

Critique of “Consumer Substitution Among the Media”

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1. Introduction

In a paper titled “Consumer Substitution Among the Media,” Professor Joel Waldfogel has used two bodies of data to study patterns of media usage by consumers¹. This study is of interest because of its possible bearing on the continued FCC regulation of cross ownership of daily newspapers and broadcast stations.

Professor Waldfogel uses correlation and regression techniques to study patterns of media supply and usage. When he finds measures from two media co-varying negatively, he describes the media involved as “substitutes” for one another. Although he lays less emphasis on it, he recognizes positive covariance between two media as “complementary.” His findings of interest here are that overall uses of broadcast television and daily newspapers have a complementary relationship but a significant substitute relationship when comparing just broadcast TV news usage to daily newspaper usage.²

Professor Waldfogel asserts that these results are “...important because FCC media ownership policies are predicated to varying degrees on the extent of substitutability of media for various purposes – news, entertainment, etc.”³ The unspoken implication of his results is, that since broadcast television and daily newspapers are “substitutes” in news reporting, the FCC should retain the cross-ownership rule.

The empirical work in Professor Waldfogel’s paper has such flaws that the quantitative results do not provide a meaningful basis for governmental review of a regulation. Moreover, even if the empirical work had been flawless, the structure of that work would not reveal underlying measures of substitution, complementarity, or any other useful information to evaluate the economic merit of a regulation. Consequently, the study does not inform the FCC’s evaluation of the newspaper cross-ownership rule and, if taken seriously, could even mislead that evaluation.

¹ “Consumer Substitution Among Media” by Joel Waldfogel, Federal Communications Commission Media Ownership Working Group 2002-3, September 2002, 81 pages. Waldfogel is a member of the Wharton School faculty at the University of Pennsylvania.

² Interestingly, Professor Waldfogel found the “clearest” relationship “between Internet and broadcast TV, both overall and for news.” Waldfogel, page 3.

³ Waldfogel, page 2.

2. Substitutes and Complements

Before looking at Professor Waldfogel's empirical studies, we need to have some definitions and economic principles clearly in mind.

The concepts of "substitutability" and "complementarity" are well defined in economic theory. Two goods are said to be substitutes in demand if, in free market conditions, an increase in the price of one causes demand for the other to increase⁴. They are complements in demand if an increase in the price of one causes demand for the other one to decrease.

The economic concept of *substitutability* is important in studying market competition. If the product of a firm has many close substitutes, then one can be sure that, in free market conditions, the firm will not be able to extract significant monopoly rent by manipulating price. The concept is important in the study of merger activity, for instance, because of the risk that letting two firms producing close substitutes merge will sufficiently isolate them from the producers of other substitute products that they can gain significant monopoly rent by manipulating price.

Notice that the use of substitutability in the study of competition necessarily involves an action and a reaction. The action consists of a price increase by one (or a group of) firm(s). The reaction consists of the direct effect of that action on demand for a single firm's product. If that reaction is positive then the products are substitutes and the firms are said to be competitive with the degree of competition being measured by size of the reaction⁵.

Professor Waldfogel's use of the word "substitute" has almost nothing to do with well-established economic concept of substitution. Price never plays a role in his analysis.⁶ Consequently, the usual inferences about market structure and regulation that can be made from economic measures of substitution cannot be drawn from Professor Waldfogel's concept.

Professor Waldfogel recognizes, however, that the availability or characteristics of other products might affect demand for a particular product. In a world of mutable products, the classical concept of substitutability can be expanded. For instance, if important qualities of

⁴ On pages 7-8, Waldfogel makes what I presume is a typographical error when he states that "each consumer's demand for each of ten products depends (negatively) on the price of the own product and, if the products are substitutes, negatively (*sic*) on the other products' prices." The latter reference presumably should be *positively*.

⁵ This concept lies at the heart of the test applied by the Department of Justice Antitrust Division in evaluating the consequences for competition of proposed mergers.

⁶ Of the media reviewed by Waldfogel, only broadcast television and radio do not charge a subscription fee. Although not easily collected, information on both local prices and national price indices for other media—cable, satellite, internet access, magazines, and newspapers—would have been available.

product B are significantly improved and if that improvement results in a reduction in demand for product A, then it is reasonable to call product B a substitute for product A in the eyes of consumers. If there is a substantial response, the products can be said to be close substitutes and, therefore, closely competitive with one another. Thus, two daily newspapers can be quite distinguishable from one another in character and yet be close competitive substitutes for one other in this sense (as well as in other ways).

Notice the sign reversal that has taken place; the substitution effect in price is positive (competitor's price rise means greater demand for own product) while it is negative in quality interaction (competitor's product quality improvement means less demand for own product).

The competition for readers, viewers, and listeners among media outlets is almost entirely carried out in terms of product characteristics, product quality, and image building. Each media outlet is striving to attract an audience that it can sell profitably to its advertisers; it actively shapes the reading, viewing, or listening package it offers consumers in order to attract its desired audience. Since no two media products are ever identical, this is inter-product competition that is carried out largely at the level of the individual producer rather than at the level of media industries. In local markets, the competition frequently crosses media boundaries.

Sorting out Professor Waldfogel's theoretical underpinnings makes clear that there are two essential elements to the concept of substitutability that he is using. There must be both an action and a reaction to establish the presence of substitutability or complementarity. The action is change in the availability or characteristics of alternative products. The reaction is a change in demand for the product in question.

3. Results Using the Time-Series Data

The first body of data that Professor Waldfogel uses consists of combined cross-section and time-series data from several published sources. It includes data on media usage by consumers, numbers of media, and demographic information in the 140 (out of a total of 210) U.S. DMAs for which MSAs and Arbitron metro areas can be linked to the DMAs. Annual data for various time periods from 1993 to 2000 are used, depending on the availability of information. Media include television, daily newspapers, weekly newspapers, radio, internet, and cable TV.

This body of data has some advantages for the purposes Professor Waldfogel has in mind since it is both cross-section (multiple DMAs) and time-series (multiple years). It is not unreasonable to suppose that at least some autonomous change in media availability over time

might occur. This change in media availability and its effects on the usage of other media has the potential of producing the kinds of empirical results that Professor Waldfogel is seeking. Thus there is the possibility of carrying out the necessary statistical experiment without the need to create a full-blown structural model.⁷

Professor Waldfogel pursues this line of inquiry in Part I of his paper but without any significant results to show for the effort.⁸ In the end, the most optimistic statement he can make is that "we conclude our analysis of the aggregate data with the observation that there is some evidence of consumer substitution across the media."⁹ From this part of the study, he reports no results whatsoever regarding the specific relationship between daily newspapers and broadcast television. For these two media, there is no report of measures based on his concept of "substitution," much less the actual economic definition of substitution. Thus, this part of the study cannot inform the FCC's evaluation of the newspaper cross-ownership rule.

4. Results Using the Cross-Section Data

The second body of data is drawn from Scarborough Research and consists of survey responses from nearly 180,000 individuals taken in the later half of 1999 and first half of 2000. The respondents reported on their usage of newspaper, television, cable and satellite, radio, and internet media with a fair amount of detail. Demographic data on the respondents were also available.

This data set permitted a fairly elaborate mapping of consumer preferences among the media, and that is what Part II of the Waldfogel paper is really all about.¹⁰ For instance, we learn in Table 12, page 74, that respondents who watch more TV are very significantly more likely to subscribe to a daily newspaper (column 1) and that respondents who subscribe to a daily newspaper are very significantly more likely to watch more TV per week (column 4). Very similar results are shown in Table 13, page 75, where it is shown that respondents who read newspapers are likely to watch more TV news, and that viewers of TV news are more likely to subscribe to a daily newspaper.

Although Professor Waldfogel never comes out and says so, one is tempted to say that the results described in the last paragraph demonstrate that daily newspapers and broadcast TV

⁷ Professor Waldfogel misinterprets one of his data series such that, even if his empirical work were flawless, the interpretation of the results would be incorrect. He incorrectly interprets "households using television" as an overall measure of television viewing, excluding cable. (Waldfogel, p. 14) The variable, however, captures viewing of broadcast, cable, satellite, and videotaped programming.

⁸ Waldfogel, pages 10-24 and tables on pages 46-61.

⁹ Waldfogel, page 24.

¹⁰ Waldfogel, pages 25-37 and tables on pages 63-79.

are complementary, rather than substitutable, products. While the statement may or may not be true, it is not proved by these empirical results for the simple reason that no experiment has been carried out here. There are no cause and effect. There is just a simple apparent truth — people who like to read newspapers tend to watch TV and, especially, TV news, and vice versa. The only way that either complementarity or substitutability could be established is if there were a change in the availability and/or quality of one product that had a resulting effect on usage of the other. Since this data set is a single cross-section and in the absence of a full-blown structural model, it simply does not permit that kind of experiment. Professor Waldfogel recognizes this shortcoming when he says “One cannot draw firm inferences about substitutability from these data directly without additional assumptions.”¹¹

I have belabored this point using an example (two paragraphs above) that one might think is favorable to dropping the daily newspaper – broadcast TV cross-ownership rule in order to make a very simple and important point that applies to all of the results obtained using this second body of data. The data simply do not permit any inference of substitutability or complementarity among media products. Rather, the results merely depict consumer preferences among media, no more and no less.

Professor Waldfogel goes on to find what he believes is strong evidence that broadcast TV news and daily newspapers are substitutes. His Table 14 on page 76 studies what he calls the “news-entertainment gap.” You can best understand what he means by the “news-entertainment gap” by referring to Table 8 on page 71. There he reports that respondents in this data set averaged 35.47 half hours of TV viewing per week, of which 5.31 half hours were devoted to news. From this information he constructs what he calls a “news-entertainment gap” for broadcast television. For each respondent, he subtracts the half hours of “entertainment” viewing (total viewing minus news viewing) from the half hours of TV news reported by that respondent. Thus, by this calculation, the average news-entertainment gap for television for all respondents is $5.31 - (35.47 - 5.31) = -24.85$, a negative number.

Using similar logic and again referring to Table 8 on page 71, Professor Waldfogel constructs news-information gaps for radio ($0.28 - (2.32 - 0.28) = -1.76$), for internet ($0.64 - (3.97 - 0.64) = -2.39$), and for cable ($0.82 - (8.40 - 0.82) = -6.76$). He does not display these calculations and you need to read his paper closely to realize that this is how these variables are defined and what they look like. Note that the constructed variables are all negative at their average values for the sample.

¹¹ Waldfogel, page 32.

What difference does it make? I will examine only the interaction of the TV news-entertainment gap and daily newspaper usage; similar remarks apply to each of the other news-entertainment gaps, but the conclusion is so strong that it does not need to be repeated.

Returning to the TV-newspaper example, what Professor Waldfogel has constructed is pretty much just a negatively valued mirror of his TV half hours per week variable. He has taken what will generally be a fairly large number (half hours of TV entertainment per week) and subtracted it from a relatively small number (half hours of TV news per week). That’s enough to ensure that the constructed variable will almost always take on a negative value in any given response. Further, variation in the entertainment component of the calculated variable is likely always to be larger in absolute value than variation in the news component.

The result is that the constructed variable will be nothing neither more nor less than a slightly distorted, negatively valued, mirror image of the total half hours of TV viewing per week variable. The variation in the value of this variable among respondents that drives the statistical estimation of the parameters in Table 14 will be generated primarily by changes in the non-news TV viewing half hours per week.

Now look at columns 1 and 4 in each of Tables 12, 13, and 14 on pages 74-76. As noted previously, Tables 12 and 13 show a positive interaction between broadcast television viewing and daily newspaper reading, suggestive of possible complementarity between these media products. Table 14 shows what appears to be a completely different result; there is now a highly significant negative interaction between broadcast television viewing and newspaper reading. But that result is an illusion generated by the fact that the TV: News – Ent gap variable used in this equation is essentially nothing but the negative of the half hours of TV viewing per week used in Table 12!

Previously, we established the fact that Professor Waldfogel’s conclusion that newspapers serve as substitutes for TV news¹² is based on an incomplete experiment that makes the inference of substitutability unjustified. Now it is clear that it is also based on the seriously flawed and quite meaningless empirical results reported in Table 14. Table 11 on page 73 reports similarly flawed correlation results. Thus, this part of the study cannot inform the FCC’s evaluation of the newspaper cross-ownership rule. Indeed, there is a significant risk that this faulty result could misinform the FCC’s evaluation.

¹² Waldfogel, page 34.

5. Professor Waldfogel's Conclusions

In concluding his study, Professor Waldfogel reports on some patterns of media usage by minority groups and cites this as additional evidence of substitution among media. While quite interesting and even suggestive in its own right, these results can not accomplish any more than that — since they result from a single cross-section data set, they cannot carry the burden of cause and effect needed to establish substitutability among media in the absence of a full-blown structural model.

Professor Waldfogel finishes by summarizing his results in a large matrix displayed in Table 18 on pages 80-81 and explained on pages 37-39. His claim that his results demonstrate clear evidence of substitutability between TV news and daily newspapers¹³ is supported only by baseless inference from the flawed empirical results described at the end of the last section and reported in Tables 11 and 14. This matrix does not provide any meaningful information for the FCC's review of the newspaper cross-ownership rule.

6. Does It Matter?

It struck me, as I studied Professor Waldfogel's results, that even if they were all true and accepted, they do not provide a reason for retaining the broadcast TV – daily newspaper cross-ownership rule. They do not address the right questions.

Cross-ownership ought to be allowed if there is evidence that sufficiently many close substitutes are available in competitive market places to ensure that attempts to extract monopoly rents or to restrict the free flow of ideas will fail.

Professor Waldfogel's large data set in Section I (reported in Tables 1-7, pages 46-53) provided a good bit of information about the number of competitive media there are in most markets and his general conclusion that consumer substitution across the media is a pervasive phenomenon are somewhat helpful in this regard even though they do not appear to have been constructed with this objective in mind.

In the 1960s, when the initiatives that ultimately led to the cross-ownership rule began, it may well have been true that there was inadequate competition in many markets to prevent abuse due to media cross-ownership. In those days, there were only three networks, no CATV, no satellite TV, no internet, and FM radio broadcast was still fairly young. There were seldom more than four viable broadcast TV outlets in markets below the top 20 DMAs, and many small and medium sized markets were served by only one or two broadcasters. One of the key policy

¹³ Waldfogel, page 39

questions in those days was: How can we get enough cities with four viable broadcasters so that an additional network can survive?

It was also true that, by the 1960s direct daily newspaper competition had largely disappeared from all but the largest twenty or so U.S. cities. As a result, many communities had a limited number of competitive media outlets.

Another factor was that the technologies of information gathering and management used at that time had little in common between broadcast and print media. This limited the benefits that might be obtained through the closer cooperation that cross ownership might make possible.¹⁴

Changes since then have been dramatic. Technology and the introduction of mandatory carriage on CATV have made UHF fully competitive with VHF, the number of viable broadcast outlets both nationally and in most communities has more than doubled, and there are now at least six significant broadcast networks. Cable and satellite TV have also created vast opportunities for programming and for specialized networks of many kinds, including a number of news networks. The internet has added a very real dimension of media information and entertainment.

Dramatic changes in technologies have reduced the advantages of large central city dailies relative to their smaller nearby competitors fostering a new level of competition among daily newspapers. Those technologies have also made the entry and growth of weekly newspapers possible, something that Professor Waldfogel reports in Table 6, page 52. Those same technologies and changes in postal regulations made direct mail advertising a much more serious competitor for all newspapers. Technology has also made remote publishing economically possible so that one can now get daily home delivery in most urban areas of at least two national dailies.

Another consequence of changing technology is that what used to be a problematic matching of news collection and dissemination methodologies between broadcast and print enterprises is no longer a significant problem. There are many examples of success and the benefits of combined electronic and print journalism are especially evident in reporting the war for Iraq.

What all of this means is that repealing the cross-ownership rule cannot help but be successful. There is ample competition from close substitutes to ensure that monopolization does

¹⁴ This author, with two colleagues, submitted a position paper that reflected the views of these paragraphs in Docket 18110. The paper was titled "Economic Issues in the Joint Ownership of Newspaper and Television Media" by James N. Rosse, Bruce M. Owen, and David L. Grey, May 1970.

not take place in either the marketplace of ideas or in the related economic markets, so there is no downside risk. However, there is a possible upside benefit in that it may well be true that there are gains in product quality and production efficiency to be found by entrepreneurs willing to take the chance.

7. Summary and Conclusion

In the presence of these facts and this history, it seems to me that the research reported by Professor Waldfogel simply misses the point and that, even if it were flawless, it would be irrelevant to the issue at hand. None of the empirical work in the paper informs the FCC's decision in the review of media ownership rules, some of it could actually misinform that decision, and certainly none of the results provides any support for continuation of the newspaper cross-ownership rule.

Statement of Jerry A. Hausman

1. My name is Jerry A. Hausman. I am MacDonald Professor of Economics at the Massachusetts Institute of Technology in Cambridge, Massachusetts, 02139.
2. I received an A.B. degree from Brown University and a B.Phil. and D.Phil. (Ph.D.) in Economics from Oxford University where I was a Marshall Scholar. My academic and research specialties are econometrics, the use of statistical models and techniques on economic data, and microeconomics, the study of consumer behavior and the behavior of firms. I teach a course in "Competition in Telecommunications" to graduate students in economics and business at MIT each year. Competition among broadcast TV, cable networks, direct to home satellite (DTH) providers, newspapers, and radio is one of the primary topics covered in the course. In December 1985, I received the John Bates Clark Award of the American Economic Association for the most "significant contributions to economics" by an economist under forty years of age. I have received numerous other academic and economic society awards. My curriculum vitae is attached as Exhibit 1.
3. I have done significant amounts of research in the telecommunications industry. I have published numerous papers in academic journals and books about telecommunications. I have also done research and published academic papers regarding advertising on broadcast TV, cable TV, and radio.
4. I have previously submitted Declarations to the Commission regarding the competitive impacts of policies affecting DTH, DBS, cable TV, and broadcast TV service offerings. I have also submitted Declarations regarding competition between cable TV and DTH and broadcast TV. I have previously made presentations to the Department of

Justice regarding competition in TV, cable TV, and radio. I have also served as a consultant to the Tribune Corporation over the past decade. Tribune owns broadcast TV stations, radio stations, and newspapers. I have also consulted for a variety of companies that sell consumer goods and do large amounts of advertising, *e.g.*, Budweiser, Kodak, and Revlon.

5. In March 2002, I submitted a Declaration to the Commission that included two empirical studies of the effects of consolidation in the radio industry that has occurred since the passage of the Telecommunications Act of 1996. In the first study I found that consolidation did not lead to higher prices for radio advertising, while in the second study I found that consolidation has resulted in increases in format diversity. In January 2003, I submitted a Statement to the Commission that extended the previous research in two ways. First, I collected data on actual rates charged by radio stations in additional markets that have experienced significant increases in concentration, and I performed additional econometric analyses of the effect of these increases in concentration on advertising prices. Second, I collected data on cable television advertising prices to study whether cable advertising provides a competitive substitute for radio advertising. The results from the first part of my further study confirmed that, across all size markets, consolidation has not led to higher radio advertising prices, even where the top two firms control more than eighty percent of the revenue. The results of the second part of my further study show a statistically significant relationship between increases in cable television advertising prices and the prices of radio advertising.

6. One of the core principles of economics is that exchanges of assets and property tend to be beneficial, both to the immediate parties in the exchange as well as to

consumers and producers who ultimately benefit from lower prices and better services made possible by market exchanges. From an economic perspective, potential harms from market exchanges occur only under exceptional circumstances. The potential economic harms from market exchanges between and among commercial firms are largely the subject of antitrust laws.

7. Antitrust laws provide a means to account for the exceptional case of potential economic harms from acquisitions or exchanges between commercial firms. Economic antitrust analyses of mergers are based on a case-by-case examination of the potential changes in consumer welfare resulting from a merger between two companies.¹ These analyses are not based ultimately on arithmetic indices.² The economic recommendations to remedy the unusual case of harm resulting from a proposed merger do not rely on arithmetic indices or predetermined prohibitions on broad classes of possible mergers.

8. The FCC's newspaper cross-ownership rule prohibits all ownership exchanges of media licenses -- both transactions that would be economically beneficial to consumers and the exceptional case that might be harmful to consumers. The federal antitrust agencies, the Department of Justice and the Federal Trade Commission, have far better tools to distinguish the economic effects of proposed mergers than the FCC in its application and enforcement of the newspaper/broadcast cross-ownership rule.

9. Many economic studies of media ownership have been conducted in recent years including a few that I have authored, such as those described in the Declaration and

¹ I analyze how to analyze mergers using a consumer welfare standard in J. Hausman and G. Leonard, "Economic Analysis of Differentiated Products Mergers Using Real World Data," George Mason Law Review, 5, 3, 1997.

² For example, the Department of Justice and Federal Trade Commission Horizontal Merger Guidelines (Merger Guidelines, April 2, 1992) state: "However, market share and concentration data provide only the starting point for analyzing the competitive impact of a merger." (§ 2.0) The HHI index is calculated from market share and concentration data.

Statement that I submitted to the FCC in March 2002 and January 2003, respectively, and that are discussed above in Paragraph 5. I am aware of no economic study, and certainly none that I have authored, that would conclude that any form of newspaper/broadcast cross-ownership rule administered by the FCC would be economically superior to relying instead on the antitrust reviews of the federal antitrust agencies. Indeed, to the extent that such a rule raises the costs of economically beneficial exchanges, and would prohibit many useful exchanges, such a newspaper/broadcast cross-ownership rule decreases both economic efficiency and consumer welfare.

10. The observation that advertising markets may include both newspapers and broadcast outlets is not a basis of support for a newspaper/broadcast cross-ownership rule, as I concluded in the studies discussed in Paragraph 5. Mergers among firms that compete in the same market often increase competition and consumer welfare.³ The empirical finding that advertising markets contain TV, radio, newspapers, and cable TV means that antitrust authorities would continue to review mergers between newspapers and broadcast outlets, as they have done in the past.⁴ For example, the Department of Justice in recently reviewing and approving News Corporation's proposed acquisition of Chris-Craft Industries, required News Corporation to divest a broadcast television channel in Salt Lake City, because of a concern that advertising prices would increase without the divestiture.⁵

³ The Merger Guidelines state: "While challenging competitively harmful mergers, the Agency seeks to avoid unnecessary interference with the larger universe of mergers that are either competitively beneficial or neutral." (¶ 0.1)

⁴ I expect that Internet advertising also competes in this market, but available data has not yet permitted me to test this hypothesis.

⁵ See *US v. The News Corporation Ltd. Fox Television Holdings, Inc., and Chris-Craft Industries, Inc.* Proposed Final Judgment and Competitive Impact Statement, 66 FR 29997, June 4, 2001.

11. While the government may have non-economic objectives to intervene in markets such as the newspaper/broadcast cross-ownership rule, such a rule cannot rely on economic studies, including mine, for support.

12. In addition to providing advertising, media outlets also provide content (such as news and entertainment) to consumers. The study by Professor Joel Waldfogel attempts to determine whether different media are substitutes for one another from the perspective of consumers.⁶ Prof. Waldfogel's results provide no support for a newspaper/broadcast cross-ownership rule.

13. Prof. Waldfogel's assertion that different media are substitutes for one another is largely based on his analysis of individual-level survey data. Prof. Waldfogel constructs measures of relative news use for each medium by calculating how much people use each medium for news relative to their use of the medium for other purposes. Prof. Waldfogel then runs a regression of relative news use for one medium on the measures of relative news use for the other media. Prof. Waldfogel interprets a negative and statistically significant coefficient to mean that news in one medium serves as a substitute for news in another medium.

14. Prof. Waldfogel's claim that his regression results provide evidence of media substitution is incorrect. An alternative interpretation of his results is that consumers prefer to obtain their news from a particular medium. Some people may mainly rely on newspapers while other people rely on TV for their main source of news. This interpretation would result in a negative correlation between news use of one medium and news use of other media. Because of this alternative explanation, Prof. Waldfogel's

⁶ J. Waldfogel, "Consumer Substitution Among Media," Federal Communications Commission, Media Ownership Working Group Paper No. 3, September 2002.

regression results cannot be used to claim that different media serve as substitutes for one another.⁷

15. An additional problem with Prof. Waldfogel's analysis is that it focuses entirely on statistical significance and not economic significance. His individual-level regressions contain almost 180,000 observations. Since statistical precision increases with sample size, it is not surprising that all of the coefficients he reports in Table 14 on p. 76 are statistically significantly different from zero at the 1% level. However, a coefficient that is statistically significant is not necessarily economically significant. For example, the coefficient on the TV relative news use variable in the newspaper regression (Column 4) is -0.0002 and is statistically significant. If one looked only at measures of statistical significance (as Prof. Waldfogel does), one would conclude that TV news substitutes for newspapers. However, an analysis of the economic significance of this coefficient leads to a very different conclusion. This coefficient indicates that an increase of one half-hour of TV news per week reduces the probability of reading a daily newspaper by approximately 0.02 percentage points. Hence while the effect of TV news use on newspaper use is statistically significant it is economically insignificant. Prof. Waldfogel's failure to consider the economic significance of his results provides yet another reason his results cannot be relied upon.

16. As I discuss above in Paragraph 7, arithmetic indices such as the HHI provide only a starting point for analyzing the competitive impacts of mergers. The economic theory of oligopoly justifies the use of the HHI for this purpose, because under certain circumstances the HHI is a function of the price-cost margin and the market elasticity of

⁷ Indeed, Waldfogel's analysis of aggregate data, which does not suffer from this potential problem, finds almost no evidence of substitution among media.

demand.⁸ Thus, changes in the HHI may indicate the changes in economic performance such as the price-cost margin of an oligopoly, following the merger of two firms.

17. In contrast, there is no economic theory that links diversity-related outcomes to underlying market structure. Nor would a “diversity index” yield predictions of changes in diversity in a market, following a merger of two firms. A merged firm may find it to be profitable to increase the diversity of its content offerings. My previous empirical research that I submitted to the Commission found that an increase in format diversity often followed after mergers had occurred in a given market. Hence, any attempt to create a “diversity index” based on market structure measures would be arbitrary and not have a basis in economic theory. An arbitrary “diversity index” would not predict either the economic performance or amount of diversity that would follow after the merger of two firms.

⁸ See, e.g., J. Hausman *et al.*, “A Proposed Method for Analyzing Competition Among Differentiated Products,” *Antitrust Law Journal* 60, 1992. An alternative justification for the use of the HHI was provided by George Stigler, who showed that the HHI could be related to the likelihood of collusion. See G. Stigler, “A Theory of Oligopoly,” *Journal of Political Economy* 72, 1964.

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- "Estimation and Inference in Nonlinear Structural Models," Annals of Economic and Social Measurement, with E. Berndt, R.E. Hall, and B.H. Hall, October 1974.
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