The Broadcasters: The Future Role of Local Stations and the Three Networks

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CONTENTS

I. INTRODUCTION

Various observers have predicted a dark future for the commercial television networks and over-the-air commercial television broadcasters as a result of the increased competition from new forms of video program delivery. Most of the prophecies of doom stem from declines in network prime-time audience shares (table 4.1) and in local-station audience shares among cable subscribers (table 4.2), and from expected increases in video market competition from new video delivery technologies.

A number of past empirical studies (Fisher, McGowan, and Evans 1980: Park 1971: Schink and Thanawala 1978: and Webster 1983) have clearly established that cable television has a significant negative impact on the audience levels achieved by over-the-air commercial television stations. There is little disagreement concerning cable's impact on

Table 4.1. Television Network Prime-Time Share Decline in Cable and Pay Cable Homes 1979–1982

	Three-Network Share		
Year	*Noncable Homes*	*Basic Cable Homes*	*Pay Cable Homes*
1979–80	87.0%	80.5%	64.5%
1980–81	86.0	78.8	63.3
1981–82	84.5	75.3	59.3

SOURCE: The information contained in this table is from A. C. Nielsen Co., National Television Index, *Cable TV A Status Report*, various issues, as found in Bortz, Pottle, and Wycke (1983).

the information and entertainment side of local television stations and the television networks. The impact is negative and significant, and it appears to be increasing in magnitude over time (see tables 4.1 and 4.2). As new forms of video delivery technology become available to expand the number of channels from which consumers can choose, a similar negative impact on broadcast audiences can be expected.

The impact of competition from cable and other new technologies on television station and television network audiences, however, does not necessarily mean that any stations or networks will be driven out of business. In fact, increased competition on the information/entertainment side of the video marketplace may not even cause a decrease in their profitability, because cable and other forms of pay-television delivery do not provide meaningful competition for television broadcasters on the *advertising* side of the video marketplace, at least at this time.

Table 4.2. Local Television Station, Sunday–Saturday, 7 A.M.–1 A.M. Share Decline in Cable Homes, 1979–1982

	Local Station Average Share 1979–80		*Local Station Average Share 1980–81*		*Local Station Average Share 1981–82*	
MARKETS	*Noncable Homes*	*Cable Homes*	*Noncable Homes*	*Cable Homes*	*Noncable Homes*	*Cable Homes*
Top 50	93.7%	80.6%	94.9%	77.0%	94.7%	73.8%
51–100	88.3	69.2	88.1	64.4	87.9	62.5
101+	78.3	53.9	77.9	50.7	78.0	48.0

SOURCE: The information contained in this table was compiled from A. C. Nielsen Co. (1982a).

If broadcasters continue to possess significant market power in advertising, they may be able to increase the price per thousand or per rating point for which they sell their audience to advertisers, and maintain revenue levels in spite of significant audience decline. To the extent that broadcasters are viewed by advertisers as "must buys" for reaching a mass audience and to the extent that broadcasters continue to operate in oligopolistic advertising markets, their revenue levels can be expected to be relatively unaffected by cable and other new delivery technologies.

The primary focus of this study will be to determine whether broadcasters continue to operate in oligopolistic advertising markets in spite of the increased program competition they face from cable television. Our empirical focus is on local television markets owing to the availability of published data in this area. Although we are not able to test our hypotheses empirically with respect to the television networks, we can extend the results obtained from our analysis to the network television advertising market.[1]

II. THE MODELS

In this section we develop two alternative models of the value of commercial time. The first is based on the assumption that the price paid for commercial time is determined in a competitive market for exposures to viewers, with the value of a particular audience determined by the characteristics of that audience. The second model is an application of oligopoly pricing, with price determined by both the characteristics of the potential viewing audience and the intensity of competition in providing access to commercial broadcast time in the market.

A. The Competitive Model

The first type of model has been widely applied in estimation of the audience-revenue relationship for television stations. An example is the work of Fisher, McGowan, and Evans (1980). A general representation of the estimating equation is

$$(1)\quad R/H = b_0 + b_1(V/H) + \sum_{i=1}^{n} b_{i+1}X_i$$

where:

R = the revenue received from the sale of commercial time of a particular duration (e.g., one 30-second spot) or over a period of time (e.g., one year).
H = the number of households in a station's viewing area;
V = a measure of audience size for the station during the revenue period;
X_i = a vector of variables which affects the quality of the audience provided by the station (e.g., average household income);
b = estimated coefficients.

The coefficient for V/H in equation (1) provides an estimate of the price for a viewer exposure. A linear relation between R/H and V/H is used because the existence of perfect competition implies that the price charged for a viewer is independent of the number of viewers provided.[2] The elements of X_i which represent characteristics of the viewers provided by a particular station, are generally interpreted as hedonic price-function parameters which show the value of a particular audience characteristic to advertisers.

B. The Oligopoly Model

Our alternative model of the value of commercial time is derived from the theory of oligopoly pricing. Following Stigler (1964), we treat the likelihood that a firm can successfully use secret price concessions to undercut its rivals as decreasing with increases in market concentration. The particular measure of concentration used by Stigler is the Herfindahl index, which is calculated as the sum of the squares of the market shares of all firms in the market. The reduced likelihood of success with secret price concessions leads to a higher expected average price level in the market. Thus, a positive relation is expected between the value of commercial time and the Herfindahl index for concentration of stations selling time in a market.[3] We use a log-linear function to apply the oligopoly pricing model to estimating the value of commercial time. Our estimating equations are of the general form.

$$(2)\quad \log(R) = b_0 + b_1\log(H) + b_2\log(V/H) + b_3\log(HI) + \sum_{i=1}^{n} b_{i+3}\log(X_i)$$

where HI is the Herfindahl index of market concentration (and all other variables have been defined above). The oligopoly pricing model implies that the value of b_3 in equation (2) is positive.

The difference in the dependent variable between equations (1) and (2) reflects a difference in the conception of the product being purchased by advertisers. In the competitive model the product is viewer exposures, while in the oligopoly model the product is access to a particular viewing audience. This difference is subtle but critical. If the product is viewer exposures, it is reasonable to consider television stations in different local markets to be competing for the same advertising dollars. The number of sellers in the relevant market is large, and perfect competition is a reasonable expectation. However, if the product is access to a particular viewing audience, the number of sellers in the relevant market is limited to the small number of stations that can reach the particular audience. This implies that viewer exposures in distant markets are not good substitutes for exposures in a local market, and competition in the local market may be very imperfect, although competition from other media certainly limits a station market power. Still, even the viewer exposures within a particular television market are imperfect substitutes for each other because the audience delivered differs across stations and programs.

The conception of the product as access to a particular audience in equation (2) affects the specification of the independent variables as well as the dependent variable. We use the number of households in the viewing area, H, as the measure of the potential audience to which a station is selling access. The ratio of households viewing an individual station to total households in the viewing area, V/H, then measures the station's success in reaching the potential audience. The coefficients of both $\log(H)$ and $\log(V/H)$ are expected to be positive, as both a larger potential audience and greater success in reaching that audience are valuable to advertisers.[4] The log-linear form of equation (2) means that the coefficients of the independent variables provide estimates of the elasticity of the price of commercial time with respect to each independent variable.

The concept of the product being access to a particular audience also affects the measurement of the Herfindahl index. The market shares provided by rating services are shares of the total viewing audience. Those households which are viewing noncommercial local stations, cable programming, or non-local-market stations are not reachable through advertising on local-market stations. Consequently, the relevant market share for measuring concentration in the local market is the share of viewers watching local commercial stations. The measure of the Herfindahl index used in our regressions is the sum of the squared market shares for local commercial stations where the shares are recalculated as shares of those viewers watching only local commercial stations.

Regression equations of form (1) are not directly comparable to those of type (2). Theil (1971:544) points out that the residual variance criterion cannot be used to choose between alternative specifications of a relationship when the left-hand variable is not the same in each specification. We can, however, test the estimated coefficients of regressions of type (2) for consistency with either the competitive pricing model or the oligopoly pricing model.

In the competitive pricing model market concentration as measured by the Herfindahl index does not affect the price paid for commercial time, because competition from other media or markets is sufficient to keep price to the competitive level with or without concentration. This implies a value of zero for b_3 in equation (2), rather than the greater-than-zero value implied by the oligopoly pricing model. If it is possible to reject the hypothesis that b_3 is equal to zero while, at the same time, it is not possible to reject the hypothesis that b_3 is greater than zero, we have clear empirical support for the oligopoly pricing model over the competitive model. If we can reject the hypothesis that b_3 is greater than zero but not the hypothesis that b_3 equals zero, we have empirical support for preferring the competitive pricing model over the oligopoly model.

A further test for discriminating between the competitive and oligopoly pricing models involves the estimated value for b_2 in regressions of type (2). In the competitive pricing model, the product sold by a station is viewer exposures. An increase in the number of viewer exposures results in a proportional increase in the value of commercial time because the price received for the product is independent of the quantity supplied by a competitive seller. This implies a value of 1.0 for b_2 in equation (2), rather than merely the greater-than-zero value implied by the oligopoly pricing model. If we can reject either the hypothesis that b_2 is equal to 1.0 or the hypothesis that b_2 is greater than zero, while not rejecting the other hypothesis, we again have a clear indication of consistency with one pricing model but not with the other. The only limitation to such a test is that it is clearly biased in favor of the oligopoly pricing model because any estimated value of b_2 that is consistent with the hypothesis that b_2 equals 1.0 is necessarily consistent with the hypothesis that b_2 is greater than zero.

III. REGRESSION RESULTS

The results from the application of regression equations of types (1) and (2) with data for a sample of 105 television stations are given in tables 4.4 and 4.5. The variable definitions and data sources are given in table 4.3. The sample of stations used in the regressions includes all CBS affiliated stations for which spot prices were available from *SRDS: Spot Television Rates and Data,* thereby limiting the range of factors affecting the value of commercial time on the stations.[5] We focus on the relationship between the highest rate charged by each station for a 30-second spot and the audience attracted by "MASH", the highest-rated half-hour program for the average CBS affiliate in November 1982.

The regression results in table 4.4 have low explanatory power and reliability as indicated by the low values of the corrected R^2's and t-ratios. This contrasts sharply with the results of prior studies employing the competitive model, such as those of the FCC (1980h) and Fisher, McGowan and Evans (1980). We attribute our lower explanatory power and reliability to the different nature of the regression samples. We have purposely limited the variation in network affiliation and programming, which accounts for much of the explanatory power in the prior studies. Thus, it is inappropriate to conclude that the competitive model should be rejected solely on the basis of the results in table 4.4.

Our test for choosing between the competitive and oligopoly models is based instead on the results provided in table 4.5. The coefficients of $\log(HI)$, the Herfindahl index, are all positive and significantly greater than zero at the 1 percent level, using a one-tailed t-test. A significantly positive impact on price is expected in the oligopoly pricing model, but not in the competitive model. Furthermore, the estimated coefficients of $\log(V/H)$, the ratio of viewers to households for the designated market area (DMA), are positive but significantly less than 1.0 at the 1 percent level, using a one-tailed t-test.[6] In the competitive model, increases in viewers supplied to advertisers are expected to lead to proportional increases in the value of commercial time. In contrast, the oligopoly pricing model implies only that the coefficient of V/H is greater than

Table 4.3. Variable Definitions and Data Sources

Variable	*Definition*	*Data Source*
R	List price of a 30-second spot for "M*A*S*H," or for highest-price non-special-event prime-time spot if "M*A*S*H" price was not directly available.	*Standard Rate and Data Service: Spot TV Rates and Data* (March 1983) (Hereinafter SRDS)
H	Number of households in the designated market area (DMA) (in thousands)	A. C. Nielsen Co. (1982a)
V	Average quarter-hour audience for "M*A*S*H" (in thousands)	A. C. Nielsen (1982a)
HI	Calculated as sum of squared market shares for all local commercial broadcast stations in the designated market area (denominator of share is total average daily viewers (7 A.M.–1 A.M., Sunday–Saturday) of local commercial stations as a group and numerator is the average daily viewers for each station). The share thus calculated differs from that provided directly in Nielsen, which includes in the denominator viewers of noncommercial local stations, stations from other designated market areas, and cable programming.	A. C. Nielsen (1982a)
SALES	Average total retail sales per DMA household (in hundreds)	*SRDS*
VHR	A dummy variable = 1 if station is a VHF station (= 0 otherwise)	*SRDS*
M	Average quarter-hour metro-area household audience for "M*A*S*H" (in thousands)	*Nielsen*
CAB	Households in DMA subscribing to cable services (in thousands)	*Pay TV Census* (December 31, 1983)
PAY	Number of subscribers to a pay programming service in the DMA (in thousands)	*Pay TV Census*

Table 4.4. Regression Results for Competitive Model (*R/H* Dependent Variable)

		Estimated Coefficients			
Constant	V/H	*SALES*	*VHF*	M/H	$\bar{R}^2$
1.354	5.962*	.060			.019
	(1.84)[a]	(.73)			
1.374	3.939	.045	.712		.031
	(1.13)	(.55)	(1.48)		
1.623	1.430	.019	.693	4.325	.030
	(.33)	(.22)	(1.44)	(.97)	

[a]Figures in parentheses are t-ratios.

*Coefficient is statistically significant at 10 percent level using a two-tailed t-test.

zero. Thus we find empirical support for the oligopoly pricing model but none for the competitive pricing model.[7]

IV. THE IMPACT OF CABLE TELEVISION ON BROADCAST REVENUES

The traditional approach to estimating the impact of cable television on the revenues of commercial broadcast stations involves two steps. First, the impact of a station's audience on its revenues is estimated using equations of type (1). Second, the impact of cable on the size and characteristics of the audience obtained by commercial stations is estimated using regressions with audience site or characteristics as the dependent variable. A study which nicely illustrates the two-step approach is that of Liebowitz (1982).

Our regression results suggest a critical flaw in this traditional approach. The audience-revenue relationship in equations of type (1) is based on an explicit or implicit assumption that viewer exposures are sold in a perfectly competitive market. Our results are inconsistent with the existence of a perfectly competitive market, and instead support the interpretation that commercial broadcast time is sold in oligopolistic markets.

In our oligopolistic pricing model, competition affects a station's revenues through two variables, the station's audience share, *V/H*, and the level of concentration in the market for selling viewer exposures to advertisers as measured by the Herfindahl index, *HI*. Since most cable systems do not currently provide significant competition for sales to

Table 4.5. Regression Results for Oligopoly Model [Log(*R*) Dependent Variable]

			Estimated Coefficients				
Constant	*log*(H)	*log*(V/H)	*log*(HI)	*log(SALES)*	*VHF*	*log(M/V)*	$\bar{R}^2$
1.889	1.028*	.238	.647*				.720
	(13.52)[a]	(1.55)	(3.41)				
1.094	1.054*	.229	.700*	.281			.720
	(13.18)	(1.49)	(3.56)	(1.03)			
1.022	1.039*	.113	.673*	.222	.167		.723
	(12.96)	(.65)	(3.42)	(.81)	(1.40)		
1.364	1.041*	.137	.677*	.123	.167	.165	.724
	(13.00)	(.79)	(3.45)	(.43)	(1.40)	(1.19)	

[a]Figures in parentheses are t-ratios.
*Indicates coefficient is statistically significant at 1 percent level using a two-tailed t-test.

advertisers, their competition extends only to the first variable, audience share. Treating the competition associated with cable offerings of distant signals and pay programming as equivalent to the competition from rival local broadcasters is therefore inappropriate. Yet, this is exactly the treatment used in the traditional approach.

The impact of both cable and other competition on broadcast revenues in the traditional approach is equal in percentage terms to their impact on the broadcast audience. In contrast, the coefficients of log (V/H) in table 4.5 provide estimates of between 0.11 percent and 0.24 percent for the effect on revenues of a 1.0 percent change in audience. Thus, we estimate that the impact of cable on broadcast revenues is only one-ninth to one-fourth as large as that assumed in the traditional approach.

Liebowitz (1982) argues that cable does not reduce the advertising revenues of commercial broadcast stations, even though he uses the two-step approach for estimating cable's impact. He finds that while cable reduces the audience of broadcast stations, it also improves the characteristics of the audience provided. He estimates the net effect on advertising revenues as approximately zero.

Our rejection of the competitive assumption implicit in the two-step approach leads us to question the validity of Liebowitz's result. Nonetheless, the argument that cable has a revenue-increasing impact on the characteristics of the audience offered by broadcast stations is plausible. This would imply that even our low estimates of the impact of cable on broadcast revenues obtained from the regressions in table 4.5 are biased upward because we do not take account of the possible impact of cable on the characteristics of the remaining broadcast audience.

We therefore allow for a possible influence of cable on audience characteristics by adding cable-penetration variables to the oligopoly pricing model regressions in table 4.5. The cable penetration variables measure the ratio of pay programming subscribers to households in the DMA, CAB/H, and the ratio of pay programming subscribers to households in the DMA, PAY/H. The results of these regressions are given in table 4.6. None of the estimated coefficients of the cable penetration variables is significantly different from zero at the 10 percent level using a two-tailed t-test.[8] Thus, we find no support for the hypothesis that cable penetration affects broadcast station revenue through audience characteristics.

Table 4.6. Regression Results for Oligopoly Model with Cable-Penetration Variable [log(*R*) Dependent Variable]

				Estimated Coefficients					
Constant	*log*(H)	*log*(V/H)	*log*(HI)	*log*(*SALES*)	*VHF*	*log*(M/V)	*log*(*CAB*/H)	*log*(*PAY*/H)	$\bar{R}^2$
1.956	1.028*	.237	.666*				−.011	.046	.715
	(12.94)[a]	(1.50)	(3.32)				(.09)	(.41)	
1.115	1.052*	.226	.705*	.278			−.011	.007	.714
	(12.63)	(1.42)	(3.44)	(.84)			(.09)	(.06)	
1.023	1.038*	.111	.676*	.223	.167		−.007	.001	.717
	(12.45)	(.62)	(3.29)	(.75)	(1.38)		(.06)	(.01)	
1.349	1.041*	.137	.676*	.126	.167	.165	.001	−.004	.718
	(12.50)	(.76)	(3.30)	(.41)	(1.38)	(1.18)	(.01)	(.03)	

[a]Figures in parentheses are t-ratios.
*Coefficient is significant at 1 percent using a two-tailed t-test.

Table 4.7. Further Regression Results for Oligopoly Model with Cable-Penetration Variables [log(*R*) Dependent Variable]

				Estimated Coefficients				
Constant	*log*(H)	*log*(HI)	*log*(*SALES*)	*VHF*	*log*(M/V)	*log*(*CAB*/H)	*log*(*PAY*/H)	$\bar{R}^2$
1.761	1.021*	.722*				−.047	.049	.711
	(12.80)[a]	(3.64)				(.41)	(.43)	
.835	1.047*	.763*	.309			−.045	.006	.711
	(12.53)	(3.77)	(1.04)			(.39)	(.05)	
.896	1.034*	.692*	.224	.202**		−.020	−.000	.719
	(12.48)	(3.41)	(.76)	(1.90)		(.17)	(.00)	
1.168	1.035*	.695*	.135	.209**	.152	−.015	−.006	.719
	(12.51)	(3.43)	(.44)	(1.96)	(1.09)	(.13)	(.05)	

[a]Figures in parentheses are t-ratios.
*Coefficient is significant at 1 percent level using a two-tailed t-test.
**Coefficient is significant at 5 percent level using a two-tailed t-test.

Our final test for an effect of cable on broadcast revenues involves removing the audience variable, *V/H*, from the regressions in table 4.6. By omitting the audience variable, we are allowing the cable-penetration variables to pick up the effect of cable on revenues that occurs either through a change in audience characteristics or through a change in audience size. The results for these regressions are given in table 4.7. None of the estimated coefficients of the cable-penetration variables in table 4.7 is significantly different from zero at the 10 percent level using a two-tailed t-test. Thus, when we measure the impact of cable and pay penetration on broadcast revenues directly, we find no evidence of a significant negative impact.[9]

V. IMPLICATIONS

The empirical results presented in the preceding section suggest that the increased competition television broadcasters are facing from new delivery technologies such as cable and pay television on the program side of the video marketplace has had little impact on the market power possessed by television broadcasters on the advertiser side. This suggests that television station (and by extension television network) revenues have not been negatively affected by cable and various forms of pay program delivery. It is our belief that local television stations and the television networks will be able to maintain their revenues (in real dollar terms) even as their audience declines, as long as new forms of video program delivery do not provide meaningful competition for television broadcasters on the advertising side of the video market. Various pieces of descriptive information gleaned from the trade press and from research reports provide support for this notion. Data provided in Bortz, Pottle, and Wyche (1983) and in "Broadcasters Show Profit Margin Drop" (1984), for instance, indicate that television network and television station revenues have continued to increase even in the face of declines in audience shares.

Our results suggest that increased competition from new forms of video delivery technology is not affecting broadcast advertising revenues. However, this does not necessarily mean that cable and various forms of pay program delivery have not had an impact on broadcast-television profits. To the extent that the increased competition for the television audience from various new video delivery technologies has caused the television networks and local television stations to spend an increasingly large percentage of each dollar of revenue on programming or promotion, television broadcast profit margins may well decline as a result of this increased competition.

Veronis, Shuler, and Associates (VS&A) ("Broadcasters Show Profit Margin Drop," 1984) provide descriptive data supportive of this hypothesis. Specifically, VS&A found that "pre-tax operating profit margins among 'typical' publicly traded broadcasting companies shrunk nearly 20% between 1978 and 1981" in spite of the fact that revenue growth averaged 13% during this same period. VS&A suggest that increasing costs, especially those in the programming area, were responsible for at least part of the decline in profit margins. Information provided in Bortz, Pottle, and Wyche (1983) provides support for the theory that increased competition from new technologies and/or independent television stations on the information/ entertainment side of the video market is largely responsible for the decline in network profit margins discovered by the VS&A report. FCC data contained in Bortz, Pottle, and Wyche (1983) indicate that the television networks experienced an average annual compound increase in advertising revenues of 13.7 percent from 1978 to 1980, while program expenses increased at an average annual compound rate of 17 percent over this same period. This finding is in sharp contrast to the "pre-audience decline" in the average annual compound growth rates of revenue and program costs experienced by the television networks from 1973 to 1977 (15.1 percent and 15.0 percent, respectively). Additional information provided by Bortz, Pottle, and Wyche (1983) for ABC-TV prime-time gross revenues and prime-time program costs from 1973 to 1981 is even more supportive of the theory that increased competition from cable or independent television stations has caused the television networks to increase their program expenditures, thus lowering profit margins. From 1978 to 1981, ABC increased its prime-time gross advertising revenues at an average compound rate of 7.9 percent. Over this same period, prime-time program expenditures increased at an average compound rate of 16.6 percent. Comparable figures for average annual compound growth in revenue and program expense from 1973 to 1977 are 18.2 percent and 15.5 percent, respectively.

VI. CONCLUSIONS

Local television stations and the television networks face increasingly complex competition for audience attention. As a result, television broadcasters have increased their program expenditures by a disproportionate amount in an attempt to reduce loss of audience share. Such an expenditure strategy is less risky than it might otherwise be since television broadcasters and the networks are not facing any significant increase in competition for advertiser revenues. The short-run result of the "program expenditure" strategy being employed by television broadcasters has been to reduce broadcaster profit margins. However, television broadcasters continue to earn above-normal returns on average (see "Broadcasters Show Profit Margin Drop" 1984). Future declines in broadcast profit margins are bounded by what entrepreneurs consider to be a normal economic return for television broadcasting.

The information in this article leads us to the conclusion that the television networks and local advertiser-supported television stations are far from moribund. As long as advertisers view television broadcast audiences as "must buys" for reaching a mass television audience, the broadcast television business continues to be a viable one. However, broadcast profit margins can be expected to continue their decline as television broadcasters spend an increasingly large amount of each dollar they take in attempting to maintain their audience share.[10]

Notes

1. Helpful suggestions on earlier versions of this paper were received from Pam Weidler, Mark Nadel, and Doug Webbink. Nancy Kuehl provided invaluable research assistance.

2. Some past studies employ the square of (*V/H*) as an explanatory variable. However, this term is not interpreted as implying a lack of competition in the sense that stations face downward-sloping demand curves for viewer exposures. In the Fisher, McGowan, and Evans (1980) study, the estimated coefficient of the

squared (V/H) term is uniformly positive, suggesting the implausible, i.e., that the stations face upward-sloping demand curves.

3. Stigler cites evidence closely related to our hypothesis in support of his theory. He cites a negative estimated relationship between the number of newspapers or radio stations in a market and the list price for advertising space or commercial broadcast time, respectively.

4. If the coefficient of $\log(H)$ exceeds the coefficient of $\log(V/H)$, the cost-per-thousand of reaching viewers in larger markets exceeds that in smaller markets. The competitive model does not allow for the possibility that the cost per thousand viewers depends on market size. This can lead to bias in the estimated coefficient of $\log(HI)$ because market size and market concentration are highly correlated.

5. The reader is referred to earlier studies of the audience-revenue relationship for commercial television stations for results on the influence on the value of commercial time of factors such as network affiliation and time of day. See, for example, FCC (1980h); Fisher, McGowan, and Evans (1980), and Park (1979). Limiting our sample to CBS affiliates and to one of the highest-rated programs on these affiliates reduces the number of variables that enter the statistical analysis while still providing a sample large enough to limit the influence of sampling error.

While our conclusions are specific to a particular network and program, this is an advantage rather than a limitation. Studies that include a wider sample are subject to bias if the influence of competition varies across categories of affiliation and programming. In contrast, our approach can be used on alternative samples to test for constancy in the estimated coefficients without introducing the possibility of bias.

6. The t-ratios for the difference between 1.0 and the estimated coefficients of V/H in table 4.5 range from 4.94 to 5.11.

7. These findings contrast sharply with those of Fournier and Martin (1983). Fournier and Martin estimate an OLS regression similar to our regressions of form (2) and find a coefficient for the Herfindahl index which is negative and not statistically significant. The Herfindahl index in the regression is apparently calculated from market shares which have not been adjusted to eliminate the viewers of noncommercial local stations, cable programming, and non-local-market stations. We reestimated the regressions in table 4.5 substituting a Herfindahl index based on unadjusted market shares, and found that the coefficient of the Herfindahl index was consistently negative and generally statistically significant at the 1% level using a two-tailed t-test. Thus, we suspect that the failure to find a positive and significant coefficient of the Herfindahl index in the Fournier and Martin study results from inappropriate measurement of the Herfindahl index.

8. An attempt was also made to explicitly include the impact of subscription television (STV) and of multipoint distribution service (MDS) competition on local station revenues by including the number of STV and the number of MDS

subscribers in our pay-penetration variable. The results obtained were virtually identical to those contained herein.

9. This result is in contrast to Wirth and Wollert (1984) who find cable penetration had a significant negative impact on local television news prices in 1978. These different results are from regressions focused on local-news advertising rates rather than prime-time entertainment advertising rates.

10. Note that this conclusion is not directly related to the circumstances of marginal broadcasters (small market, independent UHF, LPTV) because average returns are dominated by large-market network-affiliated VHF stations. The fact that cable's impact on audience improves the relative position of UHF stations (Park 1979) suggests that this group of marginal stations may not be as adversely impacted by competition.