

# Effects of Deregulation and Consolidation of the Broadcast Television Industry

By Jessica Calfee Stahl

## Online Appendix

Identification of the viewership and revenue coefficients relies upon the assumption that the timing of ownership changes was prompted by an exogenously timed deregulation. If some ownership changes were instead driven by expected changes in stations' outcome variables, this reverse causality could bias the coefficients of interest. To address this concern, I conduct a robustness check in which the revenue and viewership coefficients are estimated off of only those station purchases that would have been explicitly disallowed before 1996. The revenue and viewership results, shown in Table 1 and Table 3, are not much changed. Cost coefficients are re-estimated using the new revenue and viewership coefficients. The estimator then includes hypothetical purchases for only the stations that were involved in previously-disallowed purchases from 1996 to 2007, because these are the stations for which I have estimated viewership and revenue fixed effects. Therefore I have fewer hypothetical sales (35,710 instead of 112,062). Results, shown in Table 2, are very little changed.

Another concern is that I could be missing important effects of consolidation by not including arrangements in which one group agrees to operate a station owned by another group (variously called local/joint/shared marketing/sales/service/management agreements). As a robustness check, I use manually collected data on these agreements and run the viewership and revenue regressions with these data included.<sup>1</sup> If group A has an agreement to operate a station owned by group B, I treat the station as being owned by group A. The revenue and viewership results, shown in Table 4 and Table 5, are so little changed that I do not re-estimate the second-stage cost coefficients.

An identification concern, specifically with respect to the revenue coefficients, is that unobserved demand shocks could simultaneously raise advertising prices and viewership. If I constrain revenue per viewer to be constant, then the price shock is forced into the error term, leading to omitted variable bias. One way to address this concern is to allow for a flexible relationship between viewership and revenue, which allows for the possibility that advertising prices rise when viewership rises. As a robustness check, I run the revenue regression with a piecewise linear specification for the viewership regressor. The results are shown in Table 6; competition variable coefficients are omitted for sake of brevity. The revenue coefficient on viewership does vary with viewership, but as shown in Table 7, the differences are generally not statistically significant. There is some evidence that, for observations with extreme values for viewership, revenue per viewer is indeed higher. However, the coefficients on the ownership variables in the piecewise linear specification are virtually identical to those in the baseline specification. Because the viewership and revenue results are essentially unchanged, I do not re-estimate the second-stage cost coefficients.

In another robustness check, I specify the viewership, revenue and cost equations as log-linear rather than linear. Viewership and revenue are highly skewed, as can be seen

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<sup>1</sup>Many thanks to my research assistant Sharada Sridhar for her help in collecting and cleaning these data. The data are not perfect, but are the best we could do. We used as a starting point the agreements listed in the original dataset provided by BIAfn, but had to manually collect the start dates for these agreements, and supplemented these with any other agreements we could find.

in the table of summary statistics; presumably cost is as well. The concern is that, by specifying linear relationships, I may be biasing coefficients or simply not capturing the correct relationships between variables. This is especially worrisome in a setting in which I am constructing out-of-sample predictions. Viewership and revenue results are indeed a bit changed in the log-linear specifications, as shown in Table 8 and Table 10, but are not very different. The final column in each of the log-linear tables provides for easy comparison with the baseline results. In the revenue results, one notable difference is the coefficient on network domination; this variable has a bigger revenue impact according to the logged results. In the viewership results, the logged specification suggests that competitors' national size and network ownership are less important than in the baseline specification. Overall, though, results are very similar. In the final step in this robustness check, I use these log-linear viewership and revenue results as inputs to estimate a log-linear cost equation. Log-linear cost results are shown in Table 9. I cannot estimate standard errors for the cost coefficients for computational reasons,<sup>2</sup> so I can look only at coefficient signs and magnitudes, not statistical significance. Results are quite similar to the baseline specification; again, it is easiest to compare the last column.

The remaining robustness checks are specifically for the cost coefficients, taking the viewership and revenue coefficients as given. A series of four robustness checks address concerns about weighting in the cost estimator. The estimator weights large violations of the inequalities more heavily than small violations. One consequence is that large (high-revenue) stations and large markets are given more weight than are small stations and small markets. I run a series of robustness checks to ensure that this weighting is not having an undue effect on my results. In Table 11, only hypothetical sales involves stations in small markets (those that are not ranked in the top 50 in terms of number of viewing households) are included in estimation. In Table 12, only hypothetical sales involving stations in large markets (those ranked in the top 50 in terms of number of viewing households) are included in estimation. In Table 13, only hypothetical sales involving small stations (those below the 50th percentile in terms of 2007 revenue) are included in estimation. Lastly, in Table 14, only hypothetical sales involving large stations (those below the 50th percentile in terms of 2007 revenue) are included in estimation. In each case, results are very little changed from the baseline results.

The final set of robustness checks are meant to address concerns about whether estimates of the cost coefficients are sensitive to the choice of 2007 as the year in which to explain the industry structure. In the baseline specification, I find the cost coefficients that explain the 2007 industry structure; this is under the assumption that in 2007 the industry is in equilibrium, or at the very least not in a period of dramatic adjustment. I do not want to find the cost coefficients that explain the industry structure in, say, 1999, when the industry was undergoing rapid consolidation following the 1996 deregulation. However, it should be the case that the industry was in a relatively stable state not only in 2007

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<sup>2</sup>For each bootstrap, I re-estimate viewership and revenue coefficients, then, using these new coefficients, predict hypothetical viewership and revenue for each station affected by each of the 112,062 hypothetical sales. This is not problematic when viewership and revenue are linear; there is no need to re-run the hypothetical sales, because I can simply use the summed changes in variable values from the original run, and multiply these sums by the new viewership and revenue coefficients. However, when viewership and revenue are logged, then I cannot take this short cut; I must re-run each of the 112,062 hypothetical sales for each of the hundreds of bootstraps. This is computationally infeasible.

but in 2008 and 2009 as well. So, as a robustness check, I find the cost coefficients that explain the 2008 industry structure, and the cost coefficients that explain the 2009 industry structure. Results are shown in Table 15 and Table 16. Looking at the 2008 results first, the magnitudes of coefficients are different, but the results are qualitatively very similar. The same can be said about the 2009 results, except that the coefficient on *Duopoly* is statistically and economically insignificant. In 2009, the country was in the depths of a recession, so the 2009 results may be less trustworthy.

Similarly, I find the cost coefficients that explain the 1995 (pre-deregulation) industry structure rather than the 2007 (post-deregulation) industry structure. The assumption is that the industry was in a sort of stable state in 1995, before the deregulation took effect. I must construct the inequalities from hypothetical sales that would have been allowed in 1995, under pre-deregulation ownership rules. There are 74,540 such sales (versus 112,062 that would have been allowed in 2007, under post-deregulation ownership rules). Also, the ownership variables in the cost equation must be modified a bit. I cannot estimate a cost coefficient on *Duopoly*, because “duopolies” were not allowed in 1995 (with very few exceptions). Similarly, I cannot identify the cost coefficient on *Num\_in\_State*, because there are few instances of within-state clusters of stations in 1995 (either in reality, or that would have been allowed hypothetically). As a substitute, I estimate a cost coefficient on *Num\_in\_Region*, which is the number of jointly owned stations in the same region of the country.

Results from this robustness check are shown in Table 17. As noted, there is no coefficient estimated for *Duopoly*. The coefficient on *Num\_in\_Region* here is similar to the coefficient on *Num\_in\_State* in the baseline specification. The coefficients on *Demog\_Variety*, *Network\_Owned* and *Num\_in\_Net* are similar to the baseline specification. Coefficients on *Num\_in\_Country* and *Num\_New\_Cables* are the wrong signs, but this is not too disturbing given that, in the baseline specification, coefficients on these variables were not statistically significant and therefore were not important parts of the story. Lastly, I no longer estimate a statistically significant effect from *Avg\_Dist*.

Table 1: Robustness Check: Effect of Ownership and Competition Variables on Revenue, Using Only Transactions Newly Allowed by Deregulation

		Variables	Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station revenue?
		Time trend (years since 1996)	-510 ** (250)	
		Years_on_Air	900 *** (168)	
		Viewers	0.54 *** (0.03)	-\$714 ***
Ownership variables	Similarity of Markets/Viewers	Duopoly	-935 (788)	\$4 **
		* Time trend	87 (85)	
		Coverage	0.17 ** (0.08)	\$1,679 ***
		* Time trend	0.0011 (0.0036)	
		Num_Mkts	-2 (59)	-\$1,365 ***
		* Time trend	-13.5 *** (4.3)	
		Cov_of_Region	-2,844 ** (1,403)	\$128 *
		* Time trend	425 ** (196)	
		Demog_Variety	-131.4 *** (46.4)	-\$19 **
		* Time trend	6.28 ** (2.80)	
		Network_Owned	650 (993)	\$46
		Network_Concentration	-834 *** (185)	-\$127 ***
		* Time trend	52.7 ** (22.2)	
		Network_Domination	15,847 *** (4,821)	-\$160 ***
		* Time trend	-2,102 *** (497)	
		Cable overlap	1,410 (1,819)	\$200 **
		* Time trend	-431 *** (163)	
		Competition variables	Similarity of Markets/Viewers	Years_on_Air <i>average among competitors</i>
Duopoly <i>among competitors</i>	-2,178 *** (380)			-\$566 ***
Coverage <i>average among competitors</i>	-0.33 *** (0.08)			-\$2,541 ***
Num_Mkts <i>average among competitors</i>	216.9 *** (72)			\$1,713 ***
Cov_of_Region <i>average among competitors</i>	-1,629 (2,392)			-\$114
Demog_Variety <i>average among competitors</i>	-116.0 *** (41.7)			-\$337 ***
Network_Owned <i>sum in market</i>	1,063 *** (215)			\$744 ***
Num_Major_Nets	174 (405)			\$17
Net_Concentration <i>average among competitors</i>	-309 (383)			-\$154
Cable_Overlap <i>average among competitors</i>	3,550 ** (1,474)			\$106 **
R-squared	0.9886			
Observations	5,484			

Dependent variable is annual station revenue in thousands of 2008 dollars. Station, firm, year and network fixed effects are included. Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

† In this column, the \*, \* and \*\*\* refer, where applicable, to the joint statistical significance of the two coefficients (that is, the coefficient for the variable and the coefficient for the variable interacted with the time trend).

Table 2: Robustness Check: Effect of Ownership Variables on Cost, Using Only Transactions Newly Allowed by Deregulation

Variables	Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?	
Size/Geography	Duopoly	-4,100 (3,217)	-\$779
	Num_in_Country	19 (86)	\$228
	Avg_Dist	1.5 ** (0.7)	\$93 **
	Num_in_State	-271 ** (129)	-\$128 **
Similarity of Markets/ Viewers	Demog_Variety	-79 (55)	-\$24
	Mkt_Size_Variety	0.15 ** (0.08)	\$558 **
Networks	Network_Owned	-6,800 (4,512)	-\$476
	Num_Same_Net	-250 * (129)	-\$1,200 *
Cable Providers	Num_New_Cables	150 (198)	-\$330
Revenue-side group fixed effect		0.98 *** (0.007)	
Number of hypothetical sales used in minimum distance estimator		25,900	

Dependent variable is annual station cost, in thousands of 2008 dollars.  
Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.  
Refer to Table 1 for variable definitions.  
\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

Table 3: Robustness Check: Effect of Ownership and Competition Variables on Viewership, Using Only Transactions Newly Allowed by Deregulation

Variables		Coefficient	In thousands of households, how does the average change in this variable from 1995 to 2007 affect 2007 station viewership?†	
Time trend (years since 1996)		-1,808 *** (89)		
Years_on_Air		2,018 *** (68)		
Ownership variables	Duopoly	469 (295)	79 **	
		* Time trend (32)		
	Size/Geography	Num_in_Country (12.8)	223 ***	
		* Time trend (1.26)		
	Size/Geography	Num_in_State (129)	-18 ***	
		* Time trend (12.2)		
	Size/Geography	Avg_Dist (0.50)	58 *	
		* Time trend (0.03)		
	Similarity of Markets/Viewers	Mkt_Size_Variety (0.021)	-265 ***	
		* Time trend (0.001)		
		Demog_Variety (24.9)		0.3 **
	* Time trend (1.48)			
	Networks	Network_Owned (421)	90 ***	
	Competition variables	Duopoly <i>among competitors</i>	261.0 (176.2)	68
Num_in_Country <i>average among competitors</i>			-48.7 *** (18.8)	-502 ***
Size/Geography		Num_in_State <i>average among competitors</i>	-112.05 (243.83)	-45
		Avg_Dist <i>average among competitors</i>	1.41 ** (0.64)	195 **
Similarity of Markets/Viewers		Demog_Variety <i>average among competitors</i>	7.8 (23.8)	23
		Mkt_Size_Variety <i>average among competitors</i>	-0.037 (0.026)	-127
Networks		Network_Owned <i>sum in market</i>	350 *** (82)	245 ***
		Num_Major_Nets	105.4 (184.2)	11
Years_on_Air <i>average among competitors</i>		28.5 (31.1)	185	
R-squared		0.9865		
Observations		5,493		

Dependent variable is station viewership, in thousands of households. Station, firm, year and network fixed effects are included. Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

† In this column, the \*, \* and \*\*\* refer, where applicable, to the joint statistical significance of the two coefficients (that is, the coefficient for the variable and the coefficient for the variable interacted with the time trend).

Table 4: Robustness Check: Effect of Ownership and Competition Variables on Revenue, Including Sales/Marketing Agreements

		Variables	Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station revenue?		
		Time trend (years since 1996)	-1,151 *** (156)			
		Years_on_Air	1,285 *** (134)			
		Viewers	0.69 *** (0.02)	-\$907 ***		
Ownership variables	Similarity of Markets/Viewers	Duopoly	-659 (580)	\$192 **		
		* Time trend	152 ** (62)			
		Coverage	0.32 *** (0.05)	\$3,159 ***		
		* Time trend	0.0015 (0.0027)			
		Num_Mkts	-120 *** (43)	-\$1,087 ***		
		* Time trend	0.1 (2.9)			
		Cov_of_Region	-912 (996)	\$16 *		
		* Time trend	103 (142)			
			Demog_Variety	-57.4 ** (22.3)	-\$9 **	
			* Time trend	2.43 * (1.34)		
			Network_Owned	1,145 (783)	\$80	
			Network_Concentration	-132 (133)	\$39 ***	
			* Time trend	19.1 (14.7)		
			Network_Domination	14,780 *** (3,975)	-\$40 ***	
			* Time trend	-1,508 *** (381)		
			Cable overlap	959 (812)	\$62 **	
			* Time trend	-181 *** (68)		
		Competition variables	Similarity of Markets/Viewers	Years_on_Air <i>average among competitors</i>	1,285 *** (134)	\$8,351 ***
				Duopoly <i>among competitors</i>	-708 *** (231)	-\$184 ***
				Coverage <i>average among competitors</i>	-0.22 *** (0.05)	-\$1,696 ***
Num_Mkts <i>average among competitors</i>	111.9 *** (42)			\$884 ***		
Cov_of_Region <i>average among competitors</i>	-2,540 (1,616)			-\$178		
	Demog_Variety <i>average among competitors</i>			-58.0 ** (22.7)	-\$168 **	
	Network_Owned <i>sum in market</i>			564 *** (149)	\$395 ***	
	Num_Major_Nets			156 (240)	\$16	
	Net_Concentration <i>average among competitors</i>			416 * (229)	\$208 *	
	Cable_Overlap <i>average among competitors</i>			1,857 ** (824)	\$56 **	
	R-squared			0.9885		
	Observations			9,845		

Dependent variable is annual station revenue in thousands of 2008 dollars. Station, firm, year and network fixed effects are included. Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

† In this column, the \*, \* and \*\*\* refer, where applicable, to the joint statistical significance of the two coefficients (that is, the coefficient for the variable and the coefficient for the variable interacted with the time trend).

Table 5: Robustness Check: Effect of Ownership and Competition Variables on Viewership, Including Sales/Marketing Agreements

		Variables	Coefficient	In thousands of households, how does the average change in this variable from 1995 to 2007 affect 2007 station viewership?†	
		Time trend (years since 1996)	-1,919 *** (81)		
		Years_on_Air	2,023.7 *** (77.0)		
Ownership variables	Size/Geography	Duopoly	422 * (227)	56 **	
		* Time trend	-12 (25)		
		Num_in_Country	68.7 *** (9.9)	339 ***	
		* Time trend	-3.67 *** (0.77)		
		Num_in_State	-232 ** (91)	22 ***	
		* Time trend	25.4 *** (8.8)		
		Avg_Dist	-0.55 ** (0.27)	0 *	
		* Time trend	0.05 *** (0.02)		
		Similarity of Markets/Viewers	Mkt_Size_Variety	-0.044 *** (0.014)	-237 ***
			* Time trend	-0.002 ** (0.001)	
			Demog_Variety	22.0 * (11.9)	0.9 **
			* Time trend	-1.72 ** (0.69)	
		Networks	Network_Owned	1,474 *** (348)	103 ***
		Competition variables	Size/Geography	Duopoly	116.1 (112.4)
<i>among competitors</i>					
Num_in_Country	-25.8 ** (11.0)			-266 **	
<i>average among competitors</i>					
Size/Geography	Num_in_State		-176.84 (135.82)	-71	
	<i>average among competitors</i>				
	Avg_Dist		0.46 (0.36)	64	
	<i>average among competitors</i>				
Similarity of Markets/Viewers	Demog_Variety		14.5 (13.1)	42	
	<i>average among competitors</i>				
	Mkt_Size_Variety		0.000 (0.000)	0	
Networks	Network_Owned		267 *** (57)	187 ***	
	<i>sum in market</i>				
	Num_Major_Nets		-35.6 (114.6)	-4	
		Years_on_Air	2,023.7 *** (77.0)	13,154 ***	
		<i>average among competitors</i>			
		R-squared	0.9863		
		Observations	9,871		

Dependent variable is station viewership, in thousands of households. Station, firm, year and network fixed effects are included. Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

† In this column, the \*, \* and \*\*\* refer, where applicable, to the joint statistical significance of the two coefficients (that is, the coefficient for the variable and the coefficient for the variable interacted with the time trend).



Table 6: Robustness Check: Piecewise Linear Specification for Revenue per Viewer

			In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station revenue?†
Variables	Coefficient		
Time trend (years since 1996)	-1,219 *** (187)		
Years_on_Air	1,397 *** (169)		
Viewers1	0.04 (0.69)		
Viewers2	0.65 (0.47)		
Viewers3	0.91 ** (0.42)		
Viewers4	0.24 (0.35)		
Viewers5	0.82 *** (0.27)		
Viewers6	0.78 *** (0.20)		
Viewers7	0.71 *** (0.16)		
Viewers8	0.87 *** (0.11)		
Viewers9	1.04 *** (0.07)		
Viewers10	0.56 *** (0.03)		
Ownership variables Similarity of Markets/ Viewers	Duopoly	-894 (628)	\$163 **
	* Time trend	159 ** (69)	
	Coverage	0.32 *** (0.06)	\$2,991 ***
	* Time trend	0.00018 (0.0027)	
	Num_Mkts	-96 ** (43)	-\$1,222 ***
	* Time trend	-3.5 (3.0)	
	Cov_of_Region	-2,838 *** (1,015)	\$26 *
	* Time trend	292 ** (146)	
	Demog_Variety	-65.5 *** (22.3)	-\$12 **
	* Time trend	2.41 * (1.34)	
	Network_Owned	1,345 * (784)	\$94 *
	Network_Concentration	-430 *** (134)	-\$204 ***
	* Time trend	2.0 (14.6)	
	Network_Domination	11,551 *** (4,021)	-\$2 ***
	* Time trend	-1,057 *** (388)	
	Cable overlap	752 (822)	\$71 **
	* Time trend	-177 ** (69)	
	R-squared	0.9886	
Observations	9,762		

Dependent variable is annual station revenue in thousands of 2008 dollars. Station, firm, year and network fixed effects are included.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

† In this column, the \*, \* and \*\*\* refer, where applicable, to the joint statistical significance of the two coefficients (that is, the coefficient for the variable and the coefficient for the variable interacted with the time trend).

Table 7: Robustness Check: Piecewise Linear Specification for Revenue per Viewer, con't

	<u>F-statistic in test of difference between coefficients</u>									
	Viewers1	Viewers2	Viewers3	Viewers4	Viewers5	Viewers6	Viewers7	Viewers8	Viewers9	Viewers10
Viewers1	.	0.5751	0.3490	0.8907	0.3557	0.3772	0.4318	0.3049	0.2006	0.5598
Viewers2	0.5751	.	0.7839	0.4571	0.7754	0.8352	0.9541	0.6968	0.4502	0.7878
Viewers3	0.3490	0.7839	.	0.3349	0.9203	0.8356	0.6983	0.9700	0.7213	0.4366
Viewers4	0.8907	0.4571	0.3349	.	0.2687	0.1843	0.2485	0.0997	0.0309	0.4046
Viewers5	0.3557	0.7754	0.9203	0.2687	.	0.9007	0.6825	0.9135	0.4757	0.3070
Viewers6	0.3772	0.8352	0.8356	0.1843	0.9007	.	0.7978	0.7978	0.2474	0.2592
Viewers7	0.4318	0.9541	0.6983	0.2485	0.6825	0.7978	.	0.4814	0.0609	0.3482
Viewers8	0.3049	0.6968	0.9700	0.0997	0.9135	0.7978	0.4814	.	0.2628	0.0075
Viewers9	0.2006	0.4502	0.7213	0.0309	0.4757	0.2474	0.0609	0.2628	.	0.0000
Viewers10	0.5598	0.7878	0.4366	0.4046	0.3070	0.2592	0.3482	0.0075	0.0000	.

Table 8: Robustness Check: Effect of Ownership and Competition Variables on Revenue, Logged Transformation

Variables	Coefficient	In percentage terms, how does the average change in this variable from 1995 to 2007 affect 2007 station revenue? (Rough estimate)	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station revenue?† (Very rough estimate‡)	
Time trend (years since 1996)	-0.14 *** (0.007)			
Years_on_Air	0.16 *** (0.006)			
Viewers	0.00002 *** (0.000001)	-2% ***	-\$468 ***	
<b>Ownership variables</b>				
Similarity of Markets/ Viewers	Duopoly	-0.01887 (0.02298)	0.3%	\$60
	* Time trend	0.00321 (0.00253)		
	Coverage	0.0000141 *** (0.0000020)	12% ***	\$2,315 ***
	* Time trend	-0.0000001 (0.0000001)		
	Num_Mkts	0.00029 (0.00159)	-7% ***	-\$1,327 ***
	* Time trend	-0.00072 *** (0.00011)		
	Cov_of_Region	-0.01992 (0.03718)	0.1%	\$20
	* Time trend	0.00316 (0.00536)		
	Demog_Variety	-0.00014 (0.00082)	0.1% **	\$10 **
	* Time trend	0.00018 *** (0.00005)		
	Network_Owned	0.07910 *** 0.02868	0.6% ***	\$106 ***
	Network_Concentration	0.01082 ** (0.00492)	-0.7% ***	-\$142 ***
* Time trend	-0.00233 *** (0.00053)			
Network_Domination	-1.28435 *** (0.14612)	2% ***	\$317 ***	
* Time trend	0.18495 *** (0.01399)			
Cable overlap	0.05206 * (0.03008)	0.4% **	\$79 **	
* Time trend	-0.01101 *** (0.00252)			
<b>Competition variables</b>				
Similarity of Markets/ Viewers	Years_on_Air <i>average among competitors</i>	0.00558 *** (0.00142)	4% ***	\$696 ***
	Duopoly <i>among competitors</i>	-0.00562 (0.00869)	-0.1%	-\$28
	Coverage <i>average among competitors</i>	-0.0000032 * (0.0000018)	-3% *	-\$482 *
	Num_Mkts <i>average among competitors</i>	0.00311 ** (0.00154)	2% **	\$472 **
	Cov_of_Region <i>average among competitors</i>	-0.01505 (0.06002)	-0.1%	-\$20
	Demog_Variety <i>average among competitors</i>	0.00013 (0.00083)	0.0%	\$7
	Network_Owned <i>sum in market</i>	0.00364 (0.00557)	0.3%	\$49
	Num_Major_Nets	0.00595 (0.00883)	0.1%	\$11
	Net_Concentration <i>average among competitors</i>	0.00024 (0.00844)	0.01%	\$2
	Cable_Overlap <i>average among competitors</i>	0.03309 (0.03070)	0.1%	\$19
	R-squared	0.9997		
	Observations	9,762		

Dependent variable is logged annual station revenue in thousands of 2008 dollars. Station, firm, year and network fixed effects are included. Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

† In this column, the \*, \* and \*\*\* refer, where applicable, to the joint statistical significance of the two coefficients (that is, the coefficient for the variable and the coefficient for the variable interacted with the time trend).

‡ Evaluated at average revenue.

Table 9: Robustness Check: Effect of Ownership Variables on Cost, Logged Transformation

Variables		Coefficient	In percentage terms, how does the average change in this variable from 1995 to 2007 affect 2007 station cost? (Rough estimate)	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost? (Very rough estimate‡)
Size/Geography	Duopoly	-1.37	-26%	-\$4,946
	Num_in_Country	-0.0073	-9%	-\$1,674
	Avg_Dist	0.000074	0.5%	\$88
	Num_in_State	-0.11	-5%	-\$970
Similarity of Markets/ Viewers	Demog_Variety	0.0039	0.1%	\$22
	Mkt_Size_Variety	0.0000062	2%	\$426
Networks	Network_Owned	-4.36	-31%	-\$5,799
	Num_Same_Net	-0.071	-34%	-\$6,506
Cable Providers	Num_New_Cables	0.025	-5%	-\$1,029
Number of hypothetical sales used in minimum distance estimator		98,002		

Dependent variable is logged annual station cost, in thousands of 2008 dollars.

Standard errors are not computed for computational reasons

Refer to Table 1 for variable definitions.

‡ Using average annual station revenue as a very rough estimate of average annual station cost, since cost is unobserved. Evaluated at average values for  
\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

Table 10: Robustness Check: Effect of Ownership and Competition Variables on Viewership, Logged Transformation

Variables	Coefficient	In percentage terms, how does the average change in this variable from 1995 to 2007 affect 2007 station viewership? (Rough estimate)	In thousands of households, how does the average change in this variable from 1995 to 2007 affect 2007 station viewership?† (Very rough estimate)‡
Time trend (years since 1996)	-0.18834 *** (0.00655)		
Years_on_Air	0.19679 *** (0.00624)		
<b>Ownership variables</b>			
Size/Geography			
Duopoly	0.01043 (0.01951)	0.8%	95
* Time trend	0.00309 (0.00214)		
Num_in_Country	0.00906 *** (0.00080)	1.4% ***	155 ***
* Time trend	-0.00072 *** (0.00006)		
Num_in_State	-0.02476 *** (0.00731)	-0.3% ***	-29 ***
* Time trend	0.00175 ** (0.00070)		
Avg_Dist	-0.0000004 (0.000022)	0.2% *	19 *
* Time trend	0.0000025 * (0.000001)		
Similarity of Markets/Viewers			
Mkt_Size_Variety	-0.00000036 (0.0000011)	-0.3% ***	-32 ***
* Time trend	-0.00000004 (0.0000001)		
Demog_Variety	0.00042 (0.00096)	0.01% **	1 **
* Time trend	-0.00002 (0.00006)		
Networks			
Network_Owned	0.10186 *** (0.02789)	0.7% ***	80 ***
<b>Competition variables</b>			
Size/Geography			
Duopoly	0.00972 (0.00920)	0.3%	28
<i>among competitors</i>			
Num_in_Country	-0.00001 (0.00090)	0.0%	-2
<i>average among competitors</i>			
Num_in_State	-0.00381 (0.01093)	-0.2%	-17
<i>average among competitors</i>			
Avg_Dist	0.00005 * (0.00003)	0.7% *	75 *
<i>average among competitors</i>			
Similarity of Markets/Viewers			
Demog_Variety	-0.00040 (0.00103)	-0.1%	-13
<i>average among competitors</i>			
Mkt_Size_Variety	-0.00000012 (0.0000013)	0.0%	-4
<i>average among competitors</i>			
Networks			
Network_Owned	0.00643 (0.00465)	0.4%	51
<i>sum in market</i>			
Num_Major_Nets	-0.02503 *** (0.00917)	-0.3% ***	-28 ***
Years_on_Air	0.00059 (0.00147)	0.4%	43
<i>average among competitors</i>			
R-squared	0.9996		
Observations	9,784		

Dependent variable is logged station viewership, in thousands of households. Station, firm, year and network fixed effects are included.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

† In this column, the \*, \* and \*\*\* refer, where applicable, to the joint statistical significance of the two coefficients (that is, the coefficient for the variable and the coefficient for the variable interacted with the time trend).

‡ Evaluated at average viewership.

Table 11: Robustness Check: Effect of Ownership Variables on Cost, Small-Market Sample

Variables		Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?
Size/Geography	Duopoly	-1,350 (1,499)	-\$257
	Num_in_Country	40 (66)	\$480
	Avg_Dist	0.3 (0.3)	\$20
	Num_in_State	-321 *** (118)	-\$151 ***
Similarity of Markets/ Viewers	Demog_Variety	-42 (26)	-\$13
	Mkt_Size_Variety	0.39 *** (0.09)	\$1,408 ***
Networks	Network_Owned	-16,800 *** (4,471)	-\$1,176 ***
	Num_Same_Net	-243 ** (113)	-\$1,168 **
Cable Providers	Num_New_Cables	115 (105)	-\$254
Revenue-side group fixed effect		1.00 *** (0.002)	
Number of hypothetical sales used in minimum distance estimator		56,531	

Dependent variable is annual station cost, in thousands of 2008 dollars.

Cost estimator includes only markets not ranked in the top 50, in terms of viewing households.

Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

Table 12: Robustness Check: Effect of Ownership Variables on Cost, Big-Market Sample

Variables		Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?
Size/Geography	Duopoly	-6,600 *** (2,552)	-\$1,254 ***
	Num_in_Country	168 ** (78)	\$2,016 **
	Avg_Dist	0.9 *** (0.3)	\$59 ***
	Num_in_State	-533 *** (139)	-\$251 ***
Similarity of Markets/ Viewers	Demog_Variety	-65 *** (25)	-\$20 ***
	Mkt_Size_Variety	0.08 ** (0.04)	\$294 **
Networks	Network_Owned	-24,200 *** (7,747)	-\$1,694 ***
	Num_Same_Net	-286 *** (97)	-\$1,371 ***
Cable Providers	Num_New_Cables	54 (123)	-\$118
Revenue-side group fixed effect		1.00 *** (0.003)	
Number of hypothetical sales used in minimum distance estimator		41,471	

Dependent variable is annual station cost, in thousands of 2008 dollars.

Cost estimator includes only markets ranked in the top 50, in terms of viewing households.

Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

Table 13: Robustness Check: Effect of Ownership Variables on Cost, Small-Station Sample

Variables	Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?	
Size/Geography	Duopoly	-1,850 (2,175)	-\$352
	Num_in_Country	49 (59)	\$588
	Avg_Dist	0.5 (0.4)	\$33
	Num_in_State	-286 ** (118)	-\$134 **
Similarity of Markets/ Viewers	Demog_Variety	-45 (33)	-\$13
	Mkt_Size_Variety	0.32 *** (0.10)	\$1,167 ***
Networks	Network_Owned	-13,000 ** (5,116)	-\$910 **
	Num_Same_Net	-260 ** (128)	-\$1,248 **
Cable Providers	Num_New_Cables	154 (127)	-\$338
Revenue-side group fixed effect		1.00 *** (0.003)	
Number of hypothetical sales used in minimum distance estimator		46,125	

Dependent variable is annual station cost, in thousands of 2008 dollars.

Cost estimator includes only stations below the 50th percentile in 2007 revenue.

Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.



Table 14: Robustness Check: Effect of Ownership Variables on Cost, Big-Station Sample

Variables		Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?
Size/Geography	Duopoly	-7,350 *** (2,198)	-\$1,397 ***
	Num_in_Country	85 (53)	\$1,020
	Avg_Dist	0.4 (0.3)	\$24
	Num_in_State	-390 *** (104)	-\$183 ***
Similarity of Markets/ Viewers	Demog_Variety	-49 * (27)	-\$15 *
	Mkt_Size_Variety	0.12 *** (0.05)	\$432 ***
Networks	Network_Owned	-13,300 *** (4,628)	-\$931 ***
	Num_Same_Net	-303 *** (95)	-\$1,456 ***
Cable Providers	Num_New_Cables	31 (82)	-\$68
Revenue-side group fixed effect		1.00 *** (0.003)	
Number of hypothetical sales used in minimum distance estimator		51,877	

Dependent variable is annual station cost, in thousands of 2008 dollars.

Cost estimator includes only stations above the 50th percentile in 2007 revenue.

Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

Table 15: Robustness Check: Effect of Ownership Variables on Cost, Using 2008 Industry Structure to Estimate Cost

Variables	Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?	
Size/Geography	Duopoly	-10,000 *** (2,481)	-\$1,900 ***
	Num_in_Country	127 ** (59)	\$1,523 **
	Avg_Dist	0.5 (0.4)	\$30
	Num_in_State	-643 *** (143)	-\$302 ***
Similarity of Markets/ Viewers	Demog_Variety	-53 ** (27)	-\$16 **
	Mkt_Size_Variety	0.02 (0.03)	\$86
Networks	Network_Owned	-26,000 *** (6,917)	-\$1,820 ***
	Num_Same_Net	-280 *** (90)	-\$1,344 ***
Cable Providers	Num_New_Cables	-192 (134)	\$423
Revenue-side group fixed effect		1.00 *** (0.003)	
Number of hypothetical sales used in minimum distance estimator		84,058	

Dependent variable is annual station cost, in thousands of 2008 dollars.

Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

Table 16: Robustness Check: Effect of Ownership Variables on Cost, Using 2009 Industry Structure to Estimate Cost

Variables	Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?	
Size/Geography	Duopoly	-200 (1,625)	-\$38
	Num_in_Country	-77 (57)	-\$923
	Avg_Dist	0.5 (0.4)	\$32
	Num_in_State	-207 * (116)	-\$97 *
Similarity of Markets/ Viewers	Demog_Variety	-43 (29)	-\$13
	Mkt_Size_Variety	-0.03 (0.04)	-\$124
Networks	Network_Owned	-12,300 *** (2,068)	-\$861 ***
	Num_Same_Net	-203 (130)	-\$976
Cable Providers	Num_New_Cables	169 (132)	-\$372
Revenue-side group fixed effect		1.00 *** (0.002)	
Number of hypothetical sales used in minimum distance estimator		81,277	

Dependent variable is annual station cost, in thousands of 2008 dollars.

Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.

Table 17: Robustness Check: Effect of Ownership Variables on Cost, Using 1995 Industry Structure to Estimate Cost

	Variables	Coefficient	In thousands of dollars, how does the average change in this variable from 1995 to 2007 affect 2007 station cost?
	Num_in_Country	279 *** (72)	\$3,353 ***
	Avg_Dist	-0.08 (0.2)	-\$5
	Num_in_Region	-283 *** (47)	-\$765 ***
Similarity of Markets/ Viewers	Demog_Variety	-54 ** (23)	-\$16 **
	Mkt_Size_Variety	0.03 (0.03)	\$125
Networks	Network_Owned	-3,100 ** (1,537)	-\$217 **
	Num_Same_Net	-413 *** (113)	-\$1,980 ***
Cable Providers	Num_New_Cables	-127 ** (54)	\$280 **
	Revenue-side group fixed effect	0.99 *** (0.003)	
	Number of hypothetical sales used in minimum distance estimator	74,540	

Dependent variable is annual station cost, in thousands of 2008 dollars.

Standard errors (in parentheses) are computed via bootstrapping, adjusted for estimation error in viewership and revenue regressions.

Refer to Table 1 for variable definitions.

\*\*\*, \*\*, \* Significant at, or below, 1, 5, 10 percent, respectively.