

"reputational incentive" for the network to make decisions which will enhance the syndication value of a series even though the syndication rights to that series are retained by the producer.

As already noted, the program production market appears competitive; therefore the revenues of program producers from the network and syndication markets combined will tend to only just cover their costs, including a normal return on their investment, and a return (which could be substantial) to any special skills or capabilities. If a network acquired a reputation for not preserving producer-owned syndication values (for example, by terminating series before enough episodes had been created to permit syndication), producers would expect lower syndication revenues from programs provided to that network and would avoid contracting with that network in the future unless it received higher network license fees to compensate them for the lower expected value of the syndication rights

If the syndication market were competitive, the value of the syndication rights to an individual producer would be the same as their value to a network. It would then be in the interest of a network to acquire a reputation for treating the syndication rights exactly (as well) as would the producer.⁹¹

⁹¹ In its comments, the FTC staff suggests that because of program specific investments made by the network, producers are in a position to appropriate those investments; therefore, integration into program ownership by the networks may be an efficient response to the potential for producer opportunism. See FTC Staff at 12-13.

For two reasons, however, the potential for opportunistic behavior by the producers is unlikely to be a significant incentive for vertical integration by the networks into program production. The first relates to the reputational effects discussed in the text: a producer, like a network, has an incentive to preserve a reputation for not engaging in opportunistic behavior

Behaving otherwise would raise the costs to the network of acquiring the first-run rights.⁹²

The fact that some cable networks at least occasionally acquire the syndication rights to original programs appearing on that network suggests that

(at least as long as that producer plans on staying in the business), so that there may not be a problem here for vertical integration to solve.

But even if producer opportunism remained a problem, vertical integration could solve that problem only if the network could acquire ownership in the inputs whose behavior it is trying to control. For example, a refinery being "held-up" by a pipeline that was its only supplier could purchase the pipeline. But even if the networks were to integrate vertically into program production, much if not most of the potential for hold-up would still remain: Actors, directors, and writers--and the talent that puts them all together--could still hold-up the network. Thus, absent repeal of the Thirteenth Amendment, vertical integration is not likely to provide a solution to the FTC-staff perceived hold-up risk.

Further, the conjecture that in-house production is more efficient than contractual relationships with independent producers is surely wrong. Prior to the adoption of the FISR, CBS and NBC appeared among the top twenty suppliers of prime time series, but accounted for less than 4 percent of total prime time programming hours. Such a small network share suggests that in-house production is typically an inefficient means for the network to acquire series.

⁹² It will be in the interest of a network to acquire a reputation for treating the syndication rights as if it were the owner, whether the networks compete with each other as purchasers of programming or act as a monopsonist toward the producers in the network programming market. In other words, buyer market power in the network programming market does not reduce the reputational incentive.

The reputational incentive is reduced, however, if the networks exercise market power as sellers in the syndication market. As discussed above, the networks may be able to effectively monopolize that market even if the FISR prevents them from direct participation in the syndication market. With or without the FISR, the networks can still extract much or all of the revenue that producers expect for their syndication rights in the form of lower network fees. However, again with or without the FISR, if syndicable programs that have first gone through a network run are an "antitrust market," then the marginal value to a network of an additional off-network program will be less than its marginal value to a producer. As a result, a network may not treat the syndication rights as well as their producer-owner would wish. Such behavior may be mistakenly ascribed to moral hazard rather than to market power. We discuss this result below.

the contractual and reputational alternatives are not completely effective in eliminating moral hazard. But even if these contractual and reputational alternatives to ownership do not completely eliminate the moral hazard problem, they may reduce it enough so that the case for the networks' ownership of syndication rights on this kind of efficiency ground is greatly weakened. Ultimately if, despite these alternatives, the costs of moral hazard by the broadcast networks were significant relative to the market power effects of repealing the FISR, producers and independent television stations should be actively in favor of repealing the rule. Their continued strenuous opposition to repeal would suggest that other factors outweigh any efficiencies from network ownership of the syndication rights

In sum, the articulated efficiency rationales for network ownership of the syndication rights are both unimpressive in theory and directly contradicted in their empirical predictions by the actual positions of the parties.⁹³

4. Efficiencies from Producer Ownership: Mitigating Producer Opportunism

While moral hazard problems may arise if either the network or the producer owns the syndication rights,⁹⁴ one efficiency effect specific to producer ownership of the syndication rights may be a reduction in post-contractual opportunistic behavior. If uncertainty surrounding the success of a series is

⁹³ For a complete discussion of empirical predictions offered by the networks' economists, see Appendix D to this paper.

⁹⁴ A discussion of producer moral hazard resulting from network ownership of the syndication rights can be found in the Network Inquiry Special Staff, op.cit. at 616-619.

so great that full ex ante contracting would be too expensive, the parties may expect almost continuous renegotiations over the life of the series. Regardless of the extent to which the production market is competitive or monopsonized ex ante, it appears that soon into the life of a series, the producer and the network find themselves essentially tied to each other. Given that approximately 70% of all series fail during their first season of exhibition, an existing series becomes distinguished from new series by virtue of the additional audience-response information to the series. Because the success of a new series is highly uncertain, both the network and the producer may seek to "fine-tune" the production, scheduling, or promotion of the series in unpredictable ways as a result of the audience response. Some unanticipated decisions or actions that affect the value of the network rights will be most efficiently made or carried out by the producer (e.g., decisions about casting, plot lines, scripts, etc.), while other unanticipated decisions or actions that affect the value of the syndication rights will be most efficiently carried out by the network (decisions as to scheduling or how to make the program more attractive to advertisers). Both situations will require that the network and producer agree as to what must be done and who will bear any associated costs.

Both the probability and the costs of reaching agreement will depend on the costs to each party of non-cooperative behavior. In other words, bargaining costs tend to be lower when both parties have a lot to lose from being unreasonable. Indeed, in many cases, where one or both parties do not have enough to lose to ensure their reasonableness, their potential losses are

deliberately increased through the exchange of hostages or other actions.⁹⁵

In this context, ownership of the syndication rights by the producer becomes the hostage held by the network for good behavior by the producer. This balances the hostage held by the producer, i.e., the network's anticipated revenue network from a series, most of the costs of which are irretrievably sunk, and which may be a critical component of this season's schedule. While there may be other ways of motivating producer performance, producer ownership of syndication rights is particularly effective because the value of those rights will (in large measure) depend upon the success of the program in the network run.

In addition, while establishing the right incentives for both the network and the producer will generally require that they share the revenues, it may be very difficult to specify in advance how much each party will get. Thus, there may well be an implicit agreement that terms will be renegotiated if the series

⁹⁵ For a general discussion of the use of hostages, see Oliver Williamson, "Credible Commitments: Using Hostages to Support Exchange," American Economic Review (1983) at 519-540. A good example is the unfunded pension plan for union employees. A union is in a much more powerful position once a significant sunk capital investment has been made by the owners of the firm. In Oliver Williamson's terms, once the capital is sunk, the union has an incentive for ex post opportunistic behavior. The union can demand wage increases that in the aggregate match the sunk expenditures. One solution is for the management to try to negotiate firm long-term wage contracts before committing themselves to the investment. Another solution is for both parties to agree to fund the workers' pensions out of future net revenue (i.e., net of interest costs), so that the cost of any such opportunistic wage demands would be born entirely or in part by the workers. For a discussion, see Richard Ippolito, "The Labor Contract and True Pension Liabilities," American Economic Review (1985) at 1031-1043.

is particularly successful.⁹⁶ The amount of renegotiation required, however, will depend on who owns the syndication rights. Since many actions that increase the quality or success of a series can be expected to increase both the value of the network rights and the value of the syndication rights, producer ownership of the syndication rights gives both parties a stake in the success of the series provide both sides with an incentive to be reasonable and reduce the extent to which the network fee needs to be renegotiated if the series is a success.

Producer ownership of the syndication rights would thus appear to have a clear efficiency rationale. Clearly, however, if the only effect of producer ownership of syndication rights were to reduce producer opportunism, the networks would, if anything, try to require producers to retain those rights.

In summary, no set of efficiency stories can provide a complete or consistent explanation for the positions of various parties. A serious problem of network moral hazard would suggest that producers should be actively in favor of the Rule's repeal. Alternatively, if producer opportunism were the only market failure, the networks should prefer that the syndication rights be held by the producers. Producer opposition to and network support for the Rule's repeal is thus consistent with only two possibilities, both of which involve network market power. First, it may indeed be more efficient for the networks to own the syndication rights, but the benefits to the producers from their share

⁹⁶ Despite the fact that the initial contracts specify both a network license fee for the first year and the increases in those fees for the duration of the contract, the costs of production typically increase after the first season because talent can hold out for higher prices to stay with a series. The network will sometimes agree to bear a portion of these increased costs, but often in exchange for producer concessions, such as an increase in the option term.

of any efficiency gains beyond those already achievable through contracting or reputational effects could be more than outweighed by the market-power effects from allowing network ownership and control of syndication rights. Second, it may actually be more efficient for the producers to own the syndication rights, but the increased revenues to the networks from the market-power effects could more than outweigh their share of the increased costs due to network ownership.

5. The Efficiency Consequences of Permitting the Networks a Limited Financial Interest and the Problem of Network Favoritism (Discriminatory Moral Hazard)

We noted earlier in the paper that those advocating modification of the Rule to permit the networks to acquire a limited financial interest failed to appreciate the way in which such a "passive" interest could reduce the flow of off-network programming to independent television stations. In addition, minority participation by the networks may have other undesirable efficiency effects. At least one - referred to as "network favoritism" by the industry and as "discriminatory moral hazard" by economists - is worth a brief discussion here, particularly because producers appear to be unanimous in their assertions that this was a major problem until the FISR were instituted. In brief, the allegation is that the networks systematically discriminated against programs in which they did not hold a financial interest or the distribution rights.

The extent to which a producer's syndication rights to any one program will be harmed by network moral hazard will depend on whether the network owns the syndication rights to other programs. Given a limited supply of internal resources (e.g., good time slots) that can increase a series' value in

syndication, the network will be less likely to provide those resources to a program whose syndication rights it does not own if there is some other program where it does own the syndication rights. By assigning the better slots to the owned program(s), it receives the associated rents immediately and directly, rather than relying on reputation for taking good care of producer-owned syndication rights to result in lower network fees in the future. In effect, the opportunity to assign those slots to a network-owned program increases the opportunity cost of assigning those slots to a non-network-owned program. As the proportion of network-owned programs rises, those internal resources can be spread over a larger number of owned programs, increasing the incentive to discriminate against the non-network-owned programs.

Each individual producer will now attempt to get more favorable treatment by selling the network a larger share of the financial interest in the syndication rights to his series than the share sold by other producers. The networks will thus tend to acquire - apparently at the insistence of the individual producers - whatever is the maximum allowed financial interest in syndication, even if that share is above the efficient level and even if network ownership is against the interests of the producers as a whole. Thus, even if each individual producer would be willing to sell all or a partial of the financial interest in his syndication rights to the network, (and would be delighted to do so if he and only he were allowed to sell a financial interest to the network) producers as a group would be in favor of a rule that says that no producer can sell his rights to the networks.⁹⁷

⁹⁷ It is worth noting that the ability of the networks to produce programs in-house while the FISR bars the networks from acquiring the syndication rights to independently produced programs may have already

As noted in our earlier discussion of the problem of network moral hazard, contractual and reputational effects may mitigate this problem: the point here is that partial network participation can be expected to make that task more difficult and expensive. We should also note that, so long as the networks cannot act as a first-degree price-discriminating monopsonist, producers will earn rents from the syndication rights to infra-marginal programs. Thus, to the extent that network actions reduce the value of syndication rights to infra-marginal programs, the cost of those actions will not be born by the networks, even in the very long run and with perfect information

Finally, it is important to distinguish clearly between discriminatory moral hazard and "non-discriminatory" moral hazard (i.e., the network failing to take care of syndication values because it does not own the syndication rights to any program) because they have opposite policy implications. The policy implication of a belief that discriminatory moral hazard would be a serious problem if the FISR were repealed is to maintain the FISR. In contrast, if non-discriminatory moral hazard is currently a serious problem, one solution would be to repeal the FISR so that the networks could own the assets that they are currently mistreating.

fostered the development of discriminatory moral hazard in favor of in-house productions. And if the Rule remains in place, the effect on independent producers may intensify as the networks are permitted to produce more programs in-house. In effect, the networks can evade the Rule by "suggesting" to producers that the program be produced in association with the network; the alternative for producers that choose to remain independent is discriminatory treatment by the network. The solution here is not to repeal the FISR, since this would permit the networks to use some combination of in-house production and direct acquisition of the syndication rights to reduce the flow of off-network programs. Rather, the efficient solution may be to retain restrictions on network program production.

C. Contrasting and Testing the Efficiency and Market Power Hypotheses

1. Network Syndication Rights and the Probability That a Series Will Go into Syndication

One of the implications of the investment-deterrence model is that, since the network's financial interest can serve as a tax on syndicability, a program where the network has a financial interest should be less likely, all else being equal, to make it into syndication. Similarly, the warehousing model would argue that the networks would try to acquire distribution rights particularly in series believed to be "marginal" in terms of their syndication prospects, implying that we should observe that series in which a network owns the distribution rights are less likely, all else being equal, to make it into syndication.

To our knowledge, the only empirical work done in this area has been by Dr. Crandall, in two articles in 1971 and 1972. The goal was to test the proposition that the networks avored programs in which they had acquired either a financial interest or the distribution rights. Dr. Crandall argued that, on the basis of the empirical evidence, the proposition of network favoritism could be statistically rejected: in none of his tests was there a statistically significant positive relationship between network ownership of syndication rights and the probability of a series being retained.⁹⁸

⁹⁸ Oddly enough, this has not stopped the network economists from arguing that network moral hazard is currently a severe enough problem to warrant eliminating the FISR. As noted in the text, since a network must allocate scarce internal resources (such as favorable scheduling slots) among competing series, programs with no network ownership of syndication rights can be expected to fare worse when the network owns the syndication rights to some competing series. Thus if the potential for network abuse of non-network owned syndication rights is significant, it will appear most clearly in the form of discriminatory moral hazard. If it was not worth while for the networks to engage in discriminatory moral hazard behavior prior to the FISR,

But, apparently to his surprise, Dr. Crandall found evidence that network ownership of either the distribution rights or a financial interest was often significantly negatively correlated with program retention - precisely the results predicted by the investment deterrence and the warehousing models.⁹⁹

it is difficult to see why one should expect non-discriminatory moral hazard with the FISR.

⁹⁹ For example in his 1971 article,

Once more, the results [in Table 2] do not confirm the Commission's hypothesis. In only one of six comparisons is it possible to reject the hypothesis that the relative frequency of network ownership of rights was equal for both categories, and in that year (1960) the proportion of programs in which the networks owned distribution rights was higher for dropped shows than for retained shows. Once more, it appears [from Table 3] that the network retention decision is not influenced greatly by the ownership of distribution rights or profit shares. In none of the six years does X3 add significantly to the discriminating power of the linear discriminant. Distribution rights, X2, contribute significantly to this discriminating power in four of six years--two at the one per cent level and two at the five per cent level--but in three instances the sign of the coefficient of X2 is negative, implying that the program is more likely to be dropped, ceteris paribus, if the network owns the distribution right. ("The Economic Effect of Television-Network Program 'Ownership'" Journal of Law and Economics (1971) at 403, our emphasis.)

In both the pooled and individual-network results, the coefficients of X2 and X3 are more frequently negative than positive. This slight inverse relationship between syndication interests and the probability of retention, particularly for X2 in the early years of the sample, is somewhat puzzling. (Id. at 405-406, our emphasis.)

And in his 1972 article,

The ordinary least-squares estimate of (7) for both samples is satisfactory, with one glaring exception. The coefficient of the syndication profit share variable is negative and significant, suggesting that networks pay less for programs in which they obtain profit shares. See Table 1. This counterintuitive result derives from the networks' tendency to purchase larger shares in the less expensive programs with lower audience appeal. It is not perfectly clear why this pattern should exist. ("FCC Regulation, Monopsony, and Network Television Program Costs, Bell

Indeed, these results appear to have even stronger implications. The network-favoritism (discriminatory moral hazard) hypothesis is that the networks would discriminate against non-network-owned programs in the allocation of internal network-owned resources such as favorable scheduling slots. The investment-deterrence hypothesis is that a network financial interest will result in less being spent on non-network-owned inputs (actors, spectacular car-crashes, or episodes produced after the network run). Thus a finding of no correlation between a network financial interest and the probability that that series will go into syndication may simply mean that both problems are significant, i.e. that allowing a network financial interest would lead to both investment distortions and fewer series in syndication, but that their effects on the relative probability of network versus non-network owned series going into syndication are about equal and hence cancel each other out.

2. The Positions of the Parties

The networks' efficiency hypotheses imply that all parties should benefit if both the distribution rights and the financial interest in syndication are acquired by the highest bidder, because the highest bidder will be the most efficient user of those rights. In contrast, the market power hypothesis implies that ownership and control over syndication rights will inevitably be a source of conflict. Producers (and the independent stations who are the consumers of syndicated programs) can be expected to try to use the regulatory process to preclude the networks from acquiring the syndication rights, as they have. But once successful, what seem to be moral hazard concerns will appear, with the

Journal of Economics (1972) at 497-490, our emphasis.)

producers complaining that the networks are not making enough effort to increase or preserve the value of those producers' syndication rights, are not contributing sufficiently toward the cost of producer actions that increase the value of the network rights as well as the value of the syndication rights, and are even discouraging producers from "excessive" investment in their syndication rights. What is ironic about these complaints is that, under the market power hypothesis, the reason why the networks appear to value the syndication rights less than do their producer-owners is that the networks recognize that they rather than the producers are the ultimate beneficiaries of all the profits from syndication.

Thus, both the "moral hazard" and the "network market power in syndication" stories predict that producers will be dissatisfied with the way their syndication rights are treated by the network if the network has no financial interest in those syndication rights. The implication of the moral hazard explanation, however, is that the producers should respond by wanting to sell their syndication rights to the networks, an implication clearly contradicted by the evidence. If the true fundamental cause of that dissatisfaction is network market power in the syndication market, however, producers would be even worse off if the networks were allowed to purchase their syndication rights. It would thus appear that significant producer dissatisfaction with the networks' treatment of their syndication rights should be taken as evidence of network market power in the syndication market rather than of a moral hazard problem.

APPENDIX D

ISSUES RAISED BY THE NETWORKS' ECONOMISTS

I. Introduction

In his submission accompanying the Joint Comments of Capital Cities/ABC, Inc., CBS Inc., and National Broadcasting Company, Inc., Dr. Robert Crandall concludes that the Financial Interest and Syndication Rule (FISR) has disturbed an efficient risk-sharing relationship between over-the-air commercial networks and program producers.¹ His conclusion is based on two types of data which he believes support the hypothesis that post-FISR (that is after the imposition of the FISR and because of the FISR), the networks have aired less risky programs: (1) changes in the "riskiness" of prime time programming and (2) changes in the concentration of network program supply.

For reasons that are not clear, Dr. Crandall did not subject the data that he used to any statistical analysis. Hence, the apparent differences that Dr. Crandall cites between the pre- and post-rule periods may not represent meaningful statistical differences. Absent statistical analysis of the data, little weight should be given to Dr. Crandall's conclusions.

¹ Robert Crandall, "The Economic Case Against the FCC's Television Network Financial Interest and Syndication Rules", prepared for submission with Joint Comments of Capital Cities/ABC, Inc., CBS Inc., and National Broadcasting Company, Inc. In the Matter of Evaluation of the Syndication and Financial Interest Rules, Federal Communications Commission MM Docket No. 90-162 (June 14, 1990) (hereafter, "Crandall Submission"). Most of the arguments offered by Dr. Crandall in support of the FISR's repeal are echoed by Dr. Lawrence Summers, "The Economic Consequences of the Financial Interest and Syndication Rules Governing the Television Networks," prepared for submission with Joint Comments of Capital Cities/ABC, Inc., CBS Inc., and National Broadcasting Company, Inc. In the Matter of Evaluation of the Syndication and Financial Interest Rules, Federal Communications Commission MM Docket No. 90-162 (June 14, 1990).

In this paper, Dr. Crandall's data interpretations are reconsidered by subjecting them to standard statistical tests. None of the three measures of program risk relied upon by Dr. Crandall and none of the three additional measures used in the analysis in an Appendix accompanying Dr. Crandall's submission supports his conclusion that networks aired less risky programs following the imposition of the FISR. In order to be more certain that Dr. Crandall's submission simply did not focus only on the "right" risk measures which (if analyzed) would have supported his hypothesis, this paper constructs four additional measures of program risk. Only one of these four additional measures behaves in a way consistent with his predictions.

In addition, the behavior of Dr. Crandall's data on concentration in network program supply is statistically inconsistent with the efficiency-impairment hypothesis. Thus, this paper concludes that the data offered by Dr. Crandall do not support his claims that the FISR has created a less efficient program production industry. Indeed, in some instances, the statistical analysis directly contradicts Dr. Crandall's claims.

II. A Reassessment of Dr. Crandall's Program Performance Measures

A. Dr. Crandall's Analysis

Repeating the analysis of the Network Inquiry Special Staff², Dr. Crandall argues that the unique information held by the networks regarding programs to be aired, combined with their large portfolio of programs, render the networks the most efficient bearers of the risk associated with program investment. If this were the case, Dr. Crandall predicts that prohibiting

² Network Inquiry Special Staff, New Television Networks: Entry, Jurisdiction, Ownership, and Regulation, Volume II (Federal Communications Commission, 1980). pp. 612-622, 744-754.

the network acquisition of these rights has disturbed an efficient risk-sharing arrangement between networks and the producers. He infers that as a consequence of this disruption, FISR has "increased the cost of bearing the risk of program development... [T]his increased cost of risk bearing has reduced the willingness or ability of suppliers to offer novel, risky new series at any given price. Thus, the riskiness of new network programs declined after the early 1970's when [FISR] went into effect."³

In support of this conclusion, Dr. Crandall examines the behavior of alternative (but presumably highly correlated) measures of the dispersion of program performance as proxies for program risk: (1) the variance in the ratings of all prime time series and (2) the variance of the remaining length of run of all prime time series.⁴ Dr. Crandall interprets the risk-bearing hypothesis as predicting that the variance in both the ratings and in the length of run for all prime time programs will fall as networks tend to pick

³ Crandall Submission, p. 30. There are at least three reasons for expecting that the inefficiencies described by Dr. Crandall are in fact trivial and therefore finding an effect would be surprising. First, most if not all of the risk-sharing efficiencies attributable to the number of programs in a portfolio may be attained by multi-program providers or by joint ventures among programmers (See ICF, Inc., "Paper 2: The Economic Effects of the Repeal of the Rule on Advertisers and Independent Stations," Analysis of the Impacts of Repeal of the Financial Interest and Syndication Rule, 1983, pp.6-19 through 6-21). Second, to the extent that the risk-sharing efficiencies result from information only the networks possess, then the networks can restore the "lost" efficiencies by simply making that information available to program suppliers and investors (For a more extensive discussion, see F. R. Warren Boulton, "Economic Analysis and Policy Implications of the Financial Interest and Syndication Rule," Submitted on Behalf of the Coalition to Preserve the Financial Interest and Syndication Rule In the Matter of Evaluation of the Syndication and Financial Interest Rule, FCC MM Docket No. 90-162, June 14, 1990, pp. 33-37). Finally, if in fact the rule has created a noticeably less efficient program production industry, then one would predict that the program producers would be petitioning the FCC to repeal the rule. Of course, the producers--large and small--are vociferously opposed to repeal.

⁴ Crandall Submission, pp. 31-32

more "tried and true" programs. Thus, each of the networks in the post-FISR period (according to this view) will find it more expensive (because of the greater risk) to air programs having a high probability of early failure but also a small probability of a very long run. As already noted, Dr. Crandall then contends that the data reveal a significant decline post-FISR in these measures of program risk by comparing the values of these measures between 1963 and 1972 with those between 1973 and 1983.

Because these are absolute measures of performance dispersion, they may be affected by shifts in the entire distribution of program performance. For example, with the growth of cable and VCR's, average network viewership has fallen and that fall in turn may have resulted in lower average program ratings. The variance of program ratings may also have fallen as a consequence. So it is possible that there has been no change in dispersion relative to the average. To assess this possibility, Dr. Crandall calculates a relative dispersion measure (the coefficient of variation⁵) for the ratings measure and concludes that the results are similar to those involving the absolute measure of ratings dispersion.

An Appendix prepared by Economists, Inc., which accompanies Dr. Crandall's submission asserts (without any supporting statistical analysis) that the rule also has (under the efficiency impairment hypothesis) the effect of reducing the average length of run of new series, the percent of series whose run length exceeds two years, and the variance of the length of run for new series;⁶ however, this Appendix fails to provide any analysis to support

⁵ The coefficient of variation for any variable is calculated as the standard deviation of the variable divided by its mean. See the Crandall Submission, note 71, p.32.

⁶ Crandall Submission, Appendix D.

a conclusion that such changes would be predicted outcomes of the efficiency impairment hypothesis.⁷ Without the use of any conventional statistical testing, the Economists, Inc., Appendix simply asserts that this "prediction" is confirmed by observing differences between the 1963-72 behavior of these measures and their 1973-83 behavior.

B. Statistical Analysis of Dr. Crandall's Data

Even if one were to hypothesize, as does Dr. Crandall, that there was a single shift in the risk characteristics of programs aired by the networks, Dr. Crandall's submission simply assumes both that a change in risk "regimes" occurred and that it occurred in 1973 (by which time the full rule - the financial interest and the syndication portions - became effective). Those assumptions can be tested directly by conventional statistical methods, thus permitting the policymaker to decide how much confidence can be placed in conclusions that (for example) there were significant differences in program performance measures which can be attributed to some event. In this section, we conduct that analysis.

Assuming for purposes of this section that there is a single shift in the risk regimes that is accurately captured by the behavior of the riskiness measures Dr. Crandall uses, this paper employs statistical techniques to

⁷ It is not at all apparent that the average length of run of new series (or the percent of new series which will run for two years or more) would be reduced by the imposition of the FISR. For example, if the FISR did increase the relative cost of risky programs, then the networks might instead rely on proven program types rather than novel (risky) types which may turn out to be far more popular than average or far less popular than average. If so, the average new series run (and the percent of new programs lasting more than two years) for both program types might be the same, but the proven type will tend to have fewer early cancellations (say, during the first season) and fewer very long-running programs (say, at least 5 years).

determine the "best" first year for the new risk regime.⁸ If the change in regimes is apparent at a time "reasonably close" to the imposition of the FISR, then this paper statistically compares the "before" and "after" relationship to determine whether the differences are consistent with the predictions in the Dr. Crandall's submission.

The "reasonably close" criterion is required because Dr. Crandall did not control for the many events other than FISR occurring during this period that could also have affected the measures of program risk. Put differently, one could confidently conclude that differences between the behavior of the program performance measures between 1963-72 and 1973-83 are attributable to the imposition of the FISR only if any intervening events have had only a small or offsetting effect on the risk measures. However, Dr. Crandall offers no reason to presume that the effects of the non-FISR events can be safely ignored. In light of these intervening events, any claim that a regime switch is due to the FISR has somewhat more credibility the closer is the

⁸ Clearly, contrary to Dr. Crandall's implicit assumption and that made explicitly here, there may be more than two risk regimes during the time period analyzed by him. Thus the finding that the best year for the beginning of the second regime fails to correspond (for example) to the date of the FISR implementation does not preclude the possibility that another risk regime began around the time of the FISR implementation. But the presence of more than the two regimes assumed by Dr. Crandall (a no-FISR regime and a FISR regime) and no additional data would reduce even further the already low level of confidence with which one held the conclusion that the shift in risk regimes around the date of FISR implementation can be ascribed to the FISR. After all, if additional non-FISR risk regimes emerged because of other events, other events unrelated to FISR could also have generated the "post-FISR" regime. Developing a sufficiently refined data base to control for other non-FISR related changes that may have caused regime shifts appears to be a Herculean task and we do not fault Dr. Crandall for failing to develop that data base. But we do fault Dr. Crandall for not at least testing statistically (as we do here) for whether there exists even a single "best" year for a new risk regime and whether that new risk regime is at least time-coincident with the period during which the rule's effects would become detectable.

regime switch to the implementation of the FISR.⁹

In terms of defining "reasonably close" more concretely, it may be useful to distinguish risk measures based on the performance of all aired programs from those based on the performance of new programs. The FISR barred the networks from taking an off-network financial interest in any network program after August, 1972¹⁰ and required the networks to divest their off-network distribution rights by June, 1973. Because the transformation of a series idea into a series takes about two years¹¹, the presumed effects of

⁹ Among the changes in the video landscape, color television was transformed from a luxury to an everyday item; the nature of cable television was radically transformed and subscriber growth exploded; the number of independent television stations grew dramatically; the average age of the population was increasing; and vcr's started becoming nearly as commonplace as television sets. Among the regulatory changes, the FCC adopted the Prime Time Access Rule in addition to the FISR; it adopted and then repealed the limits on cable's importation of distant signals; and it adopted the Must-Carry Rule while Congress passed the All-Channel Receiver Act, both of which tended to reduce the UHF handicap. It would not be difficult to posit that many if not all of these factors could have affected the riskiness of program production before and after the FISR adoption.

For example, the anticipated and realized growth of color television ownership during the period referred to by Dr. Crandall as "pre-FISR" likely resulted in changes in program production to take advantage of this new dimension in viewing (for example, more exterior scenes and alternative plot lines). As program suppliers first began adapting to color television, there may have been some huge program failures as well as spectacular successes, resulting in apparently high risk measures. As time passed and suppliers became more experienced evaluating what was likely to be successful with the new medium, the variability of program performance would likely be reduced. As a result, the rise in the ownership of color television could generate the same kind of prediction regarding the behavior of program risk measures as that posited by Dr. Crandall and which he would (erroneously) attribute to the FISR. Here, the "post-FISR" regime is in fact the "post-color television" regime. Thus, even if a regime change is "reasonably close" to the date of the FISR imposition, other events could be generating the "post-FISR" regime.

¹⁰ Thus, until August of 1972, the networks could acquire a financial interest in any program aired or under development.

¹¹ Robert Crandall, "FCC Regulation, Monopsony, and Network Television Program Costs," Bell Journal of Economics (1972), p. 493.

the FISR on the performance of new programs would probably have been apparent by 1974 or 1975.

The presumed effect of the rule on risk measures based on the performance of all programs (old and new) might only be apparent with a longer lag. Because the networks have far more information on the performance of programs already aired than on new untried programs, decisions about the former group of programs are likely to be perceived as far less risky than comparable kinds of decisions for untried programs. Thus, the impact of the rule on the performance characteristics of programs that were already being exhibited at the time the rule became effective would likely be far smaller than the rule's impact on new programs (assuming that the FISR raised the cost of risk-bearing). Only as new programs replace these preexisting programs will the effect become more noticeable. Thus, the presumed effect of FISR on risk measures based on the performance of all series (including both programs affected by FISR and those not) is likely to be apparent only after the new series begin replacing those existing at the time the rule became effective. Although the presumed effect on risk measures based on all programs could be detectable as the networks begin airing the first post-FISR series, a reasonable expectation for the first year in which the effects of the FISR should be detectable is 1976 or 1977.¹²

¹² We should note that in fact the effect on the performance measures based on all series might only be apparent sometime after 1977. In addition to responding to the FISR by airing less risky new programs, the networks may also have responded to the hypothesized rule-induced increased cost of risk by postponing cancellation of programs on the air at the time the rule became effective. If so, then the effect of the rule on risk measures based on all programs may not be apparent even as late as 1977. We simply do not know whether this effect exists or how important this effect might be. To extend the "reasonable range" beyond 1977--four years after the rule became fully effective--runs a serious risk of ascribing changes in the risk measures to FISR when in fact other events could also have triggered the change. In any

Thus, even if the FISR did create incentives for networks to air less risky programs, that effect on risk measures based on new series and those based on all programs would probably not be apparent until two or three years after the date (1973) assumed by Dr. Crandall to be the first year of the post-FISR regime. In this regard, our tests (described below) are more likely to support the hypothesis of a switch than is a test based on positing 1973 as the first year of the new regime. If in fact (as seems likely) any FISR-induced regime change would not be apparent until sometime after 1973, assuming instead that the regime change occurs in 1973 will include as post-FISR observations some that should have been considered pre-FISR (in terms of being able to observe the effects of FISR). By misclassifying these observations, the statistical test will be biased towards rejecting the hypothesis of a switch.

Against that background, there are two statistical questions that must be answered affirmatively if a statistically meaningful regime change is to be regarded as evidence supporting the efficiency impairment hypothesis.

--Is the first year of the new regime within our "reasonable" range (1974 or 1975 for new series and 1976 or 1977 for all series)?

--If so, is the behavior of the risk measures in the two regimes

event, there are two reasons to believe that this presumed rule-induced effect--even if it exists--is unimportant. First, for measures based on new series as well as those based on all series, we fail to find statistical support for Dr. Crandall's claims, as detailed below. Second, for new series aired at about the time of or prior to the rule's imposition, we would have expected (if the rule-induced effect of postponing cancellation were important) to observe an increase in the average run length. As discussed below, this does not seem to have occurred.

consistent with the efficiency impairment hypothesis¹³?

Observing a statistically significant regime change around 1974 or 1975 for new series and 1976 or 1977 for all series would be (as a threshold matter) consistent with Dr. Crandall's conclusions. Observing a statistically significant regime change outside of that range should not be accepted as evidence consistent with Dr. Crandall's conclusions. This is certainly true if the shift in risk regimes occurs before the rule is effective. In addition, if the supposed post-FISR regime shift does not occur until (say) 1978 or 1979, such a shift could not be attributed to FISR unless the analysis carefully controlled for the effects of those other events.

Even if the first year of the new regime falls within the reasonable range, a comparison of the before and after behavior of the risk measures would still be required to ultimately confirm Dr. Crandall's conclusions. That is, the statistical analysis might detect a change in regimes but one that signals (in Dr. Crandall's terms) higher rather than lower program risk in the "post-FISR" regime, which would be inconsistent with Dr. Crandall's hypothesis.

For those statistically significant regime changes that fall within our reasonable range, we engage in the following kind of inquiry: Do the values of the risk measures in the post-FISR regime consistently indicate lower risk than those that would have been realized had the FISR not been imposed? In effect, the way we answer this question is by using the pre-FISR relationship

¹³ In principle, there is a third question as well: Does the first year of a new regime for measures based on new series occur prior to that for measures based on all series? As a practical matter, we need never ask this question because all of the measures but one fail one of the two test described.

to predict what the values in the post-FISR regime would have been if there had been no regime switch. Only if the pre-FISR relationship consistently predicts greater riskiness than actually observed in the post-FISR period should that regime switch be regarded as consistent with the efficiency impairment hypothesis.¹⁴

Statistical techniques were employed that selected the "best" first year for a new risk regime for each of the performance measures used by Dr. Crandall (the variance of the remaining length of run for all series, the variance of the ratings for all series, and the coefficient of variation for the all-series ratings); and for the performance measures used in the Economists, Inc., Appendix (the variance of the remaining length of run of new series, the average length of run for new series, and the percent of new series whose length of run will be at least two years).¹⁵

¹⁴ For an explanation of this consistency test, see the next note.

¹⁵ Using switching regression techniques, the performance measures were "fitted" to an equation consisting of a constant term and a time trend using ordinary least squares. For any particular year, there were two regressions: a regression spanning the beginning of the period through the assumed year marking the end of the first risk regime and a regression spanning the remainder of the period. The performance of each pair of regressions was then compared to all the other pairs to determine which best explained the actual values of the performance measures, i.e., the statistical analysis selected that pair of regressions and therefore the switch point in such a way that the predicted values of the risk measures match the actual values as closely as possible. Finally, the predictive power of that "best" pair of regressions was then statistically compared to a single regression spanning the entire time period (thus estimated on the assumption that no regime change occurred) to determine whether a "split regime" analysis explains the variation in the performance measures better than a single regime. For a discussion of this technique, see Richard E. Quandt, "The Estimation of a Linear Regression System Obeying Two Separate Regimes", Journal of the American Statistical Association (1958), pp. 873-880; J.J. Johnston, Econometric Methods (1984), pp.407-409; George C. Judge, R. Carter Hill, William E. Griffiths, Helmut Lutkepohl, and Tsoung-Chao Lee, Introduction to the Theory and Practice of Econometrics (1988), pp. 431-433; Thomas B. Fomby, R. Carter Hill, and Stanley R. Johnson, Advanced Econometric Methods (1984), p. 313.

For those regime changes that occur in the "reasonable range," the

The data provided in Dr. Crandall's submission also lend themselves to the construction of additional measures of program risk. In order to be more certain that Dr. Crandall's submission did not simply fail to examine the "right" risk measures which (if analyzed) would have supported his hypothesis, we apply the statistical technique to four additional program performance measures not used in the submission. For reasons similar to those offered by Dr. Crandall with regard to the ratings measure, we also measure the relative amount of risk as the coefficient of variation of the remaining length of run for all series and the coefficient of variation of the length of run for new series.

In addition, if the hypothesis of the effects of the rule on reducing program risk were accurate, the network would avoid airing programs that may have an unusually high likelihood of failure but also may turn out to be unusually popular. Thus, both the probability of a series being canceled very early and the probability of having an extended run will tend to fall, given Dr. Crandall's hypothesis. We noted earlier that two measures used in the Economists, Inc., Appendix (the average length of run of new series and the percent of new series running for at least two years) are unlikely to capture these effects. To correct for this, we use two substitute measures: the

behavior of those risk measures must still be assessed to determine whether that behavior is consistent with a reduction in program risk in the second regime. The most obvious way of conducting this consistency test is to determine whether the differences in the intercepts and the slopes in the two regimes both change in a direction consistent with the lower risk in the later regime. To do this, we calculate ordinary t-statistics to test for significant differences in the coefficients (assuming a zero covariance between the parameters). If one change is consistent and the other change is inconsistent with lower risk in the later regime, we then examine the difference between the realized post-FISR values and those predicted by the pre-FISR regime to determine whether and when the differences become consistent with claims of lower program risk following the imposition of the FISR.