Appendix B

Declaration of Stanley Besen

DECLARATION OF STANLEY M. BESEN

1. My name is Stanley M. Besen and I am a Vice President at Charles River Associates, Washington, DC. I previously served as a Brookings Economic Policy Fellow, Office of Telecommunications Policy, Executive Office of the President (1971-72); Co-Director, Network Inquiry Special Staff, Federal Communications Commission (1978-80); Coeditor, *RAND Journal of Economics* (1985-88); Senior Economist, RAND Corporation (1980-92); and a member of Office of Technology Assessment Advisory Panels on Communications Systems for an Information Age (1986-88) and Intellectual Property Rights in an Age of Electronics and Information (1984-85). I currently serve as a member of the editorial boards of *Economics of Innovation and New Technology* and *Information Economics and Policy*. I have taught at Rice University, Columbia University, and the Georgetown University Law Center, and I hold a Ph.D. in Economics from Yale University (1964). I have previously submitted comments in this proceeding as well as in a number of other FCC proceedings concerned with cable system ownership. My curriculum vitae is attached.

2. Counsel for AT&T Broadband has asked me to analyze, and to provide evidence on, a number of the premises underlying the Commission's consideration of a limit on the proportion of MVPD subscribers that can be served by any given entity. In particular, I have been asked to analyze: (1) whether a program service can be viable only if it serves at least 15 million MVPD subscribers; (2) the assertion that there are significant economic incentives for vertically integrated cable operators to foreclose access to their subscribers to rival program services; and (3) whether there is significant evidence that vertically integrated cable operators deny rival program services access to their subscribers.

3. I have reached the following conclusions.[1] First, program services can be, and are, viable even if they reach fewer than 15 million United States MVPD subscribers. Indeed, a number of services have been in existence for more than five years with fewer than 15 million subscribers. This reflects, among other things, the fact that program service costs vary from service to service and can be adjusted in response to changes in the number of subscribers they serve, and that program services can be supported by revenues from distribution on other media or in foreign markets, as well as by revenues from U.S. MVPDs.

[1] For a discussion of the efficiencies that can result from vertical integration between cable operators and program services, which are not discussed in this report, see S.M. Besen and J.R. Woodbury, *An Economic Analysis of the FCC's Cable Ownership Restrictions*, August 14, 1998 [hereafter "Besen and Woodbury"], pp. 12-18.

4. Second, my previous analysis of TCI's carriage behavior revealed little or no evidence that TCI favored its vertically integrated program services.[2] In fact, when comparing the carriage rate of various program services on TCI-owned-and-operated systems with the carriage rate for all other systems, I found that, relative to its owned services, TCI *actually favored non-affiliated services*. These results comport with the view that TCI's carriage decisions were largely, if not solely, determined by which services are profitable to offer cable subscribers, without regard to the effect of those carriage decisions on TCI's competitive position in the supply of program services. Thus, the historical record provides no support for the hypothesis that vertical foreclosure will occur in the future.

5. Third, I analyzed the effects of increased concentration on the incentives of MSOs to engage in foreclosure. I found that large vertically integrated cable MSOs, including those that serve substantially more subscribers than the largest current MSOs, would not have incentives to foreclose rival program services. Even if foreclosing such rivals were to permit a cable operator to raise affiliate fees and advertising rates for its program services, the effect would be more than offset by a very small reduction in the operator's cable subscribers that resulted from the decline in the quality of its cable service. Moreover, I found that, across a wide range of assumptions, an MSO's incentives to foreclose actually *decrease* as it increases in size.

6. Given that there is no evidence that the largest cable operator exhibited any anticompetitive foreclosure behavior in the past, the fact that incentives to engage in foreclosure actually decrease as concentration increases provides additional support for the conclusion that there is no serious risk of foreclosure by large vertically integrated MSOs.

7. Finally, as DBS has grown in importance, program services now have a significant alternative outlet through which they can reach potential subscribers, thus reducing the harm these services might experience from foreclosure by cable operators and, consequently, the benefits cable operators might obtain from such behavior. In addition, the cost to cable operators of foreclosing rival program services has increased because cable subscribers can now turn to DBS and other MVPDs to obtain the programming that might be foreclosed. In short, the costs of foreclosure have increased and the benefits have declined.

---

[2] Since that study was undertaken, AT&T has acquired TCI, and I refer to AT&T rather than TCI when I discuss the results of the study in more detail below. In addition, AT&T has divested what had previously been TCI's interests in Liberty Media, Food Network, Outdoor Life, Speedvision, and Sunshine Network. Even after AT&T Broadband's merger with Comcast, the extent of the resulting company's vertical integration with program services, and therefore any resulting incentives it may have to foreclose rival program services, will be substantially smaller than was the case for TCI, and hence for AT&T Broadband, prior to these divestitures.

I. PROGRAM SERVICE VIABILITY

8. The 30 percent ownership limit was "premised upon the Commission's belief that a new programming network needs to reach approximately 20% of the 80 million MVPD subscribers [the approximate number of MVPD subscribers at the time the rule was adopted] in order to succeed."[3] The Commission assumed that a 40 percent "open field" was required because "a new programming network...has only a 50 percent chance of actually reaching subscribers given tier packaging and consumer preferences."[4] The Commission goes on to note that the "40 percent open field was intended to support the typical high-cost programming network that requires large audiences."[5]

9. In one sense, the above premise is simply a tautology – networks that "require" large audiences must have large audiences. However, the question raised by the open field approach is whether program services that reach a small number of MVPD subscribers can survive, and can survive for long periods of time.

10. Before proceeding to present the evidence on the viability of program services, it is important to observe that the Commission itself recognizes the obvious fact that "different types of networks seek out, or can be supported by, different sizes of audience. Some programming networks likely can survive with distribution to a few million subscribers within a certain region; others may need nationwide distribution to a large percentage of MVPD homes in order to remain viable."[6] The Commission also recognizes "The fact that different types of programming networks can be supported by different sizes of audiences might be relevant in the context of the 'open field' regulatory approach...."[7]

11. In this regard, it should be noted that some program services may be able to adjust their costs in response to changes in coverage, so that they can survive, and, indeed, prosper, even at relatively low subscriber levels.

---

[3] Federal Communications Commission, *Further Notice of Proposed Rulemaking* In the Matter of Implementation of Section 11 of the Cable Television Consumer Protection and Competition Act of 1992, Implementation of Cable Act Reform Provisions of the Telecommunications Act of 1996, The Commission's Cable Horizontal and Vertical Ownership Limits and Attribution Rules, Review of the Commission's Regulations Governing Attribution Of Broadcast and Cable/MDS Interests, Review of the Commission's Regulations and Policies Affecting Investment in the Broadcast Industry, and Reexamination of the Commission's Cross-Interest Policy, Adopted: September 13, 2001; Released: September 21, 2001 [Hereafter "FNPRM"], para. 52. Note that this premise is necessary, but not sufficient, to justify the prior 30% limit, which also was based on the Commission's "belief that joint conduct would be more likely if there were only a limited number of operators in the market." [FNPRM, para. 55]

[4] FNPRM, fn. 102.

[5] Id.

[6] FNPRM, para. 13.

[7] FNPRM, fn. 46.

Moreover, these changes in costs can be accomplished with little or no change in the quality of the programming offered if a significant share of the service's programming costs are rents, i.e., payments that exceed the opportunity costs of the inputs needed to produce the programming.[8] In addition, programming that is carried by MVPDs in the United States can be supported by revenues from other sources (e.g., broadcast or theatrical and non-U.S. distribution), so that a service may be viable even with a relatively small number of U.S. MVPD subscribers. Finally, program services that reach small but specialized audiences may survive if those audiences are willing to pay significant amounts to obtain access to those services.[9]

12. In order to examine the premise that a program service requires at least 15 million subscribers in order to be viable,[10] I initially analyzed the 76 basic program services identified in Paul Kagan Associates, *Economics of Basic Cable Networks*, 2002.[11] These services represent a highly restricted universe and exclude many basic services that are listed in other sources.[12] Nonetheless, I am still able to identify twelve basic programming services that reached fewer than 15 million subscribers in the United States in 2000 (see Table 1, which also presents information on the year in which each of the services was launched).[13] Although some of the services that appear in the table are relatively new, two of these services – INSP and Goodlife TV – are more than ten years old and four others – Great American, FMC, Independent Film Channel, and The Outdoor Channel – are at least six years old. Therefore, even when attention is limited to the services identified in *Economics of Basic Cable*

---

[8] This will be the case, for example, for programming that is produced whether or not it is carried by an MVPD (e.g., some sporting events).

[9] John M. Higgins, in "It's all relative" (*Broadcasting & Cable*, November 10, 2001), notes (p. 16) that "cable shows that grab a particular audience and help crystallize a network's brand can be a hit with just [a] few hundred thousand viewers."

[10] Federal Communications Commission, *Third Report and Order* In the Matter of Implementation of Section 11(c) of the Cable Television Consumer Protection and Competition Act of 1992, Horizontal Ownership Limits, Adopted: October 8, 1999; Released, October 20, 1999, para. 42 presents the Commission's assumption "that a new programmer needs 15 million subscribers in order to have a reasonable chance to achieve economic viability."

[11] Although the title of this publication refers to *cable* networks, a significant number of subscribers to these networks obtain them from non-cable sources, primarily DBS. Thus, it is more appropriate to refer to them as *program* services.

[12] In fact, AT&T's comments provide an extensive list of additional program services with fewer than 15 million subscribers.

[13] This universe of services excludes premium and regional services, as well as a number of other basic national services that are listed in National Cable & Telecommunications Association, *Cable & Telecommunications Developments 2001*, Volume 25, Number 1, that reach fewer than 15 million subscribers (some of which I list below). In addition, I discuss a number of foreign language services below.

Networks, it is clear that the premise that a basic program service needs 15 million subscribers in order to be viable is incorrect.

Table 1: Basic Domestic National Program Services with Fewer than 15 Million United States MVPD Subscribers

Network	Launch Year	2000 Subscribers
Great American Country	1995	14,700,000
Inspirational Network ("INSP")	1990	14,600,000
Fox Movie Channel ("FMC")	1994	13,000,000
Independent Film Channel	1994	12,800,000
Oxygen	2000	12,300,000
Lifetime Movie Channel ("LMN")	1998	11,600,000
Goodlife TV	1984	10,100,000
Style.	1998	10,000,000
BET on Jazz	1996	8,400,000
Outdoor Channel	1994	8,100,000
SoapNet	2000	6,000,000
Ovation	1996	4,500,000

Source:
Paul Kagan Associates, Economics of Basic Cable Networks, 2002.

13. This conclusion is strengthened when a broader universe of program services is examined. To begin with, the list of services in *Economics of Basic Cable Networks* is far shorter than a list of basic services that can be compiled from all sources.[14] Among the basic national services with fewer than 15 million subscribers that are excluded by Kagan are Discovery Science Channel, Ecology Communications, and Oasis TV.[15]

14. In addition, the list does not include regional program services. Despite the relatively small number of subscribers that these services attract -- all or most reach far fewer than 15 million MVPD subscribers -- these services remain viable because their subscribers are willing to pay significant amounts to obtain them,[16] or because they are able to adjust their costs to reflect their smaller reach, or both. Significantly, these services are able to cover their "fixed" costs even with their small subscriber bases, which implies that these costs are smaller than are suggested by the premise underlying the Commission's approach.

[14] Kagan does not report the criteria employed for listing a service in *Economics of Basic Cable Networks*, but it is clear that many basic services are excluded.

[15] See National Cable & Telecommunications Association, *Cable & Telecommunications Developments 2001*, Volume 25, Number 1.

[16] This is also the case for premium services, where the willingness of a small number of subscribers to pay large amounts to obtain programming is even more obvious.

15. Finally, the list excludes a number of foreign services that reach relatively small numbers of viewers. These services, which include Canal Sur, International Channel, and Trio,[17] are presumably able to survive despite the small numbers of U.S. subscribers they reach because their costs can be spread over subscribers in other countries as well.

16. Of course, most program services that have been in existence for a significant number of years reach relatively large numbers of subscribers. This reflects two factors. First, attractive services generally have little difficulty in obtaining access to cable systems that have sufficient channel capacity to carry them.[18] Second, the evidence presented below indicates that vertically integrated cable operators seldom, if ever, fail entirely to carry a rival service. Indeed, at worst, these operators carry rival services only slightly less often than do cable system operators that are not integrated with program services. As a result, it is hardly surprising that most successful services are widely carried.

II. VERTICAL INTEGRATION AND THE INCENTIVES TO FORECLOSE

A. Conceptual Problems with Foreclosure Theories in this Context

17. A second premise underlying proposals for a strict limit on cable system ownership is that cable operators that are vertically integrated with program services have significant economic incentives to exclude rival services. As I discuss below, there is no empirical evidence in support of this proposition, but there are also several conceptual reasons to be skeptical about the premise.[19] First, a cable operator may lack the ability to affect adversely the ability of a rival service program to compete, both because the service may be able to adjust its costs to reflect reduced coverage and because the service can reach subscribers through DBS or other non-cable distribution outlets if it is not carried on cable — a factor that has taken on increasing importance over the past decade.[20]

---

[17] National Cable & Telecommunications Association, *Cable & Telecommunications Developments 2001*, Volume 25, Number 1. Canal Sur retransmits "live newscasts and the most popular shows from the leading broadcast networks" in a number of Latin American countries; International Channel "provides programming from around the world in more than 20 Asian, European, and Middle Eastern languages"; and Trio "delivers top-rated shows from the UK, Canada, and Australia."

[18] This parallels the evidence on the carriage of local broadcast stations when the "must carry" rules were in abeyance, that showing that cable systems carried virtually all broadcast stations for which there was measurable viewing.

[19] For a more detailed discussion of these factors see Besen and Woodbury, pp. 8-12, and the Declaration of Professor Janusz Ordover in this proceeding.

[20] The FNPRM [para. 22] notes that "Perhaps the most important difference between the industry in 1992 and today is that in 1992 there was no clear nationwide substitute for cable.... Today, on

18. Second, the ability of a vertically integrated cable operator to foreclose a rival program service may be constrained by the ability of cable operators who are adversely affected by the foreclosure strategy to pursue effective counterstrategies. These counterstrategies take the form of payments from these cable operators to the program services that are the putative targets of foreclosure to ensure their viability.

19. Third, a cable operator might find it unprofitable to foreclose a rival service even if it could do so. This can occur because the failure to carry the rival reduces the demand for the cable operator's service. Again, this factor has taken on increased importance because of the growth of DBS.[21] It can also occur because the cable operator may have only a partial ownership interest in the program service that may be advantaged by the foreclosure strategy.[22] Finally, there may be many alternatives to the rival service that would continue to compete with the vertically integrated program service even if one or a small number of rivals were foreclosed.

20. The concern that vertical integration might reduce competition and efficiency by restricting the supply of programming is based on the belief that a cable operator may be able to disadvantage a program service that is an actual or potential rival of a program service with which the cable operator is affiliated. The most overt form of such behavior would be refusal to carry the rival program service. In this version, because its rival is disadvantaged, the program service affiliated with the cable operator is able to raise its price to other MVPDs, or perhaps to advertisers, thereby increasing its profits.

21. If a cable operator chooses not to carry a program service that rivals its own (or to otherwise make it more difficult for subscribers to obtain access to the rival service), and the rival is valued by the cable operator's subscribers, some subscribers will choose not to subscribe to cable service because the service is not attractive to them at its current price. Alternatively, subscribers may reduce their willingness to pay for cable service, thus reducing the price the operator can charge. Significantly, the growth of the DBS alternative, much of which has occurred since the vacated ownership limit was initially established, is likely to have increased subscriber responsiveness to a failure on the part of a cable system to carry their preferred lineup of program services.

---

the other hand, DBS has a national footprint and...it appears that DBS currently offers an effective alternative path through which program networks can reach subscribers."

[21] As the Commission has noted [FNPRM, para. 22], "the competitive presence of DBS reduces cable operators' incentives to choose programming for reasons other than quality because a cable operator that selects programming on some other basis risks loss of subscribers if high quality programming is available via DBS."

[22] A cable operator with a partial ownership interest in a program service obtains only a share of any benefits when it forecloses a rival service but incurs all of the costs, in terms of fewer cable subscribers, of doing so. Thus, partial ownership reduces the incentive to foreclose.

22. A large percentage of the costs of cable system operation – those costs associated with construction of the headend and much of the distribution plant -- must be incurred regardless of the number of subscribers served. As a result, a cable operator must obtain a relatively large margin on each additional subscriber in order to be viable. Because of the substantial difference between incremental subscriber revenues and costs (required by the high fixed costs associated with the cable system plant), even a loss of a small number of subscribers may be sufficient to render a foreclosure strategy unprofitable.

23. In addition, it is important to observe that cable operators tend to share ownership of program services with other investors. If a cable operator disadvantaged a rival program service, so that its affiliated service could raise its price, the operator would also be paying that higher price when it carried the partially owned service. These additional costs might outweigh the cable operator's share of any additional profits obtained by the program service.[23]

24. Equally important, eliminating one or a few rival program services may have little or no effect on the amount that other cable systems would be willing to pay for the program service owned by the foreclosing cable operator. The program service owned by a cable operator may be only one of many program services that are relatively close substitutes. These services (which need not carry the same type of programming, appeal to the same audiences, or even charge similar license fees) are substitutes so long as carrying any of them yields approximately the same incremental net revenue. In such cases, adding any one of these to a tier of services earns a cable system approximately the same increment in net revenues, so that disadvantaging one or a few of these services would have little effect on the amount the cable system would pay for the service owned by the cable operator. Only by eliminating a large number of these rival services could this strategy raise the profits of the cable operator's program service, but this would also increase the cost of the strategy.

[23] If the cable operator's ownership interest in the program service is less than 50 percent and the program service raises affiliate fees but not advertising rates, the cable operator will necessarily realize lower profits from its own cable operation. The rate at which it will recover those lost profits depends both on the ability of the program service to raise its affiliate fees to other operators and on the vertically integrated operator's share of those gains.

B. Empirical Analysis of Foreclosure Incentives

1. Empirical Analysis of AT&T's Carriage Behavior

25. The FNPRM states that "MSOs with large programming interests may unfairly favor affiliated programming over unaffiliated programming."[24] In order to assess this hypothesis, I previously conducted two studies of the carriage behavior of AT&T (then TCI, the largest MSO).[25] In the first study, I compared, for a large number of program services, AT&T's overall carriage rate with that of other cable operators. In the second study, I conducted a statistical analysis of the carriage behavior of individual cable systems to determine whether, and to what extent, AT&T systems behaved differently from otherwise identical but unintegrated systems.

26. I found that AT&T did not favor affiliated programming services in any way that significantly forecloses non-affiliated programming. Moreover, if AT&T had undertaken a large-scale foreclosure strategy in the past, it would have carried competing services substantially less frequently than did unintegrated but otherwise identical cable operators. In fact, the evidence is inconsistent with this proposition. In those few cases in which there is a *statistically* significant relationship between vertical integration and carriage, the size of the *economic* effect is invariably small. This evidence is inconsistent with the view that AT&T has historically attempted to disadvantage rival programming services, and provides no support for the proposition that such conduct would likely take place in the future.

Comparison of AT&T's Carriage Behavior to That of Other Cable Operators

27. I performed an analysis that compared AT&T's carriage of individual program services with carriage by all other cable system operators. The results are reported in Table A-1 (attached below).

28. The second and third columns of this table compare the carriage rate of various program services on AT&T-owned-and-operated systems with the carriage rate for all other systems; the fifth column reports the difference in carriage rates. On average, the extent of carriage on AT&T systems was *less* for all services, *owned or otherwise*. For services in which AT&T had an ownership interest, the average carriage rate on AT&T systems was about 6 percentage points less than that on other systems. For services in which AT&T had no ownership interest, the average carriage rate on AT&T systems was about 3 percentage points less than that for non-AT&T

[24] FNPRM, Para. 29.

[25] As I noted above, TCI owned the cable systems whose behavior I analyzed, but AT&T has subsequently acquired these systems and I refer to these as AT&T systems throughout this section.

systems. Thus, these data indicated that, relative to its owned services, *AT&T actually favored non-affiliated services.*

29. Moreover, AT&T's lower carriage rates of non-affiliated services typically affected only a small percentage (0.49 percent) of all cable subscribers. In addition, the number of AT&T's affected subscribers typically represented a very small proportion (1.1 percent) of the total subscribers to the non-affiliated services. Of course, some services were affected to a greater extent, particularly the Sci Fi Channel, Home and Garden TV, The Inspirational Network, and the History Channel. However, two of these services, Home and Garden TV and the History Channel, were only in existence for a year or less during the time period covered by my analysis. Thus, the lower penetration on AT&T systems may simply have reflected the newness of these services.

30. Table A-1 also reports the results of a test to determine whether a higher ownership interest leads to a larger difference between AT&T's carriage rate and that of other systems. If the degree of "favoritism" within the set of AT&T affiliated services increased with AT&T's ownership percentage, one would expect a significant correlation between AT&T's ownership interest and the carriage rate difference. In fact, the correlation is statistically insignificant.

Statistical Analysis of Carriage Behavior

31. I also undertook a statistical analysis of individual cable system behavior to address directly the concern that vertical integration between AT&T and program services would lead AT&T to disadvantage rival services. In particular, I analyzed, for each of a large number of program services, the determinants of the carriage behavior of AT&T systems and of cable operators that are not affiliated with any program service. For all program services, I then estimated the number of AT&T subscribers that are unavailable to "disadvantaged" services as a percentage of all subscriber transactions. I measured both the gross and net foreclosure rates, where the gross foreclosure rate is the percentage of subscribers (or subscriber transactions) without access to services that are carried less frequently on AT&T's systems than on unintegrated systems. The net foreclosure rate is the gross foreclosure rate less the rate at which rival services *gain* because AT&T carried them *more frequently* than did unintegrated systems. While the gross foreclosure rate may be used to evaluate the carriage of any *particular* rival (or owned) service, drawing inferences about the presence and extent of foreclosure for any *group* of services must also account for services that are favored by AT&T.

32. My approach was to estimate the difference between the carriage of a service by an AT&T system and its carriage by an otherwise identical system that is unintegrated with a cable service. Ultimately, I was seeking answers to the following questions: First, given two otherwise identical cable systems, will the systems' propensity to carry any particular service

differ if one is owned by AT&T and the other is not? Second, if there is a difference, how large is it? Below I discuss the methodology I employed in conducting my statistical foreclosure analysis.

33. For each of 65 nationally distributed pay and basic services, using data from the *1993 Cable and Television Factbook,* I estimated the likelihood that a sample of majority-owned AT&T systems would carry the service, after accounting for differences in system and franchise characteristics.[26] Similarly, I estimated the likelihood that a cable system not affiliated with any program service would carry each of these services.[27] For each service, I then calculated the number of AT&T subscribers that did not have access to each service, or the extent to which the service was offered to additional subscribers, because of its greater carriage on AT&T systems. In both cases, this difference was calculated as the number of subscribers that would have had access to the service on AT&T systems, minus those who would have had access to the service on otherwise identical but unintegrated cable systems.[28]

---

[26] I focused only on nationally distributed services. While judgment was used in this determination, typically the service had to reach at least a dozen states and not be confined to any specific geographic region. I excluded audio-only and text-only services from the analysis. In addition, I became aware that, at the time of submitting their *Factbook* entries, AT&T was instructing systems to report the combined Nickelodeon and Nick-at-Nite services as Nickelodeon only. I understand that virtually every AT&T system carrying Nickelodeon also carried Nick-at-Nite. To avoid any confusion, I excluded Nick-at-Nite from my calculations.

[27] Technically, I estimated probit equations for each of these services. The dependent variable in the probit took a value of 1 if the service was carried by the system and 0 otherwise. In addition to including a variable that took a value of 1 if the system in question was an AT&T-owned system, the other variables controlling for system and franchise characteristics included: system age, homes passed, the number of off-air stations, miles of cable per subscriber, the basic subscription fee, the number of basic subscribers, the channel capacity of the system, the number of subscribers per home passed by the cable system, percentage of the population over 65, percentage of the population under 14, percentage of the population between 15 and 24, income per household, and number of persons per household. The data for the system characteristics were drawn from the *Factbook*. Because the data contained in the *Factbook* can be years old, I limited the analysis to those systems reporting data from January 1, 1992.

The demographic data were drawn from the *City and County Databook* and were matched to the *Factbook* data by the reported counties served. In order to determine which systems were AT&T systems and which of those were majority-owned, I relied on the *Factbook* information. To determine which systems were non- affiliated with any program service, I compared the system owner with a list of owners of program services from the *Factbook*, various newsletters published by Paul Kagan, Inc., and internal AT&T documents. After excluding observations with missing values, the AT&T sample consisted of 754 systems and the unintegrated sample consisted of 1,480 systems.

For each service, the raw AT&T carriage statistics, those for the unintegrated systems, the estimated coefficient of the AT&T variable, and its associated P-value (level of statistical significance) are reported in Table A-4 (attached below).

[28] For each AT&T system in the sample, I estimated the probability of carrying the particular service on an AT&T system and the probability of carrying the same service on an unintegrated but otherwise identical system. The difference in probabilities was then multiplied by the number

Results

34. Table A-2 (attached below) reports the estimated differences in carriage rates between AT&T and its unintegrated counterparts. As shown in this table, AT&T's carriage behavior disadvantaged 21 non-affiliated services, affecting 18.5 million subscriber transactions, and advantaged 25 non-affiliated services, affecting 14.7 million subscriber transactions. The estimated gross foreclosure rate for all services combined is about 1.8 percent,[29] and the net foreclosure rate *is less than one- half of one percent.*

35. None of these foreclosure rates is quantitatively significant. Moreover, AT&T's carriage behavior towards non- affiliated services becomes even less competitively significant when viewed in light of the results contained in Table A-3 (attached below), which reveals that AT&T "forecloses" about one-third of the 19 AT&T-affiliated services considered in this analysis. Indeed, the typical percentage of AT&T subscribers without access to these affiliated services (the typical gross foreclosure rate) is about 8.5 percent, an average that is *higher* than that for the disadvantaged non-affiliated services.

36. In sum, while some non-affiliated services are available to fewer AT&T subscribers than to subscribers to comparable unintegrated systems, the extent of the affected market is too small to be seen as the outcome of a foreclosure strategy or to have a significant effect on competition. Indeed, by this standard, nearly one-third of the AT&T-affiliated programming services studied here are also disadvantaged — *and importantly, more non-affiliated services are advantaged than disadvantaged by AT&T.* These results comport with the view that AT&T's carriage decisions are

---

of subscribers to the system to determine the extent to which a service was advantaged or disadvantaged. For each service, this number was then summed over all AT&T systems in the sample and computed as a percentage of all AT&T subscribers in the sample. Finally, this percentage was applied to all AT&T's subscribers (as opposed to only those in the sample) to estimate the subscribers in all of AT&T's systems having access to the service.

There were some services for which I was unable to estimate the extent of advantage or disadvantage from the probit coefficients because the service was either carried or not carried by virtually all systems. For these services, I multiplied the difference in the raw carriage frequencies by the number of AT&T subscribers. Finally, AT&T's carriage rate for a number of services was not statistically different from that of unintegrated systems. Thus, statistically, these services were neither disadvantaged nor advantaged by AT&T's carriage choices. For these services, I used the point estimate to estimate the extent of advantage or disadvantage.

I used the predicted probability that a particular AT&T system would carry a service, rather than using the actual access to the service on AT&T systems. This is because some variables have likely been omitted from my analysis, and their omission would be reflected in the actual but not the predicted subscriber access.

[29] This is calculated as the number of subscriber transactions foreclosed for all non- affiliated services as a percentage of the total number of subscriber transactions for all non-affiliated services (see Table A-2).

largely, if not solely, determined by which services are profitable to offer cable subscribers, without regard to the effect of those carriage decisions on AT&T's competitive position in the supply of program services.

Favoritism

37. Because vertical integration between cable systems and program services reduces or eliminates a number of costs associated with arm's-length transactions, including double marginalization, bargaining costs, and opportunism, the costs of carrying an affiliated service are lower than those for a non- affiliated service. Thus, a finding that vertically integrated cable operators tend to carry their affiliated services more often than do unintegrated operators is unremarkable. Of the 19 AT&T-affiliated services I examined (see Table A-3), 13 were advantaged by AT&T. However, Encore is the only service for which the extent of the advantage is substantially greater than that for non-affiliated services, and the evidence does not suggest this resulted from an exclusionary strategy.

38. Moreover, as observed earlier,[30] AT&T carried nearly one-third of its *affiliated* services *less* often than unintegrated systems. Indeed, for affiliated services, the typical percentage of AT&T subscribers that were disadvantaged by AT&T's carriage is about 8.5 percent, an average that is *higher* than that for the *non-affiliated* services that were disadvantaged by AT&T's carriage behavior.

Efficiencies

39. Because the evidence regarding exclusionary behavior is weak, this suggests that any favoritism by AT&T towards its affiliated program services is more likely due to efficiency rather than anticompetitive reasons. I also conducted a somewhat more direct test of this hypothesis. If vertical integration results in cost savings, one way in which those savings may become apparent is through increases in the number of services offered by AT&T. I performed regressions of the number of services offered both by AT&T and by unintegrated systems on a variety of independent variables. The results suggest that, holding other factors constant, AT&T offers its subscribers, on average, roughly two more services than do otherwise identical unintegrated systems.[31]

Summary

40. In short, when AT&T's carriage behavior was analyzed, there was no evidence that the carriage of affiliated programming services by vertically integrated cable system operators adversely affected the ability of non-affiliated services to compete. Thus, the historical record provides no

[30] See Tables A-2 and A-3.

[31] It should be noted that the results also suggest that other vertically integrated MSOs offer their subscribers more services, perhaps because they operate systems with larger channel capacities.

support for the hypothesis that such "foreclosure" will occur in the future. Moreover, the significant growth of DBS and other distribution outlets, together with the marked reduction in vertical integration since the time when the data underlying this analysis were originally compiled, suggests that the measured effects would be even smaller today than they were then.

2. Analysis Showing that Incentives to Foreclose *Decrease* as MSO Size Increases.

41. My previous analysis shows that there is no evidence that the largest cable MSO engaged in a strategy of foreclosing rival program services. In this section, I analyze the incentives of a vertically integrated cable operator -- including an operator much larger in size than any that exist today -- to foreclose rival program services. I obtain two significant results. First, foreclosure is unlikely to be a profitable strategy because the effect of even a relatively small subscriber loss (resulting from the failure to carry a rival service) is likely to more than offset any gains to the affiliated program service. Second, the magnitude of the (critical) subscriber loss at which foreclosure is unprofitable actually *declines* as cable MSO size increases. Together, these results confirm my earlier conclusion that there is no serious risk of foreclosure by large vertically integrated MSOs.

42. In analyzing the incentives of a vertically integrated cable operator, I have identified the costs and benefits associated with a foreclosure strategy and attempted to quantify the net effect of foreclosure across a range of assumptions concerning concentration and vertical integration. For purposes of illustration, I apply this model assuming that the largest cable company serves 30, 40, 50, and 60 percent of all MVPD subscribers.

43. My calculations are based upon the following scenario: A cable system acquires an ownership interest in a basic programming service and chooses, as a result, to drop a rival service from its basic package. Because its access to cable subscribers is restricted, the rival program service exits. As a result, the affiliated program service is able to raise the fees it charges to MVPDs and its advertising rates as well.[32] The price of the MVPDs' basic service package is assumed not to change after the foreclosure strategy is adopted. Because this price has remained unchanged, while the quality of the basic package has declined, some MVPD subscribers choose to discontinue their subscriptions. In addition, the cable operator experiences an increase in the wholesale price of the

[32] Alternatively, the program service might only be able to raise its affiliate fees. By adopting the stronger assumption, I have increased the likelihood that the calculation will show that the foreclosure strategy is profitable.

affiliated program service, although this effect is mitigated by the operator's ownership interest in the service.

44. I obtained the financial data employed in my analysis from public sources. I constructed an average cable operator margin from data for describing aggregate consumer, local cable advertiser, and cable operator spending for basic service packages and for premium and pay-per-view services.[33] These data indicate that the net revenue that an average cable operator earns from serving an additional subscriber is $359.83 per year.[34] Finally, for the twenty largest basic program services (based on MVPD subscriber figures), I obtained estimates of the average program service penetration rate (89 percent), the average annual per-subscriber affiliate fee revenue ($2.75), and the average annual per-subscriber total revenue ($7.15).[35] In performing my calculations, I assumed that the MVPD penetration rate and per-subscriber affiliate fees for the program service affiliated with the cable operator and for the rival service are the same as the average values for the twenty largest services. I do not mean to suggest that these are the only possible values that could be used in such an analysis.[36] I do believe, however, that these assumptions are sufficiently representative to support my conclusions that, across the entire range of assumptions: (1) even a small subscriber loss would render the strategy unprofitable, and (2) the strategy becomes *more* unprofitable as the size of the MSO increases.

45. I then assume a range of values for (1) the rate increases the affiliated program service might achieve after foreclosure of the unaffiliated program service and (2) the percentage of the "affiliated" programming service owned by the foreclosing MSO. With these assumptions, I can solve for the critical percentage subscriber loss (caused by failing to carry desirable rival programming) at which the foreclosure strategy would "break even." If the failure to carry the rival service results in a subscriber loss that exceeds this amount, foreclosure would be unprofitable.

---

[33] The source of these data is Veronis, Suhler & Associates, *Communications Industry Forecast*, 2001.

[34] This illustrates the earlier point that it is very costly for a cable operator to lose a subscriber.

[35] The source of these program service data is Paul Kagan Associates, *Economics of Basic Cable Networks*, 2002. Revenue data were unavailable for QVC and C-Span (and in any case, the economics of those two services is atypical), so I included two services with somewhat fewer subscribers among the twenty largest services.

[36] In fact, some of these assumptions are conservative. For example, the results might differ if a wider range of program services were considered.

46. Table 2 presents an illustrative calculation of the critical subscriber loss. The calculation takes into account a number of factors. First, there is the cable operator's share of the gain realized by the affiliated program service because the foreclosure of the rival service is assumed to permit the operator to raise advertising rates and affiliate fees for its program service. The gain to the operator is calculated as the increase in affiliate fees and advertising rates charged by the affiliated service multiplied by the number of subscribers to the program service nationwide – in order to determine the total gain to the service -- and then by the operator's ownership share in the service – in order to determine the operator's portion of that gain. (see Module A)

Table 2: Illustrative Calculation of the Effect on Annual Profits of the Failure to Carry a Service that Competes with an Affiliated Program Service

Parameters	**Assumed Parameter Values**
Ownership Share of MVPD Subscribers	30%
Ownership Share of Program Service	25%
Increase in Program Service Revenue per Subscriber Due to Foreclosure	5%
Lost Subscribers on MVPDs as a Percent of Initial Rival Service Subscribers	1%

Module		**Parameters and Intermediate Effects**	**Effects on Profits**
	Program Service Net Revenue ($ millions)	562.59	
	Increase in Program Service Net Revenue ($ millions)	28.13	
	Ownership Share in Program Service	25%	
A	Share of Increase in Program Service Revenue ($ millions)		7.032
	Average Program Service Affiliate Fee ($/subscriber)	2.75	
	Increase in Program Service Affiliate Fee ($/subscriber)	0.14	
	Cable System-Program Service Subscribers (millions)	23.60	
B	Cost to Cable System of Program Service Fee Increase ($ millions)		(3.247)
	Rival Program Service Affiliate Fee ($/subscriber)	2.75	
	Cable System-Rival Program Service Subscribers (millions)	23.60	
C	Cable System Avoided Cost from Foreclosing Rival Program Service ($ millions)		64.948
	Cable System New Operating Margin per Subscriber ($/subscriber)	362.46	
	Cable System Lost Subscribers from Foreclosing Rival Program Service (millions)	0.24	
D	Cable System Foregone Profits from Lost Subscribers ($ millions)		(85.528)
	Average Program Service Revenue After Increase ($/subscriber)	7.51	
	Lost Program Service Subscribers from Foreclosing Rival Program Service (millions)	0.70	
	Foregone Program Service Revenue from Lost Subscribers ($ millions)	(5.24)	
	Ownership Share in Program Service	25%	
E	Share of Foregone Program Service Revenue from Lost Subscribers ($ millions)		(1.310)
	Net Change in Profit (Loss) ($ millions)		**(18.105)**

	Critical Subscriber Loss	**Case Illustrated Above**
Lost Subscribers on MVPDs as a Percent of Initial Rival Service Subscribers	0.792%	1.000%
Total Subscribers Lost Due to Foreclosure (millions)	0.187	0.236
Change in Cable Operator Profits ($ millions)	0.000	(18.105)

47. Second, the calculation accounts for the increased cost the cable operator incurs when it pays the higher fee to carry the affiliated program service. That is, when the vertically integrated service is assumed to raise its affiliate fees, the operator pays those higher fees as well. The resulting cost is simply the increase in the affiliate fee multiplied by the number of cable subscribers served by the operator (see Module B). Note that this effect is mitigated by the operator's ownership interest in the program service, and is reflected in partially offsetting cost and revenue increases in modules A and B.[37]

48. Third, the calculation takes into account the savings by the cable operator when it no longer pays affiliate fees for the foreclosed rival program service. The effect is calculated as the rival service's affiliate fees multiplied by the (original) number of subscribers to the rival service on the cable system (see Module C).

49. Fourth, the calculation recognizes the loss to the foreclosing cable operator that results when subscribers discontinue their subscriptions if the rival service is foreclosed. This loss occurs because the quality of the service offered by the cable operator has been reduced by foreclosure; the loss is calculated as the difference between the additional subscriber fees and advertising revenues for each lost subscriber and the (incremental) per-subscriber affiliate fees multiplied by each cable subscriber lost by the operator (see Module D).[38]

50. Finally, the calculation takes into account the loss to the program service resulting from the reduction in the number of subscribers it reaches when the rival program service is foreclosed. That is, because the rival service has been foreclosed, all cable operators experience a reduction in the quality of their offerings and, therefore, a reduction in the number of subscribers they serve. As a result, there is a reduction in the number of subscribers that are reached by the vertically integrated service. The

[37] That is, although the overall calculation takes into account the fact that the cable operator both pays and receives the higher affiliate fee, this module takes into account only the higher costs. The offset would be complete if the cable operator had a 100 percent ownership interest in the program service.

[38] I have used the average cable industry margin in this calculation as a starting value for the margin. To the extent that large cable operators pay below average affiliate fees, the calculation understates the margin and thus overstates the incentives for foreclosure. The margin is modified to include the increased costs associated with the affiliated service (to offset the increased costs in Module B for lost subscribers) and to exclude the rival service's fees (to offset the savings recognized in Module C for lost subscribers).

resulting loss is calculated as the product of the lost subscribers and the affiliate fees and advertising revenues per subscriber of the affiliated service.[39] Of course, the impact of this effect on the vertically integrated cable operator is proportional to its ownership interest in the program service. (see Module E)

51. Table 2 reports that the break-even point in my illustrative calculation (the "critical subscriber loss") is .792 percent. That is, foreclosure is unprofitable if the failure to carry the rival service reduces the number of the cable operator's subscribers by more than this amount. Because the critical subscriber loss is so small, the likelihood that the cable operator would profit from foreclosure is correspondingly small.

52. Tables 3A and 3B report the results of my calculations of the critical subscriber losses for a range of values of cable system ownership and vertical integration. Table 3A provides results for an assumed 5 percent increase in the affiliated program service fees and advertising rates and 3B provides results for a 10 percent increase in these prices. The smaller the critical subscriber loss, the weaker is the incentive for a vertically integrated cable operator to engage in foreclosure. As these tables show, the critical subscriber loss *decreases* with increasing concentration *across the entire range of assumptions.*

[39] This loss may not be very great if the affiliated service is carried on DBS and many cable subscribers switch to DBS when their quality of cable service declines. However, the magnitude of this loss has a very small effect on the calculation. The affiliate fees and advertising rates used in this calculation reflect the price increase, so they offset some gains reported in Module A.

Table 3: Maximum Subscriber Losses for Profitable Foreclosure Strategies

Table 3A: Program Service Revenue Increase: 5 Percent

Program Service Ownership	Cable Ownership of MVPD Subscribers				
	30%	35%	40%	50%	60%
25%	0.79%	0.78%	0.77%	0.76%	0.76%
33%	0.81%	0.80%	0.79%	0.78%	0.77%
50%	0.86%	0.84%	0.83%	0.81%	0.79%
100%	0.99%	0.95%	0.93%	0.89%	0.86%

Table 3B: Program Service Revenue Increase: 10 Percent

Program Service Ownership	Cable Ownership of MVPD Subscribers				
	30%	35%	40%	50%	60%
25%	0.83%	0.81%	0.80%	0.77%	0.76%
33%	0.88%	0.85%	0.83%	0.80%	0.78%
50%	0.98%	0.94%	0.91%	0.86%	0.83%
100%	1.26%	1.18%	1.12%	1.04%	0.98%

Sources:
Veronis, Suhler & Associates, *Communications Industry Forecast*, 2001.
Paul Kagan Associates, *The Pay TV Newsletter*, June 30, 2001, p. 5.

53. Tables 3A and 3B indicate that with these assumptions a very modest reduction in the number of subscribers served by a large vertically integrated cable operator would more than offset the operator's share of any increase in profits that an affiliated program service would obtain from the foreclosure of a rival service. For example, even with a 100 percent ownership interest in a program service that can raise its prices by 5 percent as a result of the foreclosure strategy, a subscriber loss of less than 1 percent of all MVPD subscribers would reduce the total profits of a vertically integrated cable operator with 30 percent of MVPD subscribers. Because each additional cable subscriber contributes such a large amount to covering fixed costs, a cable operator must be greatly concerned about the subscribers it might lose if it were to fail to carry a rival service, a concern that has become even more important with the growth of DBS. Although it is conceivable that the failure to carry some services might result in small subscriber losses, because these would be services on which subscribers place relatively low value, or services for which there

are many good substitutes, their foreclosure would be unlikely to permit the operator to raise the price of its affiliated program service.

54. Tables 3A and 3B also show that the incentives to foreclose a rival program service actually decline as cable ownership increases. This is because increasing the share of all subscribers served by the foreclosing cable operator increases the losses it must bear. To continue the previous example, if, contrary to the typical experience, the cable operator wholly owns the affiliated program service, and if it serves 60 percent of MVPD subscribers, the critical subscriber loss is .86 percent of MVPD subscribers instead of .99 percent when it serves 30 percent of subscribers.

55. In addition, a comparison of the critical subscriber losses for 5 percent and 10 percent price increases at given ownership levels shows that even large price increases for the affiliated service do not alter the foregoing conclusions. For example, for a cable operator serving 30 percent of MVPD subscribers and owning 25 percent of a program service, a doubling of the price increase by the program service (from 5 percent in Table 3A to 10 percent in Table 3B) increases the maximum profitable subscriber loss by only 5 percent, from .79 percent to .83 percent of all MVPD subscribers. For a cable operator serving 60 percent of all MVPD subscribers and owning 25 percent of a program service, a doubling of the price increase by the program service has essentially no effect on the maximum sustainable subscriber loss. This lack of proportionality between price increases and maximum sustainable subscriber losses results almost entirely from the fact that the avoided costs when the rival program service is dropped (Module C) are independent of the magnitude of the price increase. Thus, although the direct gain from the higher program service prices shown in Module A is proportional to the price increase, the increase in profits is not. As a result, the critical subscriber loss rises less than proportionately to the increase in price. Indeed, in my calculations, there is very little difference between the magnitudes of the critical losses for price increases of 5 and 10 percent.

56. Moreover, as MVPD ownership grows, the incentive to impose a larger price increase grows less than proportionately. For example, with a 25 percent interest in a program service, doubling the price increase raises the maximum sustainable subscriber loss by 5 percent (from .79 percent to .83 percent of MVPD subscribers) for an operator that serves 30 percent of subscribers, and by only 3 percent (from .77 percent to .80 percent of MVPD subscribers) for an operator that serves 40 percent of subscribers.

57. Given that, as shown above, there is no evidence that the largest cable operator exhibited any anticompetitive foreclosure behavior in the past, the fact that incentives to engage in foreclosure actually decrease as concentration increases provides additional support for the conclusion that there is no serious risk of foreclosure by large vertically integrated MSOs.

VERIFICATION

I, STANLEY M. BESEN, declare under penalty of perjury that the foregoing is true and correct. Executed on January 4, 2002.

Stanley M. Besen

EXHIBITS

Table A-1
TCI vs. Non-TCI Carriage Rates For Basic Cable Programming Services
1995

Programming Service[1]	TCI Ownership Interest	TCI Subscriber Penetration Rates (%)	Non-TCI Subscriber Penetration Rates (%)	Total Subscribers to Service	Difference in Penetration Rates	Difference in Penetration as a % of Total Cable Subscribers	Difference in Penetration as a % of Total Subscribers to Service
TCI affiliated services							
Prime Deportiva[2]	100.00	2.37	1.79	1,300,000	0.58	0.10	5.39
Home Shopping Network[2,3]	80.40	62.63	63.50	41,500,000	-0.87	-0.14	-0.22
International Channel	50.00	12.96	10.10	7,300,000	2.86	0.50	4.71
The Discovery Channel	49.29	90.15	99.27	67,300,000	-9.12	-1.59	-1.63
The Learning Channel	49.29	30.29	72.71	45,000,000	-42.42	-7.40	-11.33
Faith and Values Channel	49.00	55.48	33.11	25,500,000	22.37	3.90	10.55
QVC[2,3]	42.60	80.87	68.71	46,300,000	12.16	1.98	2.80
Court TV	33.33	41.57	34.64	24,700,000	6.93	1.21	3.38
CNN[4]	22.60	95.08	99.41	68,000,000	-4.33	-0.71	-0.72
CNN International[2,4]	22.60	3.28	4.91	3,200,000	-1.64	-0.27	-5.81
Headline News[4]	22.60	87.12	87.25	60,100,000	-0.13	-0.02	-0.02
The Cartoon Network[4]	22.60	13.66	40.24	24,700,000	-26.57	-4.39	-12.24
TNT[4]	22.60	94.50	97.09	66,600,000	-2.59	-0.43	-0.44
Turner Classic Movies[2,4]	22.60	0.20	7.26	4,200,000	-7.07	-1.17	-19.14
WTBS[4,5]	22.60	95.66	98.60	67,600,000	-2.94	-0.49	-0.49
BET Cable Network	21.96	58.50	65.52	44,300,000	-7.02	-1.22	-1.90
The Family Channel	20.28	87.64	95.23	64,700,000	-7.58	-1.32	-1.41
Fit TV	18.25	20.79	5.98	5,900,000	14.82	2.59	30.19
E! Entertainment Television, Inc.	10.40	28.98	58.93	37,000,000	-29.94	-5.22	-9.73
Average (Weighted by Subscribers to Service)		*71.73*	*77.99*	*37,115,789*	*-6.27*	*-1.09*	*-2.03*
Non-TCI affiliated services							
Arts & Entertainment (A&E)		88.41	93.83	64,000,000	-5.42	-0.95	-1.02
American Movie Classics (AMC)		94.32	84.32	59,300,000	10.00	1.74	2.03
America's Talking[2]		20.92	14.57	10,800,000	6.35	1.11	7.07
Bravo		20.86	35.15	22,500,000	-14.30	-2.49	-7.64
CNBC		86.34	82.32	57,200,000	4.02	0.70	0.85
Comedy Central		49.32	57.79	38,800,000	-8.47	-1.48	-2.62
Country Music Television (CMTV)		51.48	46.96	32,900,000	4.51	0.79	1.65
ESPN		94.88	99.68	68,100,000	-4.79	-0.84	-0.85
ESPN 2		24.30	47.43	29,900,000	-23.13	-4.04	-9.30
Fox Net[2]		4.23	2.31	1,822,466	1.92	0.33	12.64
fX[2]		82.84	20.64	21,700,000	62.20	10.85	34.46
Galavision[2]		8.90	2.16	2,300,000	6.74	1.18	35.23
GEMS[2]		5.81	1.80	1,719,749	4.02	0.70	28.08
History Channel[2]		0.76	1.60	1,000,000	-0.83	-0.15	-10.01
Home & Garden TV[2]		2.44	16.19	9,500,000	-13.75	-2.40	-17.40
Inspirational Network		3.92	15.35	9,200,000	-11.42	-1.99	-14.92
KTLA[2]		0.36	12.05	6,900,000	-11.69	-2.04	-20.37
Lifetime		92.79	93.09	64,100,000	-0.30	-0.05	-0.06
Mind Extension University		31.65	38.14	25,500,000	-6.49	-1.13	-3.06
MTV		91.81	91.71	63,200,000	0.10	0.02	0.02
MTV Latino[2]		0.91	0.93	635,982	-0.02	0.00	-0.37
Newstalk[2]		1.66	1.94	1,300,000	-0.28	-0.05	-2.57
Nickelodeon		93.50	95.57	65,600,000	-2.07	-0.36	-0.38
Nostalgia		11.70	13.17	8,900,000	-1.47	-0.26	-1.99
Sci-Fi		6.64	48.53	28,400,000	-41.89	-7.31	-17.73
Television Food Network		25.03	21.61	15,300,000	3.42	0.60	2.69
The Weather Channel		91.98	89.04	61,700,000	2.94	0.51	0.57
TNN		92.92	94.64	65,000,000	-1.72	-0.30	-0.32
Travel Channel		23.71	29.10	19,400,000	-5.39	-0.94	-3.34
USA		94.28	98.40	67,300,000	-4.12	-0.72	-0.74
VH 1		62.39	82.10	54,200,000	-19.71	-3.44	-4.37
WGN		56.06	58.83	40,200,000	-2.77	-0.48	-0.83
WOR		18.74	18.90	13,000,000	-0.16	-0.03	-0.15
Average (Weighted by Subscribers to Service)		*71.12*	*73.90*	*31,253,885*	*-2.79*	*-0.49*	*-1.07*

Table A-1 (continued)
TCI vs. Non-TCI Carriage Rates For Basic Cable Programming Services
1995

Correlation between ownership share and penetration rate difference:	0.1621
P-Value:	0.5073

Notes:
[1] Only national, basic cable programming services for which data are complete are included. C-Span, C-Span II, and Intro TV! are excluded.
[2] Total service subscribers come from the Time Warner White Paper, Exhibit 12.
[3] With the exception of ownership, data are from 1994. Home Shopping Network's ownership (from Kagan) is reported as voting securities by TCI.
[4] TCI subscriber data from Turner, ownership data from Kagan.
[5] TCI's records indicate indirect ownership is 100%.

Sources:
"Broadband Multichannel Universe Snapshot at Year-End", Cable TV Programming, Paul Kagan Associates, Inc., No. 215, March 29, 1996, p. 1
Cable TV Programming, Paul Kagan Associates, Inc., No. 210, October 25, 1995.
Economics of Basic Cable Networks 1996, Paul Kagan Associates, Inc., p. 22.

Table A-2

TCI's Carriage of Unaffiliated Services

Estimates of TCI Cable Subscribers "Foreclosed" to Unaffiliated Program Services

			Foreclosed Subscribers as a Percent of...			
Program Service	**Total Subscribers to Program Service [1]**	**Foreclosed Subscribers [2]**	**All TCI Subscribers**	**Total Subscriber Transactions for Unaffiliated Services**	**Total Subscribers to the Service**	**Subscriber Totals**
CMTV	19,600,000	-2,702,567	-20.1%	-0.3%	-13.79%	All TCI Subscribers [6]
VH1	47,400,000	-1,653,810	-12.3%	-0.2%	-3.49%	13,445,609
Sci-Fi	11,000,000	-1,626,919	-12.1%	-0.2%	-14.79%	
Travel Channel	17,500,000	-1,600,027	-11.9%	-0.2%	-9.14%	
WGN	38,100,000	-1,479,017	-11.0%	-0.1%	-3.88%	National Subs [1]
Nostalgia	14,700,000	-1,236,996	-9.2%	-0.1%	-8.41%	58,030,380
Playboy [3]	8,000,000	-1,236,996	-9.2%	-0.1%	-15.46%	
TMC	10,700,000	-1,223,550	-9.1%	-0.1%	-11.44%	
WWOR	12,500,000	-994,975	-7.4%	-0.1%	-7.96%	Total Subscriber
New Inspirational	7,000,000	-833,628	-6.2%	-0.1%	-11.91%	Transactions for
Sports Channel America [4]	20,000,000	-806,737	-6.0%	-0.1%	-4.03%	Unaffiliated Services [7]
Trinity [4]	18,000,000	-793,291	-5.9%	-0.1%	-4.41%	1,053,554,062
WPIX	9,700,000	-712,617	-5.3%	-0.1%	-7.35%	
Bravo	11,500,000	-403,368	-3.0%	0.0%	-3.51%	
KTLA	5,500,000	-389,923	-2.9%	0.0%	-7.09%	
WSBK	577,000	-322,695	-2.4%	0.0%	-55.93%	
International Channel	4,900,000	-255,467	-1.9%	0.0%	-5.21%	
MOR Music [5]	7,000,000	-161,347	-1.2%	0.0%	-2.30%	
Telemundo	13,320,000	-13,446	-0.1%	0.0%	-0.10%	
FamilyNet [5]	NA	-13,446	-0.1%	0.0%	NA	
TMS News	NA	-80,674	-0.6%	0.0%	NA	
Totals [8]	**276,997,000**	**-18,541,495**				

Table A-2 (continued)

TCI's Carriage of Unaffiliated Services

Estimates of TCI "Advantage" Provided to Unaffiliated Program Services

Program Service	Total Subscribers to Program Service [1]	Advantaged Subscribers [2]	Advantaged Subscribers as a Percent of... All TCI Subscribers	Total Subscriber Transactions for Unaffiliated Services	Total Subscribers to the Service	Subscriber Totals
VISN/ACTS	19,100,000	3,455,522	25.7%	0.3%	18.1%	All TCI Subscribers [6]
Mind Ext Univ	24,000,000	1,653,810	12.3%	0.2%	6.9%	13,445,609
CNBC	49,000,000	1,411,789	10.5%	0.1%	2.9%	
TWC	53,400,000	1,317,670	9.8%	0.1%	2.5%	
C-SPAN2	31,300,000	873,965	6.5%	0.1%	2.8%	National Subs [1]
C-SPAN	59,400,000	833,628	6.2%	0.1%	1.4%	58,030,380
Univision [9]	12,000,000	833,628	6.2%	0.1%	6.9%	
Lifetime	57,000,000	605,052	4.5%	0.1%	1.1%	
FoxNet	2,022,000	578,161	4.3%	0.1%	28.6%	Total Subscriber
TNN	57,500,000	551,270	4.1%	0.1%	1.0%	Transactions for
EWTN	32,000,000	457,151	3.4%	0.0%	1.4%	Unaffiliated Services [7]
Cinemax [5]	6,300,000	309,249	2.3%	0.0%	4.9%	1,053,554,062
MTV	57,300,000	295,803	2.2%	0.0%	0.5%	
Showtime	10,700,000	282,358	2.1%	0.0%	2.6%	
ESPN [5]	61,700,000	228,575	1.7%	0.0%	0.4%	
Galavision	4,231,062	188,239	1.4%	0.0%	4.4%	
Nick	59,000,000	161,347	1.2%	0.0%	0.3%	
USA Network	60,124,000	147,902	1.1%	0.0%	0.2%	
A&E	56,000,000	134,456	1.0%	0.0%	0.2%	
Comedy Central	28,000,000	107,565	0.8%	0.0%	0.4%	
Natl. Jewish TV	3,000,000	107,565	0.8%	0.0%	3.6%	
KTVT	2,400,000	94,119	0.7%	0.0%	3.9%	
SPICE	6,600,000	26,891	0.2%	0.0%	0.4%	
HBO	17,400,000	13,446	0.1%	0.0%	0.1%	
Disney	7,080,000	13,446	0.1%	0.0%	0.2%	
Totals [8]	**776,557,062**	**14,682,605**				

[1] From National Cable Television Association, Cable Television Developments (Nov 93), except where noted.

[2] Based on differential probabilities of carriage between TCI-owned and non-TCI, unintegrated systems, except where noted.

[3] Total Subscribers are represented by addressable homes, from Warren Publishing, Television & Cable Factbook (1994).

[4] Total Subscribers are from Warren Publishing, Television & Cable Factbook (1994).

[5] Carriage probabilities were unstable. The number of foreclosed subscribers was based on differentials in straight carriage rates.

[6] TCI.

[7] The sum of Total Subscribers over all unaffiliated program services.

[8] May not sum due to rounding.

[9]

Table A-3

TCI's Carriage of Affiliated Services

Estimates of TCI Cable Subscribers "Foreclosed" to Affiliated Program Services

Program Service	Total Subscribers to Program Service [1]	Foreclosed Subscribers [2]	Foreclosed Subscribers as a Percent of... All TCI Subscribers	Foreclosed Subscribers as a Percent of... Total Subscribers to the Service	Subscriber Totals
HSN	21,000,000	-2,285,754	-17.00%	-10.9%	All TCI Subscribers [3]
The Learning Channel	20,400,000	-2,258,862	-16.80%	-11.1%	13,445,609
QVC Fashion	7,600,000	-672,280	-5.00%	-8.8%	
E! Entertainment	22,000,000	-658,835	-4.90%	-3.0%	National Subs [1]
Cartoon Network	6,132,000	-605,052	-4.50%	-9.9%	58,030,380
HSN 2	13,000,000	-363,031	-2.70%	-2.8%	

Estimates of TCI "Advantage" Provided to Affiliated Program Services

Program Service	Total Subscribers to Program Service [1]	Advantaged Subscribers [2]	Advantaged Subscribers as a Percent of... All TCI Subscribers	Advantaged Subscribers as a Percent of... Total Subscribers to the Service	Subscriber Totals
Encore [4]	15,000,000	8,470,734	63.00%	56.5%	All TCI Subscribers [3]
Court TV	14,100,000	4,356,377	32.40%	30.9%	13,445,609
AMC	44,500,000	2,971,480	22.10%	6.7%	
Prime Sports Network [5]	27,000,000	2,070,624	15.40%	7.7%	National Subs [1]
QVC	46,200,000	1,680,701	12.50%	3.6%	58,030,380
The Box	16,000,000	900,856	6.70%	5.6%	
BET	36,800,000	793,291	5.90%	2.2%	
TNT	59,000,000	766,400	5.70%	1.3%	
Headline News	51,600,000	537,824	4.00%	1.0%	
Discovery Channel	59,300,000	470,596	3.50%	0.8%	
Family Channel	57,400,000	255,467	1.90%	0.4%	
WTBS	60,032,000	201,684	1.50%	0.3%	
CNN	61,100,000	53,782	0.40%	0.1%	

[1] From National Cable Television Association, Cable Television Developments (Nov 93), except where noted.

[2] Based on differential probabilities of carriage between TCI-owned and non-TCI, unintegrated systems, except where noted.

[3] TCI.

[4] Total Subscribers are represented by subscribers to which service is available, from Warren Publishing, Television & Cable Factbook (1994).

[5] Total Subscribers are from National Cable Television Association, Regional Sports Networks Media Guide (1993) for Prime Network under the Prime Network Affiliates tab.

Table A-4

Summary of Carriage Rates and Results of Probit Model

Service	Carriage Rates (%)						Probit Model				
	Including Missing Value Records			Excluding Missing Value Records							
	TCI >= 50%	Non-TCI Non-Vert.	Difference (TCI - Non)	TCI >= 50%	Non-TCI Non-Vert.	Difference (TCI - Non)	TCI Coefficient	P Value	But-For Subscriber Difference	TCI Basic Subscribers (in Model)	Percent Difference
CMTV	14.2	34.0	-19.8	11.3	35.8	-24.5	-0.8645	0.0001	-1,853,772	9,219,745	-20.1%
HSN	10.6	17.2	-6.6	9.6	22.6	-13.0	-0.6906	0.0001	-1,563,099	9,219,745	-17.0%
LEARNING	6.5	12.5	-5.9	6.8	17.4	-10.7	-0.7903	0.0001	-1,549,745	9,219,745	-16.8%
PREVUE	4.3	7.6	-3.3	5.4	11.8	-6.4	-0.6797	0.0001	-1,207,546	9,219,745	-13.1%
VH1	27.5	30.3	-2.7	31.7	42.3	-10.6	-0.6014	0.0001	-1,131,646	9,219,745	-12.3%
SCIFI	0.8	6.0	-5.2	0.7	8.3	-7.7	-1.3661	0.0001	-1,116,906	9,219,745	-12.1%
TRAVEL	2.5	5.6	-3.1	3.2	8.2	-5.1	-0.7486	0.0001	-1,098,887	9,219,745	-11.9%
WGN	65.6	82.0	-16.4	60.7	79.7	-19.0	-0.4091	0.0001	-1,018,529	9,219,745	-11.0%
NOSTAL	2.9	5.1	-2.2	3.5	8.3	-4.9	-0.6175	0.0001	-847,992	9,219,745	-9.2%
PLAYBOY	0.4	2.4	-2.0	0.4	4.1	-3.7	-1.1634	0.0001	-845,683	9,219,745	-9.2%
TMC	22.9	25.6	-2.6	26.7	32.5	-5.8	-0.3505	0.0001	-835,639	9,219,745	-9.1%
WWOR	12.4	16.6	-4.2	14.1	20.3	-6.2	-0.3190	0.0001	-681,363	9,219,745	-7.4%
NEWINSP	2.0	5.3	-3.4	2.3	6.6	-4.4	-0.5819	0.0001	-569,585	9,219,745	-6.2%
SC_AM	1.3	2.4	-1.2	1.9	4.3	-2.4	-0.5897	0.0001	-552,806	9,219,745	-6.0%
TRINITY	6.9	9.7	-2.8	6.4	11.4	-5.0	-0.3566	0.0001	-540,549	9,219,745	-5.9%
WPIX	2.2	3.5	-1.2	3.1	5.2	-2.2	-0.4877	0.0003	-489,733	9,219,745	-5.3%
QVCFASH	0.3	3.0	-2.7	0.5	2.9	-2.4	-0.9245	0.0001	-463,365	9,219,745	-5.0%
E_ENT	4.7	4.1	0.6	5.3	6.4	-1.0	-0.2767	0.0104	-449,013	9,219,745	-4.9%
CARTOON	0.4	2.5	-2.1	0.7	3.5	-2.9	-0.8542	0.0001	-418,345	9,219,745	-4.5%
BRAVO	3.1	4.2	-1.1	4.0	5.6	-1.6	-0.2272	0.0803	-280,260	9,219,745	-3.0%
KTLA	1.3	1.9	-0.6	1.7	2.8	-1.1	-0.4019	0.0098	-269,728	9,219,745	-2.9%
HSN2	0.9	1.1	-0.2	0.5	2.0	-1.4	-0.5206	0.0222	-247,634	9,219,745	-2.7%
WSBK	1.8	3.5	-1.7	2.1	5.7	-3.6	-0.3383	0.0347	-217,278	9,219,745	-2.4%
INTLCHAN	0.3	0.3	0.0	0.4	0.5	-0.1	-0.5192	0.1579	-175,208	9,219,745	-1.9%
PLAYNITE	0.9	0.7	0.3	1.2	1.3	-0.1	-0.1651	0.3857	-93,560	9,219,745	-1.0%
TMSNEWS	0.1	0.3	-0.2	0.1	0.4	-0.3	-0.5594	0.2168	-56,989	9,219,745	-0.6%
TELEMUND	0.6	0.3	0.3	0.5	0.4	0.1	-0.1125	0.7189	-13,648	9,219,745	-0.1%
HBO	96.1	87.8	8.3	97.1	92.0	5.1	0.1549	0.2335	5,319	9,219,745	0.1%
DISNEY	87.3	70.6	16.8	89.3	78.1	11.2	0.0646	0.4588	11,981	9,219,745	0.1%
SPICE	0.3	0.2	0.1	0.3	0.3	0.0	0.0827	0.8536	19,659	9,219,745	0.2%
CNN	98.4	92.8	5.6	98.5	95.4	3.1	0.3487	0.0212	36,307	9,219,745	0.4%

Table A-4 (continued)

Summary of Carriage Rates and Results of Probit Model

	Carriage Rates (%)						Probit Model				
	Including Missing Value Records			Excluding Missing Value Records							
Service	TCI >= 50%	Non-TCI Non-Vert.	Difference (TCI - Non)	TCI >= 50%	Non-TCI Non-Vert.	Difference (TCI - Non)	TCI Coefficient	P Value	But-For Subscriber Difference	TCI Basic Subscribers (in Model)	Percent Difference
KTVT	4.2	2.4	1.8	3.7	2.3	1.4	0.1444	0.2466	59,996	9,219,745	0.7%
NATJEWTV	0.2	0.1	0.1	0.3	0.1	0.1	0.3619	0.4383	71,907	9,219,745	0.8%
COMEDY	19.7	13.7	6.0	24.3	19.9	4.4	0.0324	0.6453	77,735	9,219,745	0.8%
AE	64.9	47.0	18.0	72.0	59.5	12.6	0.1243	0.0774	89,873	9,219,745	1.0%
USA	96.9	84.4	12.6	97.2	89.9	7.3	0.4523	0.0001	105,398	9,219,745	1.1%
NICKDN	84.8	62.6	22.2	87.9	75.3	12.7	0.2760	0.0006	109,262	9,219,745	1.2%
GALA	4.7	2.0	2.7	4.6	2.7	1.9	0.1403	0.2816	126,631	9,219,745	1.4%
WTBS	97.9	97.6	0.3	97.4	97.4	0.0	0.2034	0.1329	142,410	9,219,745	1.5%
FAMILYCH	93.1	90.0	3.1	95.4	91.1	4.3	0.2633	0.0090	176,928	9,219,745	1.9%
SHOW	68.8	55.2	13.7	76.9	62.0	14.9	0.2362	0.0007	195,672	9,219,745	2.1%
MTV	80.0	47.8	32.2	86.6	64.6	22.0	0.5648	0.0001	206,236	9,219,745	2.2%
EWTN	12.6	5.9	6.7	14.6	9.2	5.4	0.1529	0.0641	313,843	9,219,745	3.4%
DISCOV	93.7	76.7	17.0	96.2	81.6	14.6	0.6915	0.0001	319,728	9,219,745	3.5%
HEADLINE	66.7	41.3	25.4	72.6	54.8	17.8	0.3113	0.0001	365,965	9,219,745	4.0%
NASHV	96.6	91.4	5.2	97.5	92.8	4.6	0.4713	0.0002	375,107	9,219,745	4.1%
FOXNET	18.1	4.3	13.8	13.3	3.0	10.2	0.7381	0.0001	392,771	9,219,745	4.3%
LIFETIME	82.3	43.1	39.3	86.6	57.1	29.5	0.7781	0.0001	414,309	9,219,745	4.5%
EPRGD	4.8	1.5	3.2	5.8	2.6	3.2	0.3574	0.0036	434,270	9,219,745	4.7%
TNT	94.0	65.4	28.6	96.2	70.5	25.6	1.1612	0.0001	529,505	9,219,745	5.7%
BET	22.2	10.4	11.8	26.8	15.5	11.3	0.2839	0.0001	540,996	9,219,745	5.9%
UNIVIS	13.7	5.9	7.8	15.1	7.1	8.0	0.2647	0.0016	571,274	9,219,745	6.2%
CSPAN	71.3	33.6	37.7	76.0	45.5	30.5	0.7376	0.0001	573,822	9,219,745	6.2%
CSPAN2	13.3	5.4	7.9	16.3	8.7	7.7	0.3055	0.0004	603,620	9,219,745	6.5%
THE_BOX	1.1	0.1	1.0	1.7	0.2	1.5	1.2699	0.0051	619,001	9,219,745	6.7%
DMEXP	4.8	0.9	4.0	6.2	1.6	4.6	0.5028	0.0001	684,387	9,219,745	7.4%
WEATH	75.0	37.9	37.1	79.7	49.5	30.2	0.7312	0.0001	907,349	9,219,745	9.8%
JONESGAL	3.9	0.0	3.9	5.6	0.1	5.5	1.5722	0.0001	924,715	9,219,745	10.0%
CNBC	61.4	19.9	41.6	68.7	29.8	38.9	1.0308	0.0001	971,600	9,219,745	10.5%
MINDEXTU	14.8	2.8	12.0	16.3	4.1	12.3	0.7412	0.0001	1,136,083	9,219,745	12.3%
QVC	69.2	37.1	32.1	76.0	45.9	30.1	0.7240	0.0001	1,151,274	9,219,745	12.5%
PRIMESPT	22.3	1.7	20.7	21.9	2.4	19.5	1.0923	0.0001	1,423,597	9,219,745	15.4%

Table A-4 (continued)

Summary of Carriage Rates and Results of Probit Model

	Carriage Rates (%)						Probit Model				
	Including Missing Value Records			Excluding Missing Value Records							
Service	TCI >= 50%	Non-TCI Non-Vert.	Difference (TCI - Non)	TCI >= 50%	Non-TCI Non-Vert.	Difference (TCI - Non)	TCI Coefficient	P Value	But-For Subscriber Difference	TCI Basic Subscribers (in Model)	Percent Difference
AMC	83.0	26.2	56.9	86.9	35.4	51.5	1.4933	0.0001	2,033,766	9,219,745	22.1%
VISNACTS	32.7	5.4	27.3	35.7	7.7	28.0	0.9791	0.0001	2,366,095	9,219,745	25.7%
COURT	34.8	1.1	33.6	34.8	2.0	32.8	1.8102	0.0001	2,982,971	9,219,745	32.4%
ENCORE	81.7	6.7	75.0	84.1	9.2	74.9	2.3352	0.0001	5,812,236	9,219,745	63.0%
EPRGDJR	0.1	0.4	-0.3		0.7	-0.7		—	*Unstable Results*	—	
ESPN	99.8	96.7	3.1	100.0	98.3	1.7		—	*Unstable Results*	—	
FAMNET		0.1	-0.1		0.1	-0.1		—	*Unstable Results*	—	
MAX	64.7	51.6	13.1	66.8	64.5	2.3		—	*Unstable Results*	—	
MORMUSIC		1.2	-1.2		1.2	-1.2		—	*Unstable Results*	—	
NASA	0.1	0.2	-0.1		0.3	-0.3		—	*Unstable Results*	—	
UPIDATA		0.1	-0.1		0.2	-0.2		—	*Unstable Results*	—	
XPRXCH	2.0	0.0	1.9	3.1		3.1		—	*Unstable Results*	—	

STANLEY M. BESEN

EDUCATION

City College of New York
B.B.A., Economics (1958)
Yale University
M.A., Economics (1960)
Ph.D., Economics (1964)

PROFESSIONAL EXPERIENCE

1992-present, Vice-President, Charles River Associates Incorporated

1980-1992 - Senior Economist, The Rand Corporation

1990-1991 - Visiting Professor of Law and Economics, Georgetown University Law Center

1988-1989 - Visiting Henley Professor of Law and Business, Columbia University

1985-1988 - Coeditor, Rand Journal of Economics

1978-1980 - Co-Director, Network Inquiry Special Staff, Federal Communications Commission

1971-1972 - Brookings Economic Policy Fellow, Office of Telecommunications Policy, Executive Office of the President

1965-1980 - Assistant Professor, Associate Professor, Professor of Economics, Allyn R. and Gladys M. Cline Professor of Economics and Finance, Rice University

1963-1965 - Economist, Institute for Defense Analyses

1962-1963 - Acting Assistant Professor of Economics, University of California, Santa Barbara

CONSULTANCIES

The Rand Corporation, 1972-1978

Office of Telecommunications Policy, Executive Office of the President, 1972-1977

Department of Defense, 1967

PROFESSIONAL ACTIVITIES/HONORS

Member, The National Academies Computer Science and Telecommunications Board Committee on Internet Searching and the Domain Name System, 2001-present

Member, Editorial Board, Information Economics and Policy, 1992-present

Member, Editorial Board, Economics of Innovation and New Technology, 1989-present

Member, U.S. National Committee on Data for Science and Technology (CODATA), National Academy of Sciences/National Research Council, 1993-1996

Member, Office of Technology Assessment Advisory Panel on Communications Systems for an Information Age, 1986-1988

Member, Regional Telecommunications Planning Advisory Committee, City of Cincinnati, 1985

Member, Office of Technology Assessment Advisory Panel on Intellectual Property Rights in an Age of Electronics and Information, 1984-1985

Expert, World Intellectual Property Organization/UNESCO Meeting on Unauthorized Private Copying of Recordings, Broadcasts and Printed Matter, 1984

Who's Who in America, 1982-1983, 1984-1985, 1986-1987, 1988-1989, 1990-1991, 1992-1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001

Member, Editorial Board, Southern Economic Journal, 1979-1981

Member, Task Force on National Telecommunications Policy Making, Aspen Institute Program on Communications and Society, 1977

Brookings Economic Policy Fellow, 1971-1972

Member, Technical Advisory Committee on Business Development, Model City Program, City of Houston, 1969-1971

Wilson University Fellow, 1959-1961

Overbrook Fellow, 1958-1959

Beta Gamma Sigma, 1958

PUBLICATIONS

Books

Misregulating Television: Network Dominance and the FCC, University of Chicago Press, 1984 (with T.G. Krattenmaker, A.R. Metzger, and J.R. Woodbury). Paperback edition, 1986.

New Television Networks: Entry, Jurisdiction, Ownership and Regulation, Final report, Network Inquiry Special Staff, Federal Communications Commission, 1980 (with T.G. Krattenmaker et al).

Introduction to Monetary Economics, Harper and Row, 1975.

Articles

"Advances in Routing Technologies and Internet Peering Agreements," **American Economic Association Papers and Proceedings**," (with P. Milgrom, B. Mitchell, and P. Srinagesh) May 2001.

"Vertical and Horizontal Ownership in Cable TV: Time Warner-Turner (1996)," in J. E. Kwoka and L.J. White, **The Antitrust Revolution**, Scott, Foresman, (with E.J. Murdoch, D.P. O'Brien, S.C. Salop, and J.R. Woodbury), 1998.

"Intellectual Property," in **The New Palgrave Dictionary of Economics and the Law**, The Macmillan Press, 1998. Reprinted in R. Towse and R.W. Holzhauer (editors), **The Economics of Intellectual Property**, Edward Elgar, 2001.

"Telecommunications in the U.S.A: Evolution to Pluralism," in B. Lange (editor), **ISDN: An International Comparison of Trends in the USA, Japan, Singapore and Europe**, Final Report to the ISDN Commission of North Rhine-Westphalia, May 1996 (with S.R. Brenner and J.R. Woodbury).

"The Standards Processes in Telecommunications and Information Technology," in R. Hawkins, R. Mansell and J. Skea (editors), **Standards, Innovation, and Competitiveness: The Politics and Economics of Standards in Natural and Technical Environments**, Edward Elgar, 1995.

"Rate Regulation, Effective Competition, and the Cable Act of 1992," **Hastings Communications and Entertainment Law Journal**, 1994 (with J.R. Woodbury).

"Choosing How to Compete: Strategy and Tactics in Standardization," **Journal of Economic Perspectives**, 1994 (with J. Farrell).

"AM versus FM: The Battle of the Bands," **Industrial and Corporate Change**, 1992.

"An Economic Analysis of Copyright Collectives," **Virginia Law Review**, 1992 (with S.N. Kirby and S.C. Salop).

"The Role of the ITU in Telecommunications Standardization: Pre-Eminence, Impotence or Rubber Stamp?," **Telecommunications Policy**, 1991 (with J. Farrell). Reprinted as The Rand Corporation, RP-100, 1992.

Telecommunications and Information Technology Standardization in Japan: A Preliminary Survey, The Rand Corporation, N-3204-CUSJR, 1991.

"An Introduction to the Law and Economics of Intellectual Property," **Journal of Economic Perspectives**, 1991 (with L.J. Raskind). Translated and reprinted as "Introduzione agli Aspetti Legislativi ed Economici della Proprieta Intellettuale," in G. Goisis (editor), **Efficienza Produttiva: Alcuni Contributi Su Noti (E Meno Noti) Argomenti**, CEDAM, 1994.

"The European Telecommunications Standards Institute: A Preliminary Analysis," **Telecommunications Policy**, 1990. Reprinted as The Rand Corporation, N-3320-NSF, 1991.

"The Prototype Model of Defense Procurement," in T.R. Gulledge and L.A. Litteral (editors), **Cost Analysis Applications of Economics and Operations Research**, New York: Springer-Verlag, 1989 (with K. Terasawa).

"Separate Satellite Systems and INTELSAT: an American View," **Revue de Droit de l'Informatique et des Telecoms** (Computer and Telecoms Law Review), 1989.

"Private Copying, Appropriability, and Optimal Copying Royalties," **Journal of Law and Economics**, October 1989. An earlier version appeared as The Rand Corporation, R-3546-NSF, October 1987 (with S.N. Kirby).

Compensating Creators of Intellectual Property: Collectives that Collect, The Rand Corporation, R-3751-MF, May 1989 (with S.N. Kirby).

"The Economics of Telecommunications Standards," in R.W. Crandall and K. Flamm (eds.), **Changing the Rules: Technological Change, International Competition, and Regulation in Communications**, Brookings Institution, 1989 (with G. Saloner). Reprinted as "Compatibility Standards and the Market for Telecommunications Services," in T.J. Allen and M.S. Scott Morton (eds.), **Information Technology and the Corporation of the 1990s,** Oxford University Press, 1994.

New Technologies and Intellectual Property: An Economic Analysis, The Rand Corporation, N-2601-NSF, May 1987.

"Assessing the Effects of Bulk Power Rate Regulation: Results from a Market Experiment," **Applied Economics**, May 1987 (with J.P. Acton). Reprinted in J. Plummer and S. Troppmann (editors), **Competition in Electricity: New Markets and New Structures**, Public Utilities Reports and QED Research, 1990. An earlier and more extended version appeared as **Regulation, Efficiency, and Competition in the Exchange of Electricity: First-Year Results from the FERC Bulk Power Market Experiment**, The Rand Corporation, R-3301-DOE, October 1985.

"Discussion of Michael A. Tyler, 'The Extent of Software Piracy,'" in Frank L. Huband and R.D. Shelton (eds.), **Protection of Computer Systems and Software**, Law & Business, Inc., 1986.

Compatibility Standards, Competition, and Innovation in the Broadcasting Industry, The Rand Corporation, R-3453-NSF, November 1986 (with L.L. Johnson).

"Private Copying, Reproduction Costs, and the Supply of Intellectual Property," **Information Economics and Policy**, 1986. Reprinted in D. Lamberton (editor), **The Economics of Communication and Information**, Edward Elgar, 1996. An earlier version appeared as The Rand Corporation, N-2207-NSF, December 1984.

"Copying Costs and the Costs of Copying," in M. Greenberger (ed.), **Electronic Publishing Plus: Media for a Technological Future**, Knowledge Industries, 1985.

"Regulation of Broadcast Station Ownership: Evidence and Theory," in E.M. Noam (ed.), **Video Media Competition: Regulation, Economics, and Technology**, Columbia University Press, 1985 (with L.L. Johnson).

The Economics of Bulk Power Exchanges, The Rand Corporation, N-2277-DOE, May 1985 (with J.P. Acton).

Regulation of Media Ownership by the Federal Communications Commission: An Assessment, The Rand Corporation, R-3206-MF, December 1984 (with L.L. Johnson).

"The Regulation of Telecommunications Networks," **Information Society**, 1984.

An Analysis of the Federal Communication Commission's Group Ownership Rules, The Rand Corporation, N-2097-MF, January 1984 (with L.L. Johnson).

Issues in the Design of a Market Experiment for Bulk Electrical Power, The Rand Corporation, N-2029-DOE, December 1983 (with J.P. Acton).

"The Determinants of Network Television Program Prices: Implicit Contracts, Regulation, and Bargaining Power," **The Bell Journal of Economics**, Autumn 1983 (with J.R. Woodbury and G.M. Fournier).

"Regulation, Deregulation, and Antitrust in the Telecommunications Industry," **The Antitrust Bulletin**, Spring 1983 (with J.R. Woodbury).

Summary Comments in E.M. Noam (ed.), **Telecommunications Regulation Today and Tomorrow**, Law and Business, Inc./Harcourt Brace Jovanovich, 1983.

An Economic Analysis of Mandatory Leased Channel Access for Cable Television, The Rand Corporation, R-2989-MF, December 1982 (with L.L. Johnson).

After Energy Price Decontrol: The Role of Government Conservation Programs, The Rand Corporation, N-1903-DOE, October 1982 (with L.L. Johnson).

"Economic Implications of Mandated Efficiency Standards for Household Appliances: Comment," **The Energy Journal**, January 1982 (with L.L. Johnson).

"Regulating Network Television: Dubious Premises and Doubtful Solutions," **Regulation**, May/June 1981 (with T.G. Krattenmaker).

"Cable Copyright and Consumer Welfare: The Hidden Cost of the Compulsory License," Shooshan and Jackson, May 1981 (with H.M. Shooshan, C.L. Jackson, and J. Wilson).

"The Deregulation of Cable Television," **Law and Contemporary Problems**, Winter 1981 (with R.W. Crandall).

"An Analysis of the Network-Affiliate Relationship in Television," Network Inquiry Special Staff, Federal Communications Commission, 1980 (with S.A. Preskill).

"Copyright Liability for Cable Television: Compulsory Licensing and the Coase Theorem," **Journal of Law and Economics**, April 1978 (with W.G. Manning and B.M. Mitchell). Reprinted in R. Towse and R.W. Holzhauer (editors), **The Economics of Intellectual Property**, Edward Elgar, 2001. An earlier version appeared as **Copyright Liability for Cable Television: Is Compulsory Licensing the Solution?**," The Rand Corporation, R-2023-MF, February 1977.

"The Value of Television Time: Some Problems and Attempted Solutions: Reply," **Southern Economic Journal**, April 1978.

"Deregulating Telecommunications - Sorting Out Mixed Signals," **Regulation**, March/April 1978.

On Measuring the Gain in Economic Welfare from Marginal Cost Pricing When a Related Market Is of Importance: The Case of Electricity and Natural Gas, The Rand Corporation, P-5755, February 1977 (with B.M. Mitchell).

Economic Policy Research on Cable Television: Assessing the Costs and Benefits of Cable Deregulation, prepared for the Office of Telecommunications Policy, Executive Office of the President, December 1976 (with B.M. Mitchell, R.G. Noll, B.M. Owen, R.E. Park, and J.N. Rosse). Reprinted in Paul W. MacAvoy (ed.), **Deregulation of Cable Television**, American Enterprise Institute, 1977.

"Watergate and Television: An Economic Analysis," **Communication Research**, July 1976 (with B.M. Mitchell). An earlier version appeared as The Rand Corporation, R-1712-MF, May 1975.

"A Simultaneous Equations Model of Television Station Revenue and Expenditure," Appendix F to Rolla E. Park, Leland L. Johnson and Barry Fishman, **Projecting the Growth of Television Broadcasting: Implications for Spectrum Use**, The Rand Corporation, R-1841-FCC, February 1976.

"The Value of Television Time," **Southern Economic Journal**, January 1976. An earlier version appeared as **The Value of Television Time and the Prospects for New Stations**, The Rand Corporation, R-1328-MF, October 1973.

"The Economics of the Network-Affiliate Relationship: Reply," **American Economic Review**, December 1975 (with R. Soligo).

"Market Size, VHF Allocations, and the Viability of Television Stations," **Journal of Industrial Economics**, September 1975 (with P.J. Hanley).

"The Economics of the Cable Television 'Consensus,'" **Journal of Law and Economics**, April 1974.

An Economic Analysis of an Alternative Method of Financing Public Broadcasting, Broadcasting Institute of North America, 1973.

"The Economics of the Network-Affiliate Relationship in the Television Broadcasting Industry," **American Economic Review**, June 1973 (with R. Soligo).

"Education and Productivity in United States Manufacturing: Some Cross-Section Evidence," **Journal of Political Economy**, May/June 1973.

"Elasticities of Substitution and Returns to Scale in United States Manufacturing: Some Additional Evidence," **Southern Economic Journal**, October 1967.

"Cost Effectiveness Analysis for the 'War on Poverty'", in T.A. Goldman (ed.), **Cost-Effectiveness Analysis: New Approaches in Decision-Making**, Praeger, 1967 (with A.E. Fechter and A.C. Fisher).

Evaluating the Returns to Regional Economic Development Programs, Institute for Defense Analyses, B-272, 1966.

Internal Prices as an Administrative Tool: An Application to the Military Air Transport Service, Institute for Defense Analyses, S-200, 1965 (with M.J. Bailey, J.G. Cross, and W.P. Sewell).

"An Empirical Analysis of Commercial Bank Lending Behavior," **Yale Economic Essays**, Fall 1965.

Review Articles

B. R. Litman, **The Vertical Structure of the Television Broadcasting Industry: The Coalescence of Power**, **The Antitrust Bulletin**, Fall 1982.

R. G. Noll, M. J. Peck, and J. J. McGowan, **Economic Aspects of Television Regulation** (with B.M. Mitchell), **Bell Journal of Economics and Management Science**, Spring 1974. An earlier version appeared as **Economic Analysis and Television Regulation: A Review**, The Rand Corporation, R-1398-MF, December 1973.

Reviews

B. Kahin and H.R. Varian (eds.), **Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property**, **Journal of Economic Literature**, 2001.

F.M. Fisher, **Industrial Organization, Economics, and the Law** (edited by John Monz), **Regulation**, 1991.

S.S. Wildman and S.E. Siwek, **International Trade in Films and Television Programs**, **Information Economics and Policy**, 1990.

G. W. Wilson, et al., **The Impact of Highway Investment on Development**, **Journal of Business**, 1967.

R. A. Gordon and L. Klein (eds.), **American Economic Association Readings in Business Cycles," Southwestern Social Science Quarterly**, 1966.

Other

Witness, Subcommittee on Intellectual Property and Judicial Administration, Committee on the Judiciary, U.S. House of Representatives, 1991. Prepared statement and testimony appear in **Intellectual Property and International Issues**, 102nd Congress, 1st Session.

Witness, Subcommittee on Telecommunications and Finance, Committee on Energy and Commerce, U.S. House of Representatives, 1990. Prepared statement and testimony appear in **Cable Television Regulation (Part 2)**, 101st Congress, 2nd Session.

Witness, Subcommittee on Telecommunications, Consumer Protection, and Finance, Committee on Energy and Commerce, U.S. House of Representatives, 1983. Prepared statement and testimony appear in **Options for Cable Legislation**, 98th Congress, 1st Session.

Witness, Subcommittee on Communications, Committee on Commerce, Science, and Transportation, U.S. Senate, 1982. Prepared statement and testimony appear in **Cable Television Regulation**, 97th Congress, 2nd Session.

Witness, Subcommittee on Telecommunications, Consumer Protection, and Finance, Committee on Energy and Commerce, U.S. House of Representatives, 1981. Prepared statement and testimony appear in **Status of Competition and Deregulation in the Telecommunications Industry**, 97th Congress, 1st Session.

Witness, Subcommittee on General Oversight and Minority Enterprise, Committee on Small Business, U.S. House of Representatives, 1980. Prepared statement and testimony appear in **Media Concentration (Part 1)**, 96th Congress, 2nd Session.

Panelist, Session on "The Role of Competition in the Electronic Media," Federal Trade Commission Symposium on Media Concentration, 1978. Comments reprinted in Federal Trade Commission, Bureau of Competition, **Proceedings of the Symposium on Media Concentration**, Volume I.

Witness, Subcommittee on Communications, Committee on Commerce, Science and Transportation, U.S. Senate, 1977. Prepared statement and testimony appear in **Cable Television**, 95th Congress, 1st Session.

Witness, Subcommittee on Communications, Committee on Interstate and Foreign Commerce, U.S. House of Representatives, 1976. Prepared statement and testimony appear in **Cable Television Regulation Oversight - Part 1**, 94th Congress, 2nd Session.