SWV violated the Act; required SWB to provide the interconnection requested by Elkhart.	Interconnection denial

November 16 1995	House November 7 on 80–27 vote, and Senate approved House version November 9. It received strong support from local telcos. Cable industry also believes it's "a pretty good bill," said Colleen McNamara, Exec. Dir. of Mich. Cable TV Assn. (MCTA). Measure also appears to assure "decent" interconnection and number portability, McNamara said.	Federal rule established
October 30 1995	Opposition has surfaced from several quarters to Dept. of Justice motion that would let US West offer out-of-region long distance service in combination with competitive local exchange service (CD Oct 12 p1). BellSouth said DoJ went beyond its authority in recommending approval by US Dist. Court, D.C.	Company challenge
November 3 1995	LECs have gained "unwarranted regulatory relief" by citing "potential for competition," while companies continue to be shut out of markets, she said. ALTS complained that at federal level, LECs have submitted and had rejected 4 sets of tariffs, launched 2 court appeals of FCC decisions and thwarted implementation in many markets.	Court challenge

References

Akerlof, G. (1970). The market for lemons: Qualitative uncertainty and the market mechanism. *Quarterly Journal of Economics*, *84*, 488–500 August.

AT&T v. Iowa Utils. (1999). *Bd. 119 S. Ct. 721*.

Beynon, R. (2000). The FCC's implementation of the 1996 Act: Agency litigation strategies and delay. *Federal Communications Law Journal*, *53*(1), 27–47.

Boiler, D. S. (1991). The year in review. *Public Utilities Fortnightly*, *127*(1), 44 January.

Buchanan, J. M. (1975). *The limits of liberty: Between anarchy and leviathan*. Chicago: The University of Chicago Press.

Economides, N. (1997). The telecommunications act and its impact. *Paper presented at the annual telecommunications policy conference.* Tokyo, Japan.

FCC, Common Carrier Bureau (1995). *Common carrier competition. Spring, 6.* http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/fcc-link.html.

FCC (1996). *The first report & order in the matter of implementation of the local competition provisions in the telecommunications act of 1996.* http://www.fcc.gov/ccb/local_competition/fcc96325.html.

García-Murillo, M., & MacInnes, I. (2001). FCC organizational structure and regulatory convergence. *Telecommunications Policy*, *25*(6), 431–452.

García-Murillo, M., & MacInnes, I. (2003). The impact of technological convergence on the regulation of ICT industries. *Journal of Media Management*, *5*(5), 57–67.

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (1998). *Applied statistics for the behavioral sciences* (1st ed). Boston: Houghton Mifflin Company.

Hobbes, T. (1651). *Leviathan*. New York: Everyman Edition, 1943.

Kahn, A., Tardiff, T., & Weisman, D. (1999). The telecommunications act at three years: An economic evaluation of its implementation by the federal communications commission. *Information Economics and Policy*, *11*(4), 319–365.

Lacy, S., & Riffe, D. (1997). Sampling error and selecting intercoder reliability samples for normal content categories. *Journalism and Mass Communication Quarterly*, *73*(4), 963–973.

Lessnoff, M. (Ed.). (1990). *Social contract theory*. Oxford: B. Blackwell.

Lindstrom, A. H. (1992). Free trade zone symposium lights competitive fires, telecommunications free trade zone proposed in Chicago, IL. *Telephony.* Retrieved November 11, 2004, from the World Wide Web: http://tinyurl.com/eyv37

Marino, A. M. (1998). Regulation of performance standard versus equipment specification with asymmetric information. *Journal of Regulatory Economics*, *14*(1), 5–18.

Pejovich, S. (1998). *Economic analysis of institutions and systems. International studies in economics and econometrics*, Vol. 33. Boston: Kluwer Academic Publishers.

Simon, H. (1982). *Models of bounded rationality*. Cambridge, Mass: MIT Press.

Zitner, A. (1993). 10 years later, Bell breakup's impact grows. *The Boston Globe*, *27*, 1 December.