Employment and Wage Effects of Radio Consolidation

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Introduction

A typical headline laments: "Local Radio Loses a Distinctive Voice."[1] Another reports: "Radio News Facing Cutbacks: Consolidation in the Industry Brings Leaner Staffing."[2] A more pointed article offers a metaphor: "Localism Vanishing as N[ew] H[ampshire] Radio Is 'McDonaldized.' "[3] Such accounts often tell the story of a single veteran disk jockey, ousted from his or her longtime on-air slot, often at the decision of large companies like Clear Channel, Viacom, Radio One, or their pre-merger predecessors. Many commentators point to the brisk pace of ownership consolidation—the phenomenon of mergers and acquisitions leading to a more concentrated market structure in the industry—as the primary cause of local radio employees losing their jobs. One article quotes an estimate that "10,000 radio-related jobs" disappeared between 1996 and 2002.[4] The Telecommunications Act of 1996 eliminated the national ownership limit for owners of radio stations while relaxing the limits on local radio ownership.[5] In this article, I examine how increased concentration of radio station ownership relates to employment and wages in three radio-industry occupations by analyzing data from the seven years following the Telecommunications Act (1996 to 2003).

While the employment effects of consolidation have economic importance in their own right, they also fall under the purview of the FCC's major policy goals[6] of ensuring localism and fostering diversity. One journalist in Detroit, where four firms garner over eighty percent market share,[7] argues that "radio programming leaves little room to showcase local musicians, and there has been an invasion of syndicated shows and on-air personalities spliced in from distant cities via computer" and observes that "[s]yndicated hosts . . . threaten local jobs."[8] The author concludes, under the heading "Loss of Jobs," that "[r]adio analysts are convinced that many practices the big chains are responsible for—the de-emphasis on local content—save[] money,

but will ultimately kill local radio."[9] A radio station's choice to carry remotely produced programming, while it may satisfy some listeners' preferences, may simultaneously detract from localism and reduce employment. To the extent that consolidated firms have a stronger tendency to rely on syndication, voice tracking technology, or national programming than smaller firms, larger job losses (or smaller job gains) will accompany greater ownership concentration. Furthermore, if media mergers lead to job losses on a local level, then media outlets could become less familiar with and less responsive to the local communities in which they are based. And thinner ranks of disk jockeys and news reporters may mean less diverse choices of music and news stories. Empirical analysis shows that the FCC should concern itself with the threat to localism and diversity that job losses (and, indirectly, wage reductions) represent.

Common sense—as well as much anecdotal and qualitative evidence in the public debate over media regulation—holds that media mergers have led to downsizing. After all, the proponents of relaxed ownership rules argued that more restrictive rules prevented media firms from exploiting economies of scale. That is to say, commentators on all sides expected consolidators to centralize some functions that previously existed separately in separately owned stations. But studies using aggregate data can test these theories and verify anecdotal claims, like those quoted above from post-Telecommunications-Act newspaper accounts. Quantitative analysis allows one to ask more formally whether ownership consolidation has led to job losses or wage reductions. Furthermore, it allows one to estimate the magnitude of those relationships and to determine whether different occupations within the radio industry have experienced different levels of employment decreases and wage decreases.

Using data from the Occupational Employment Survey of the U.S. Bureau of Labor Statistics, I estimate the effects of radio consolidation on employment and wages for three

occupations: announcers, news reporters, and broadcast technicians. I find that, comparing figures across metropolitan areas, an increase in the number of stations per owner within a metropolitan area was associated with both lower employment levels and lower wages during the years 1996 to 2003. Whether this represents a causal effect of radio consolidation, in the sense that increasing the concentration of ownership within a particular market over time would in fact lead to job losses and lower wages, is a more difficult question. I conclude that the relationship between greater consolidation and lower levels of employment and wages probably pre-dates the Telecommunications Act of 1996; the data studied in this article do not answer definitively whether consolidation "causes" job loss or wage reductions in the sense described above. Yet the strong correlation between radio consolidation, job losses, and lower wages for common radio occupations remains an important fact for policymakers at the FCC as they seek to promote localism and diversity in radio programming.

I. Industry Context

Beginning in the 1980s, Congress and the FCC passed statutes and adopted regulations to relax the limits on national and local radio ownership.[10] But the most dramatic changes to ownership policy in radio arrived with the Telecommunications Act of 1996. In that legislation, Congress repealed the national radio ownership limit, which previously capped a firm's holdings at forty stations. Moreover, Congress raised the local radio ownership limit from a sliding scale of three to four stations, depending on the total number of stations in a market, to a sliding scale of five to eight stations. As a result, many stations changed hands and many firms merged. The national radio market became much more concentrated; by spring 2002 the ten largest firms had two-thirds market share and the two largest (Clear Channel and Viacom) combined for over forty

percent market share.[11] Local radio markets became highly concentrated—in almost every metropolitan area, the four largest firms together had over seventy percent market share.[12] That figure generally exceeded ninety percent in smaller markets (that is, in all but the fifty largest U.S. cities).[13] This article will focus on local radio markets in order to study the corresponding local labor markets for radio-industry occupations.

While advocating the relaxation or elimination of various media ownership rules, both before the passage of the Telecommunications Act and later in debate over the FCC's recent biennial review of its media ownership rules,[14] media companies and some commentators often argued that media companies were poised to benefit from economies of scale if allowed to grow bigger and to centralize some operations.[15] In other words, two stations that each required ten employees when separately owned could, in theory, be staffed by fewer than twenty employees when jointly owned. Implicit in the economies-of-scale theory is a promise to shareholders to reduce the number of employees needed to support the same number of broadcast outlets. If media companies made good on their stated intentions, then one should observe lower employment levels in more consolidated markets.

Theoretical predictions of the effect of radio consolidation on wages in particular occupations are more ambiguous. Decreased demand for labor resulting from economies of scale could depress wages, based on a simple supply-and-demand diagram. But surely such a model is too simple. Technological developments facilitated by economies of scale could enhance productivity per worker. Macroeconomic trends could exert pressure on industry-wide wages. Perhaps most importantly, layoffs might target employees with above-average or below-average wages compared to the industry as a whole. The wage effects of firms' layoff choices will depend on many factors that are difficult to observe, especially at the aggregate level, such

as the particular organizational structure of firms and the wage profile of the particular employees laid off.

New technologies and organizational strategies have indeed arisen in the wake of the Telecommunications Act. First, large radio companies can now adopt "voice tracking" technology. Voice tracking is the practice of broadcasting the show of a famous radio announcer (or DJ) nationwide while trying to make the show seem local.[16] Radio companies can enjoy the cost savings that accompany syndication while appearing to tailor its programming to communities' needs. Second, radio companies now plan much of their programming centrally. DJs have less choice; market-testing of ten-second song snippets has become prevalent; and payola-like practices have allegedly affected programming decisions. To the extent that more programming decisions occur centrally, fewer DJs and program directors are needed.[17] Third, there have been large radio firms that appear to take advantage of their size to hire fewer broadcast technicians. Consider the now-infamous incident in Minot, North Dakota, which arose when a train carrying ammonia fertilizer derailed, releasing deadly ammonia gas.[18] When local officials sought to broadcast warnings on the radio, no one at the designated emergency broadcast station (KCJB, owned by Clear Channel) was available at the station to answer the phone.[19] The allocation of labor across radio stations delayed an emergency response team's attempts alert to their local community. These three examples show that firms in the radio industry have in fact attempted to exploit economies of scale.

Consolidation of operations like the engineering tasks performed by broadcast technicians represents centralization within a local market. What used to be two jobs in a particular city becomes one job. Some centralization of programming occurs on a local level as well. If two stations had separate radio newsrooms but become jointly owned, the consolidator

will probably close one of the newsrooms. The phenomenon of "simulcasting" functions similarly. An owner of multiple stations within a market might choose to rebroadcast all or part of one station's programming on one of the jointly owned stations within the same local market. One reason a firm might do this is to increase signal reach; its broadcast towers could stand on either side of a large city, both considered part of the same market. A decision to simulcast by a consolidating firm, like other strategies of local centralization, will cause job losses.

Centralization on a national scale also shrinks radio-industry employment, but in a more complicated fashion because of the interplay between the national and local levels of organization. It is unclear whether the more consolidated local markets will experience relatively more job loss as a result of nationally centralized programming. Syndication and voice tracking have developed within larger firms, which tend to have holdings in larger markets.[20] Larger markets, in turn, tend have less concentrated ownership than smaller markets, on average. Together these facts suggest that less consolidated markets might experience more of the job loss caused by national centralization. On the other hand, if a consolidating firm happens to locate some of its centralized operations in a particular market, that city might retain (or even gain) radio jobs. Syndicated shows and voice-tracked programs employ at least a few people and have to locate somewhere. Radio firms may choose to centralize operations in larger metropolitan areas, resulting in more job losses within small markets, which generally have more concentrated ownership. In general, the location of jobs after a firm implements more nationally centralized programming will depend on the firm's particular strategy, its existing employment allocations across stations, and other hard-to-measure factors. Thus, national centralization may influence the correlation between local-market consolidation and job loss positively or negatively. Overall, however, based on the impact of the various forms of local centralization discussed

above, one would predict that greater consolidation in a local market should lead to lower employment levels in that market.

II. Regulatory Framework

Labor markets are not explicitly contemplated in standard descriptions of the FCC's three overarching policy goals of competition, diversity, and localism. So where does analysis of radio consolidation, employment, and wages fit into the FCC's regulatory framework? I argue that the employment levels and wages of those in radio-industry occupations are highly relevant to whether broadcasters adequately serve local communities. The notion that employing local residents may contribute to community responsiveness runs through many of the public debates over issues like syndication and nationalization. Lower wages could indirectly decrease the quality of local radio programming by providing talented media employees with less incentive to work in radio. Labor-market issues also affect diversity, particularly viewpoint diversity, since job losses mean fewer participants in media production and fewer participants means fewer viewpoints. But employment issues relate most closely to localism.

Phillip Napoli has identified two major strains within policymakers' and scholars' thinking about the goal of localism.[21] Both can accommodate a concern for what occurs in the labor markets for radio occupations. The first theory conceives of localism geographically. As Napoli explains, under this theory "any program produced and presented within a local community would be seen as contributing to the fulfillment of the localism ideal."[22] This geographic conception depends on local production and thus on local employees. In this way, local labor markets become highly relevant to the localism goal, with job losses thwarting its achievement. The second theory focuses more on content; in this conception "the localism

principle is only fulfilled if the programming addresses the unique needs and interests of the local community."[23] Whether radio employees are local to a geography (such as a city, town, or metropolitan area) will relate to the second conception of localism under two conditions: (a) if one decides that geographic definitions of "community" remain important despite mass-media technology, perhaps in light of state and local politics; and (b) if one thinks that radio employees' physical presence in a community will promote responsiveness to community needs. This article will not address whether those two conditions hold. But if those conditions did hold true, then the employment effects of radio consolidation would matter a great deal for localism.

Historically, the FCC has scrutinized the organization and location of work in media industries, so labor-market issues have always been part of the localism goal, whether directly or indirectly. Section 307(b) of the Communications Act, which the Senate has recently called the "pole star" of telecommunications regulation,[24] directs:

> In considering applications for licenses, and modifications and renewals thereof, when and insofar as there is demand for the same, the Commission shall make such distribution of licenses, frequencies, hours of operation, and of power among the several States and communities as to provide a fair, efficient, and equitable distribution of radio service to each of the same.[25]

By directing the FCC to consider "communities" and the distribution of licenses among them, the statute created a foundation for considering whether stations serve local communities well. When the FCC still conducted initial assignment hearings, two of the seven factors required applicants to show that "there is a need for the proposed broadcast station in the community" and that they "will be responsive to local community needs."[26] These factors related to employment issues only indirectly. But in comparative hearings, the FCC would consider the "full-time participation in station operation by owners" and explained that "[w]hile . . . integration of ownership and management is important per se, its value is increased if the participating owners are local residents."[27] The FCC argued that local residents could respond to changing

community needs better than non-locals. Thus, in the days of licensing hearings, FCC policy connected the localism goal to the geographic location of station employees, specifically the day-to-day managers.

Of course, the U.S. Court of Appeals for the D.C. Circuit struck down the integration criterion for ownership and management in 1993 in *Bechtel v. FCC*,[28] and Congress and the FCC have done away with comparative licensing hearings.[29] But those facts do not imply that the FCC may not consider labor-market issues in the course of regulating broadcast. The norms behind the former integration preference survive in the two theories described above, not to mention the ideals still reflected in Section 307(b). If eliminating the national radio ownership limit and relaxing local radio ownership limits led to detrimental effects on localism and diversity, then the FCC can and should examine them. The court in *Bechtel* had a multi-pronged rationale for overturning the integration preference, including concerns about the particular implementation of the FCC's policy and the ease of circumventing it.[30] Most importantly, the court wanted to see some kind of empirical evidence to support the FCC's policy,[31] a common theme in recent administrative-law reviews of FCC policy.[32] Suppose, for example, that the FCC collected empirical evidence linking consolidation to job loss, and coupled it with evidence associating local employees with responsiveness to their geographic community. Then, in accordance with its localism goal, the FCC could take action (such as maintaining or even reducing ownership caps) and have a strong argument that a reviewing court should show deference to its decision.

Recently the FCC launched a Localism Task Force "to gather empirical data on broadcast localism, and to advise the Commission on concrete steps to promote this significant policy goal."[33] The commission announced its intentions to investigate some of the issues discussed

above in Part I, such as voice tracking,[34] national playlists,[35] diminished political news coverage,[36] and disaster warnings.[37] In this article, I will study the labor markets for the very occupations involved in these policy debates: on-air announcers (including disk jockeys), broadcast news reporters, and broadcast technicians. Thus the employment effects of radio consolidation provide the FCC with another angle from which to research the issues it has recently deemed most important for achieving the ideal of localism.

III. Labor Market Trends

General labor-market trends in employment and wages in radio provide context for analyzing the labor-market effects of radio consolidation. The Current Employment Statistics survey (CES), conducted and published by the Bureau of Labor Statistics (BLS) can provide a broad overview. Chart 1 shows industry-wide employment levels over time for the radio industry as well as the television industry, for comparison.[38] (The dotted line marks the passage of the Telecommunications Act of 1996.) From this chart, it appears that radio employment has stagnated, while from 1992 onward television employment has increased. This may reflect factors beyond radio deregulation, such as the upsurge of cable television along with cable music channels.

Chart 1
Industry-Wide Employment 1982–2004

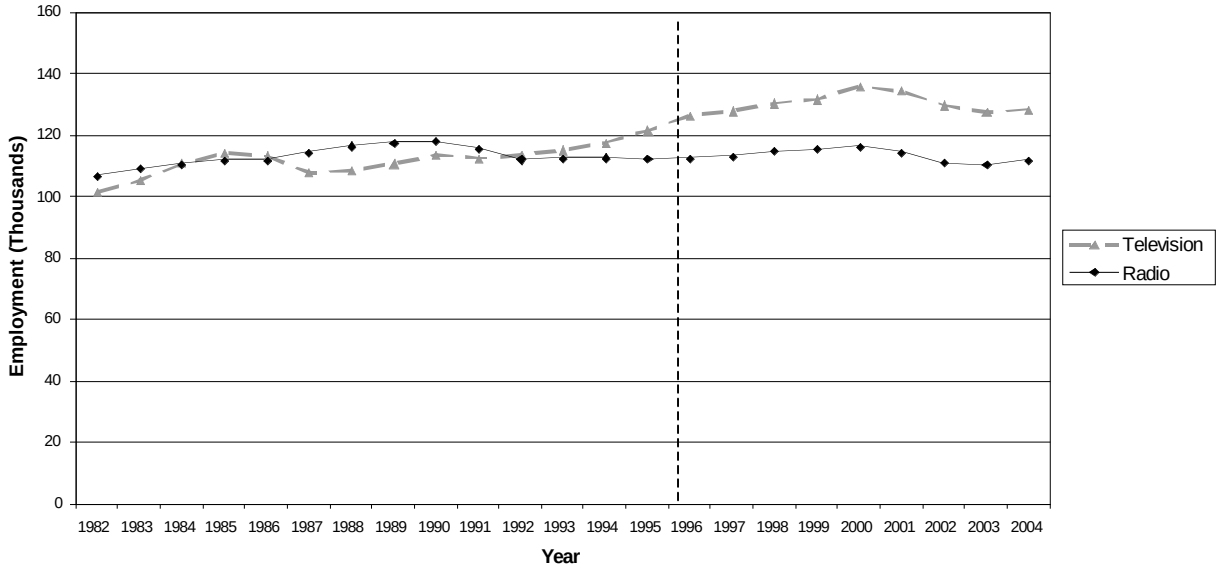
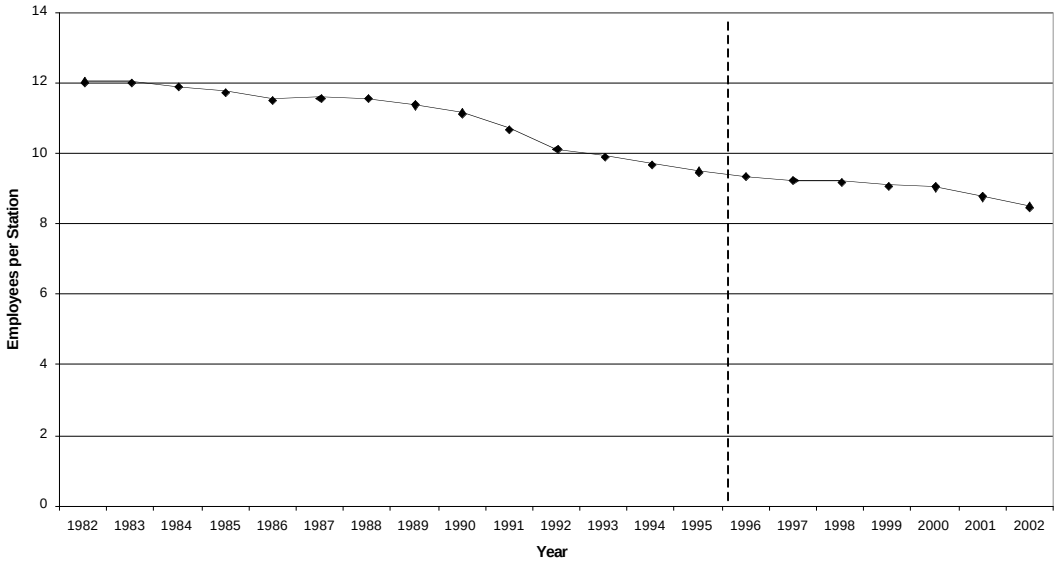


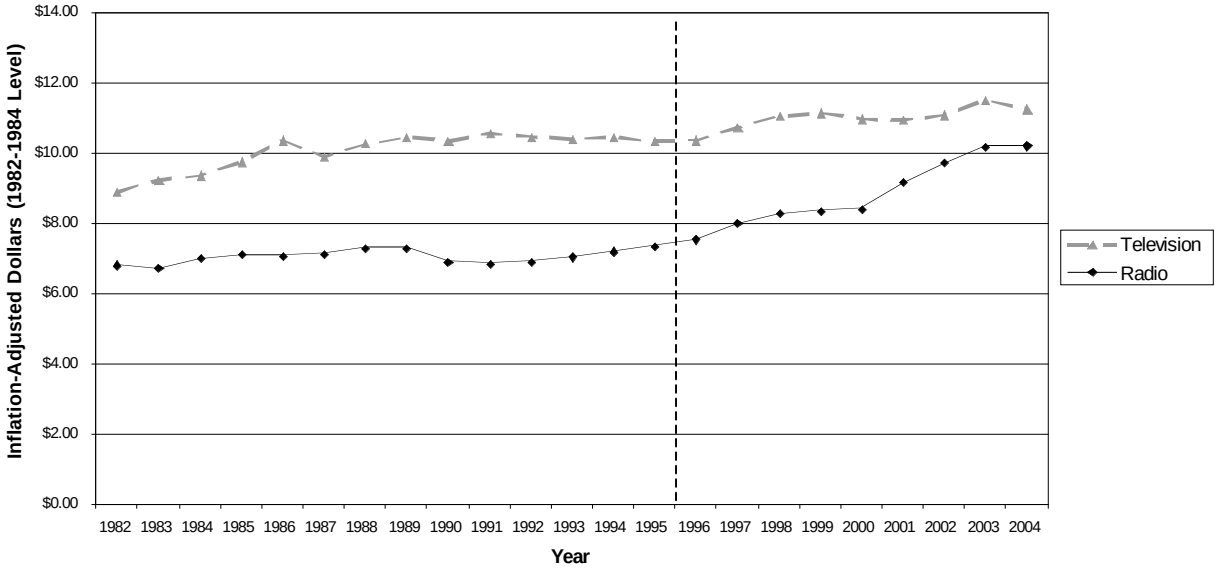
Chart 2 adjusts the aggregate radio employment figures for the number of stations in the U.S.[39] It appears that the late 1980s and early 1990s actually brought about the most significant decrease in employment per station over the past two decades. From 1988 to 1995, employment per station dropped from 11.65 to 9.54, an 18.1% decrease. In the period following the Telecommunications Act of 1996, employment per station has continued to drop (from 9.54 to 8.70), but by only 8.8%. The decline between 1988 and 1995 might be explained by the incremental steps of deregulation that occurred in 1984 and 1992, that is, the gradual relaxation of both the national and local radio ownership limits. The precipitous decline may also signify a period of sagging financial outcomes for radio firms; the Telecommunications Act was pitched as a way to rescue ailing radio firms.[40]

Chart 2
Radio Employment Per Station 1982–2002



Real wages in the radio industry show a steady upward trend over the past two decades, as illustrated in Chart 3.[41] Over the period from 1995 to 2004, real wages increased 38.7 percent; this compares to 3.3 percent increase from 1988 to 1995. Macroeconomic trends have no doubt influenced these figures, perhaps in unpredictable ways, but it appears from the aggregate statistics that since the Telecommunications Act of 1996, employment per station in the radio industry has declined a total of about nine percent while real wages have risen by almost thirty-nine percent.

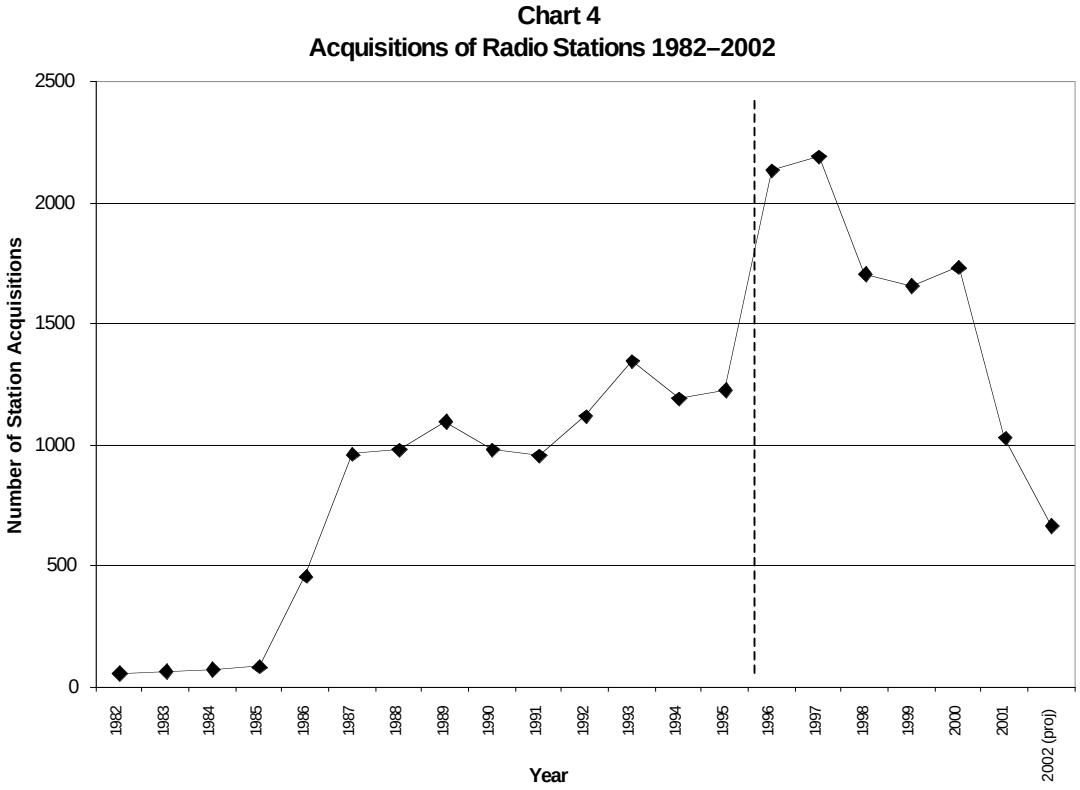
Chart 3
Industry-Wide Average Hourly Wage, 1982–2004



In sum, total employment in the radio industry has been steady. But this, together with the growth in the number of licensed stations, means that employment per station has declined in each of the past two decades. On average, each radio licensee utilizes fewer labor resources to produce its programming. The regulatory changes of 1996 came at a time when job losses already occurred fairly frequently; this accords with anecdotal accounts. Real wages, in contrast, have increased sharply in the years following the Telecommunications Act.

IV. Methodology and Data Sources

Consolidation rarely occurs in a quick, coordinated way. This makes it difficult, in general, to isolate the effects of consolidation on labor market outcomes. But in the radio industry, the removal of certain regulations directly limiting the size of firms resulted in an industry-wide wave of consolidation within a relatively short period of time. Fast-paced change has occurred in radio since the passage of the Telecommunications Act of 1996, as shown by the time series of station acquisitions displayed in Chart 4.[42]



The brisk pace of consolidation provides a source of variation. Different markets started from different levels of concentration and experienced consolidation at different rates over time. Using this variation in consolidation, I use ownership concentration as an explanatory variable in a series of panel regressions with employment and wages as the outcomes. Chart 4 shows that the pace of consolidation peaked in 1996–1997 and slowed by 2001–2002. Since the change in consolidation occurred over a relatively brief span of time, one can hope that fewer unobserved, confounding factors have influenced consolidation, employment and wages, or their relationship.

The Occupational Employment Survey (OES), conducted by the BLS, contains data on employment and wages, broken down by occupation and by metropolitan statistical area (MSA), in non-agricultural industries. In 1998, the BLS began conducting the OES on a yearly basis, rather than once every three years.[43] In 2003, the OES shifted again, to a twice-yearly format.

Each release of the OES contains data looking back on three years. In this article I use OES data from the 1998 release through the November 2003 release; thus, I have employment and wage data from 1996 to late 2003. The advantage of the OES data for studying the radio industry is that three occupations of interest can be studied: (1) announcers; (2) news analysts, reporters, and correspondents ("news reporters"); and (3) broadcast technicians. Table 1 displays some summary statistics on the OES occupational data; note that until recently the OES aggregated radio and television into one industry group.[44]

Table 1: Occupation Employment Survey
Summary Statistics, Radio and Television Industries

Occupation	Year	Employment in Radio & TV	% Radio & TV	% Just Radio	Mean Hourly Real Wage	Median Hourly Real Wage	Mean/ Median
Announcers	1998	46,100	93.8%	—	$11.44	$8.51	1.34
	1999	45,010	89.3%	—	$11.98	$8.68	1.38
	2000	42,220	84.8%	—	$12.44	$9.03	1.38
	2001	40,990	81.3%	—	$12.22	$8.90	1.37
	2002	40,280	80.9%	73.6%	$12.70	$8.93	1.42
	2003(May)	38,990	79.0%	71.4%	$12.43	$8.86	1.40
	2003(Nov.)	38,350	78.7%	70.8%	$12.64	$9.03	1.40
News Reporters	1998	11,320	21.6%	—	$18.65	$13.35	1.40
	1999	17,530	27.1%	—	$19.39	$14.16	1.37
	2000	19,900	30.2%	—	$20.64	$15.27	1.35
	2001	19,020	29.7%	—	$20.12	$15.02	1.34
	2002	16,890	27.6%	6.8%	$20.15	$14.52	1.39
	2003(May)	16,350	27.1%	6.3%	$20.69	$14.81	1.40
	2003(Nov.)	17,480	28.6%	6.9%	$21.21	$15.47	1.37
Broadcast Technicians	1998	22,990	61.7%	—	$13.72	$10.70	1.28
	1999	19,820	77.5%	—	$12.57	$10.15	1.24
	2000	24,610	73.3%	—	$14.57	$10.80	1.35
	2001	21,960	70.6%	—	$14.37	$10.98	1.31
	2002	21,210	67.3%	20.1%	$13.94	$10.63	1.31
	2003(May)	21,820	66.6%	21.2%	$13.72	$10.52	1.30
	2003(Nov.)	21,230	68.6%	22.8%	$13.58	$10.82	1.25

I merged the OES data with information from BIA Financial Networks' Media Access Pro (Radio Version) database, which contains information about every radio station in the U.S., including ownership history, ratings, and estimated revenue. The database classifies stations by "Arbitron markets," geographical areas roughly corresponding to MSAs used by the Arbitron

Company.[45] I matched MSAs with Arbitron markets wherever possible to produce a panel data set with 246 markets and 7 time periods (1998 through 2002, plus May 2003 and November 2003). Since the OES does not survey firms in every market about every occupation in every year, several of the potential observations in the panel are missing.

The panel data set I constructed has four main drawbacks. First, while the OES samples about 400,000 establishments each year, the sample sizes for an individual occupation in a particular market-year combination can be tiny (or zero, when the market-year observation is missing). Second, to use the occupational data in the OES, one must look at all individuals in a given occupation, not just the individuals in one industry-occupation combination. In other words, the outcome variables I use include some employees from non-radio industries, potentially confounding the effects of radio consolidation on radio employment, especially in the "news reporters" occupation. Third, the OES reports data only at the market level—so one cannot disaggregate the data to study issues like the employment effects when two previously independent stations come under common ownership. Fourth, both the OES and Media Access Pro data sets begin in 1996, eliminating the potential for pre/post analysis of the Telecommunications Act.[46] Despite these disadvantages, the panel data provide a number of interesting insights.

V. Regression Analysis

The unit of observation in my analysis is a market-year combination. As described above, the data set includes 246 markets and 7 time periods, with many market-year observations missing due to the nature of the OES. The labor-market outcome variables I analyze come in three groups of three: the number of employees, the mean hourly wage, and the median wage for

announcers, news reporters, and broadcast technicians. Sample sizes vary by both occupation and the particular outcome in question, again as a result of the OES survey methodology.

I study three explanatory variables for each market-year combination: number of stations, stations per owner, and the variance of stations owned. First, the number of radio stations in a market should affect employment simply because, all else equal, more stations will require more employees. I include both commercial and non-commercial stations, since both for-profit and non-profit employees can show up in the OES data. Second, the number of stations in a market divided by the number of firms owning stations provides a measure of consolidation. I will refer to this variable as "stations per owner," but it is important to remember that the variable is measured locally; stations owned in other markets are not taken into account. Third, the variance of stations owned by each firm within a market measures a second-order effect of consolidation that may relate to labor-market outcomes in the presence of economies of scale. Consider two markets, A and B, each with 20 total stations and each with 5 stations per owner. The holdings of the four owners in these hypothetical markets could differ considerably. For instance, in market A, each owner might have 5 stations, while in market B, two owners have 9 stations and two owners have just 1 station. The variance of stations owned captures such differences in ownership structure within markets.

Table 2 reports summary statistics for the panel data set.[47] Because the OES employment data include a greater number of missing values than the OES wage data, the sample sizes vary. Thus, Table 2 contains two sets of summary statistics for the outcome variables, one corresponding to the employment regressions and one corresponding to the wage regressions.

Table 2: Means, Standard Deviations, and Sample Sizes for Variables Used in Panel Regressions

		Occupation			
Category	**Variable**	Announcers	News Reporters	Broadcast Technicians	Total
Outcome Variables	Employment	183	275	196	—
		(215)	(426)	(360)	
		[1067]	[966]	[811]	
	Mean Hourly Wage ($)	13.08	17.47	13.80	—
		(3.77)	(4.35)	(3.50)	
		[1278]	[1114]	[891]	
	Median Wage ($)	10.24	15.13	12.37	—
		(2.58)	(3.90)	(3.56)	
		[1278]	[1114]	[891]	
For Employment Regressions	Total Stations in Market	32.7	35.0	37.8	27.0
		(17.9)	(18.6)	(18.3)	(16.6)
		[1067]	[966]	[811]	[2023]
	Stations per Owner	1.81	1.83	1.83	1.82
		(0.356)	(0.356)	(0.342)	(0.395)
		[1067]	[966]	[811]	[2023]
	Variance of Stations Owned	2.11	2.28	2.29	2.10
		(1.44)	(1.53)	(1.51)	(1.70)
		[1067]	[966]	[811]	[2022]
For Wage Regressions	Total Stations in Market	32.0	34.1	37.4	27.0
		(17.5)	(18.1)	(18.2)	(16.6)
		[1278]	[1114]	[891]	[2023]
	Stations per Owner	1.81	1.82	1.83	1.82
		(0.360)	(0.358)	(0.345)	(0.395)
		[1278]	[1114]	[891]	[2023]
	Variance of Stations Owned	2.09	2.23	2.33	2.10
		(1.45)	(1.56)	(1.57)	(1.70)
		[1278]	[1114]	[891]	[2022]

Note: Standard deviations in parentheses, sample sizes in smaller font and brackets.

Because the data set is a panel, I can estimate multiple types of models to measure the effect of consolidation on employment and wages. I start with a pair of pooled regressions, which treat each market-year observation as independent, essentially ignoring the panel nature of the data set.[48] The first of the pooled regressions uses only two explanatory variables (the number of stations and stations per owner); the second adds the variance of stations owned. Next, I estimate a similar model, using all three explanatory variables, but control for year-specific effects. Finally, I estimate a fixed effects model by adding a full set of market-specific

indicators. Stated more formally, for each of the three occupations and each of the three outcome variables, I estimate four types of models:

$$(1) \qquad y_{mt} = w'_{mt}\gamma + \varepsilon_{mt}$$

$$(2) \qquad y_{mt} = x'_{mt}\beta + \varepsilon_{mt}$$

$$(3) \qquad y_{mt} = x'_{mt}\beta + d'_t\lambda_t + \varepsilon_{mt}$$

$$(4) \qquad y_{mt} = x'_{mt}\beta + d'_m\alpha_m + d'_t\lambda_t + \varepsilon_{mt}$$

where y denotes the outcome variable in question (employment, mean hourly wage, or median hourly wage); w denotes a shortened vector of explanatory variables (just number of stations and stations per owner); x denotes the full vector of explanatory variables (number of stations, stations per owner, and variance of stations owned); ε denotes the error term; d_t denotes a vector of year indicators; λ_t denotes year-specific fixed effects; d_m denotes a vector of market indicators; and α_m denotes market-specific fixed effects.

The pooled regressions serve as a sort of baseline for comparison. Their coefficient estimates are based on both cross-sectional variation and variation over time. Including year-specific effects, which control for industry-wide time trends, allows one to focus on cross-sectional variation as well as deviations from time trends within particular local markets. The fixed-effects model that also controls time-specific effects has the advantage of allowing one to ignore any omitted variables that do not change over time (but do vary across individuals) as well as any omitted variables that do not vary across individuals (but do change over time).[49] This approach, in other words, attempts to avoid the common problem of omitted variable bias.[50] Since many unobservable factors influence radio firms' employment decisions, as discussed above, I try to address the omitted-variable-bias issue by using a fixed-effects approach.

Table 3-A: Regression Results

Outcome Variable = Employment
All Variables in Natural Logarithms

		Model			
Occupation	**Explanatory Variable**	**(1)**	**(2)**	**(3)**	**(4)**
Announcers	Total Stations in Market	1.25**	1.26**	1.25**	-0.280
(N = 1067)		(0.077)	(0.082)	(0.082)	(0.416)
	Stations per Owner	-0.401**	-0.307	-0.268	-0.112
		(0.143)	(0.294)	(0.296)	(0.212)
	Variance of Stations Owned	—	-0.027	-0.033	-0.012
			(0.070)	(0.076)	(0.045)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.560	0.560	0.567	0.905
News Reporters	Total Stations in Market	1.39**	1.33**	1.36**	-0.124
(N = 966)		(0.098)	(0.100)	(0.097)	(0.402)
	Stations per Owner	-1.04**	-1.58**	-1.56**	0.026
		(0.212)	(0.336)	(0.337)	(0.191)
	Variance of Stations Owned	—	0.162*	0.062	0.042
			(0.075)	(0.081)	(0.040)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.590	0.595	0.614	0.947
Broadcast	Total Stations in Market	1.42**	1.39**	1.38**	0.104
Technicians		(0.111)	(0.119)	(0.119)	(0.541)
(N = 811)	Stations per Owner	-0.582**	-0.855*	-0.838*	-0.172
		(0.181)	(0.332)	(0.337)	(0.252)
	Variance of Stations Owned	—	0.082	0.117	0.039
			(0.083)	(0.095)	(0.050)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.555	0.556	0.560	0.927

Note: Standard errors in parentheses. ** denotes significant at the 1% level; * denotes significant at the 5% level.

Table 3-B: Regression Results

Outcome Variable = Mean Hourly Wages
All Variables in Natural Logarithms

		Model			
Occupation	**Explanatory Variable**	**(1)**	**(2)**	**(3)**	**(4)**
Announcers	Total Stations in Market	0.225**	0.192**	0.210**	0.075
(N = 1278)		(0.030)	(0.031)	(0.030)	(0.170)
	Stations per Owner	-0.037	-0.302*	-0.334**	0.021
		(0.073)	(0.118)	(0.116)	(0.092)
	Variance of Stations Owned	—	0.078**	0.027	-0.008
			(0.029)	(0.031)	(0.019)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.173	0.186	0.262	0.757
News Reporters	Total Stations in Market	0.192**	0.149**	0.165**	0.327
(N = 1114)		(0.029)	(0.030)	(0.031)	(0.180)
	Stations per Owner	0.083	-0.285**	-0.277*	-0.145
		(0.061)	(0.108)	(0.108)	(0.089)
	Variance of Stations Owned	—	0.110**	0.061**	-0.002
			(0.026)	(0.027)	(0.018)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.169	0.204	0.270	0.773
Broadcast	Total Stations in Market	0.196**	0.178**	0.189**	0.408
Technicians		(0.041)	(0.045)	(0.043)	(0.242)
(N = 891)	Stations per Owner	-0.001	-0.149	-0.143	0.056
		(0.074)	(0.161)	(0.159)	(0.114)
	Variance of Stations Owned	—	0.045	-0.011	-0.034
			(0.035)	(0.35)	(0.023)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.140	0.145	0.197	0.763

Note: Standard errors in parentheses. ** denotes significant at the 1% level; * denotes significant at the 5% level.

Table 3-C: Regression Results

Outcome Variable = Median Hourly Wages
All Variables in Natural Logarithms

		Model			
Occupation	**Explanatory Variable**	**(1)**	**(2)**	**(3)**	**(4)**
Announcers	Total Stations in Market	0.115**	0.091**	0.106**	0.060
(N = 1278)		(0.026)	(0.027)	(0.026)	(0.168)
	Stations per Owner	0.031	-0.166	-0.189	0.135
		(0.066)	(0.106)	(0.105)	(0.091)
	Variance of Stations Owned	—	0.058*	0.013	-0.024
			(0.025)	(0.027)	(0.019)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.062	0.072	0.147	0.681
News Reporters	Total Stations in Market	0.155**	0.107**	0.122**	0.186
(N = 1114)		(0.030)	(0.030)	(0.031)	(0.197)
	Stations per Owner	0.040	-0.360**	-0.355**	-0.246*
		(0.059)	(0.104)	(0.104)	(0.098)
	Variance of Stations Owned	—	0.120**	0.076**	0.039
			(0.026)	(0.027)	(0.020)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.107	0.148	0.201	0.729
Broadcast	Total Stations in Market	0.207**	0.199**	0.208**	0.369
Technicians		(0.040)	(0.043)	(0.042)	(0.299)
(N = 891)	Stations per Owner	-0.027	-0.095	-0.084	0.184
		(0.073)	(0.154)	(0.152)	(0.142)
	Variance of Stations Owned	—	0.021	-0.034	-0.059*
			(0.035)	(0.037)	(0.028)
	Year Effects	No	No	Yes	Yes
	Market Effects	No	No	No	Yes
	R^2	0.133	0.134	0.173	0.695

Note: Standard errors in parentheses. ** denotes significant at the 1% level; * denotes significant at the 5% level.

Striking results emerge from the pooled regressions and the regressions including year-specific effects in Charts 3-A, 3-B, and 3-C.[51] Estimates from the pooled regressions and the regressions including year-specific effects are broadly similar. The total number of stations variable has a positive correlation with employment, as expected. Markets with more stations also had higher hourly wages (both mean and median), perhaps reflecting the higher cost of living in larger markets.

Greater consolidation, as measured by stations per owner, has a negative and statistically significant association with employment of both news reporters and broadcast technicians. (The coefficient on stations per owner in column (3) of Chart 3-A for announcers is negative but not statistically significant.) The relationship between employment and consolidation is also economically meaningful: a 1% increase in consolidation was associated with a 1.5% decline in employment of news reporters and a 0.8% decline in employment of broadcast technicians. Suppose that model (3), with year-specific effects, is the correct model of a radio market, allowing one to estimate the true causal effect of consolidation on employment. In the average Arbitron market, stations per owner increased by about 36% between 1996 and 2003.[52] So in an average market, according to the estimates in column (3) of Table 3-A, employment of news reporters would have declined by 56% and employment of broadcast technicians by 30% over this time period, signifying very large job losses.

Consolidation also has a negative and statistically significant correlation with mean hourly wages, for both news reporters and announcers, and with median hourly wages for news reporters. In the context of large wage increases industry-wide, as shown in Chart 3 above, this means that markets with more ownership consolidation experienced smaller wage increases. Stations per owner has an estimated coefficient of -0.33 for announcers and -0.28 for news

reporters, as shown in column (3) of Table 3-B. Using these estimates and making the same assumption as above about the veracity of model (3), it appears that wages for announcers and news reporters in an average market are 12% and 10% lower, respectively, as a result of radio consolidation.

The fixed-effects estimates in column (4) of Charts 3-A, 3-B, and 3-C complicate this picture. Only one of the estimates for the coefficients on stations per owner remains statistically significant after including market-specific indicator variables. (The negative association between consolidation and median hourly wages for news reporters remains statistically significant at the five percent level.) This shows that cross-sectional variation provided most of the identification in the regressions with only year-specific effects. In other words, differences across markets, rather than within markets, appear to have generated the negative correlations between consolidation and employment and between consolidation and wages. The fixed-effects regressions do not support the causal inference that if consolidation increased over time (for some reason exogenous to the workings of the market) in a particular local market, job loss and lower wages would result in that particular market. Rather, the shift in the results from the year-specific-effects model to the fixed-effects model only demonstrate a cross-sectional relationship between consolidation and job loss and between consolidation and lower wages.

On the other hand, the fixed-effects estimates have some potential problems. The OES data may be too incomplete (that is, they may contain too many missing values) to generate statistically significant estimates based solely on within-market variation over time. Because it uses a full set of indicator variables for markets and years, the fixed-effects model may ask too much of the OES data. Furthermore, fixed-effects models in general are highly sensitive to measurement error in the explanatory variable.[53] While the data on station ownership histories

from Media Access Pro are fairly reliable, they may not be perfect. More importantly, the combination of Media Access Pro and OES may introduce something akin to measurement error. Since the OES only surveys a subset of firms in a market in a given year, it may be that the most appropriate *x* variables would reflect the number of stations owned by those particular firms, the stations per owner actually surveyed by OES, and so on. Instead, the *x* variables include market-wide measures that may not correspond properly to the *y* variables in a particular market-year, since the identities of the firms surveyed by OES are unavailable. This kind of measurement error might even attenuate (bias toward zero) the estimates somewhat in the pooled and year-specific-effects models, but would introduce stronger attenuation bias in the fixed-effects model.

Even taking the fixed-effects estimates as accurate, the pooled regressions and the regressions with only year-specific effects suggest a strong cross-sectional correlation between greater consolidation and lower employment and wages. This may reflect economic relationships between the variables that pre-date the 1996–2003 period of study. Radio ownership limits, both national and local, began to increase gradually in the 1980s. So a causal relationship between consolidation and employment (and between consolidation and wages) may exist, though it may have commenced operating more than a decade before the time period I have been able to study using the OES and Media Access Pro. One can conclude from the regressions that more consolidated markets, controlling for the number of stations as well as year-specific effects, have lower employment levels and lower wages than less consolidated markets do.

VI. Conclusion

Labor-market outcomes have not often, if ever, received explicit empirical scrutiny in discussions of broadcast media regulation. Yet many issues important to legislators, scholars, activists, and FCC regulators—syndication, voice tracking, emergency broadcast warnings, nationalized music programming, and local news coverage—have important labor-economic aspects. Under the rubric of localism, especially, but also in the context of promoting viewpoint diversity, the FCC can and should monitor job losses and wage reductions in radio-industry occupations. The empirical analysis in this article, controlling for the number of stations and industry-wide time trends, demonstrates that more consolidated markets have fewer radio announcers, news reporters, and broadcast technicians. Job losses in these professions indicate that fewer local residents make decisions now about what music to play and what stories to report. The employment effects of radio consolidation thus represent a threat to both localism and diversity.

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[1] Tom Feran, "Local Radio Loses a Distinctive Voice," CLEV. PLAIN DEALER, June 3, 1999, at 1E.
[2] Steve Knoll, "Radio News Facing Cutbacks: Consolidation in the Industry Brings Leaner Staffing," N.Y. TIMES, Dec. 30, 1996, *reprinted in* CLEV. PLAIN DEALER, Dec. 31, 1996, at 3C.
[3] Jack Kenny, "Localism Vanishing as N.H. Radio Is 'McDonaldized,' " N.H. BUS. REV., Oct. 23, 1998, at 1.
[4] Todd Spencer, "Radio Killed the Radio Star," SALON.COM (Oct. 1, 2002), *at* http://www.salon.com/tech/feature/2002/10/01/nab/.
[5] Pub. L. No. 104-104, 110 Stat. 56 (1996).
[6] The FCC has cited three major, longstanding goals in its broadcast media policy: competition, diversity, and localism. See, for example, Federal Communications Commission, Notice of Proposed Rulemaking, No. 02-249, ¶ 2 (Sept. 12, 2002).
[7] Source: BIA Financial Networks, Media Access Pro, data as of May 16, 2002.
[8] Susan Whitall, "Once Distinctive Sound Fades into Predictability; Media Giants Control What Music Is Played," DETROIT NEWS, Nov. 10, 2002, at 1.
[9] *Id.*
[10] For a fuller description of radio's regulatory history, see PETER DICOLA & KRISTIN THOMSON, RADIO DEREGULATION: HAS IT SERVED CITIZENS AND MUSICIANS? 5-16 (2002), *available at* http://www.futureofmusic.org/research/radiostudy.cfm (last visited Apr. 3, 2005).
[11] *Id.* at 18.
[12] *Id.* at 31.
[13] *Id.* at 33.
[14] Federal Communications Commission, Report and Order in the Matter of 2002 Biennial Regulatory Review, No. 03-127 (June 2, 2003).

[15] *See*, *e.g.*, Bill Holland, "Telecommunications Act Signed: Legislation to Revamp Media Climate," BILLBOARD (Feb. 17, 1996) ("Scott Ginsburg, Evergreen Media chairman/CEO, says that signing the bill into law 'will lead to a tide of radio ownership consolidation and improved economies of scale for radio broadcasters.' ").
[16] *See*, *e.g.*, Anna Wilde Mathews, "From a Distance: A Giant Radio Chain Is Perfecting the Art Of Seeming Local," WALL ST. J., Feb. 25, 2002, at A1; Randy Dotinga, "Good Morning [Your Town Here]," WIRED.COM (August 6, 2002), *at* http://www.wired.com/news/business/0,1367,54037,00.html (last visited Apr. 3, 2005).
[17] *See* DICOLA & THOMSON, *supra* note 10, at 61-67.
[18] Jill Burcum, "Ammonia Cloud Engulfs Minot," MINN. STAR-TRIB., Jan. 19, 2002, at 1A.
[19] *See* Jennifer 8. Lee, "On Minot, N.D., Radio, A Single Corporate Voice," N.Y. TIMES, Mar. 31, 2003, at C7.
[20] This observation stems from a series of cross-tabulations of indicator variables for holdings of large firms versus concentration ratios in local markets. Source: BIA Financial Networks, Media Access Pro, data as of May 16, 2002.
[21] PHILIP M. NAPOLI, FOUNDATIONS OF COMMUNICATIONS POLICY: PRINCIPLES AND PROCESS IN THE REGULATION OF ELECTRONIC MEDIA 209-224 (2001).
[22] *Id*. at 210.
[23] *Id*. at 212.
[24] Preservation of Localism, Program Diversity, and Competition in Television Broadcast Service Act, S. 1046, 108th Cong. (2003).
[25] 47 U.S.C. § 307(b) (2000).
[26] STUART MINOR BENJAMIN, DOUGLAS GARY LICHTMAN, & HOWARD A. SHELANSKI, TELECOMMUNICATIONS LAW AND POLICY 85 (2001). The seven-factor test grew out of the FCC's interpretation of Section 308 of the Communications Act, which "requires that applicants demonstrate 'citizenship, character, and financial, technical, and other qualifications.' " *Id.* at 84-85 (quoting 47 U.S.C. § 308(b) (2000)). The catch-all phrase "other qualifications" permitted the FCC to consider localism.
[27] *Id*. at 87-88 (quoting FCC Policy Statement on Comparative Broadcast Hearings, 1 FCC 2d 393 (1965)).
[28] 10 F.3d 875 (D.C. Cir. 1993).
[29] *See* BENJAMIN, LICHTMAN, & SHELANSKI, *supra* note 26, at 144-147.
[30] *Bechtel*, 10 F.3d at 885-86.
[31] *Bechtel*, 10 F.3d at 880 ("Despite its twenty-eight years of experience with the policy, the Commission has accumulated no evidence to indicate that it achieves even one of the benefits that the Commission attributes to it.").
[32] *See*, *e.g.*, *Fox Television Stations, Inc. v. FCC*, 280 F.3d 1027 (D.C. Cir. 2002).
[33] Federal Communications Commission, Notice of Inquiry, No. 04-129, ¶ 6 (June 7, 2004).
[34] *Id*. ¶ 38.
[35] *Id*. ¶ 39.
[36] *Id*. ¶¶ 21-23.
[37] *Id*. ¶¶ 27-29.
[38] Source: Current Employment Statistics survey, data from 1982–2004, *at* http://www.bls.gov/ces/ (last visited March 1, 2005).
[39] Sources: Current Employment Statistics survey, data from 1982–2002; BIA Financial Networks, Media Access Pro, data as of May 16, 2002.
[40] *See* PATRICIA AUFDERHEIDE, COMMUNICATIONS POLICY AND THE PUBLIC INTEREST: THE TELECOMMUNICATIONS ACT OF 1996, at 48-49 (1999).
[41] Sources: Current Employment Statistics survey, data from 1982–2002; annual CPI from the Bureau of Labor Statistics.
[42] Source: BIA Financial Networks, Media Access Pro, data as of May 16, 2002.
[43] Starting in 1998, each year, BLS surveyed at least some establishments; some of the smaller individual establishments were surveyed on a rotating basis once every three years.
[44] Source: Occupational Employment Survey, data from 1998 through Nov. 2003.
[45] The Arbitron Company identifies over 280 markets (cities and metropolitan areas) in which it conducts surveys on radio listenership. These markets are ranked according to population, from New York City (#1) to Casper, Wyoming (#285). I will use and refer to these 280-plus "Arbitron markets" throughout my analysis. Arbitron markets differ from MSAs because of some adjustments based on industry practice and marketing considerations.
[46] This drawback is less important than one might initially suspect. Though it was a major policy change, the Telecommunications Act followed twelve years of gradual relaxation of ownership limits in radio. That regulatory changes occurred frequently starting in the 1980s would confound attempts to conduct pre/post analysis of the Act.

[47] Sources: Occupational Employment Survey, data from 1998 through Nov. 2003; BIA Financial Networks, Media Access Pro, data as of May 16, 2002.
[48] *See* JACK JOHNSTON & JOHN DINARDO, ECONOMETRIC METHODS 390 (4th ed. 1997).
[49] *See* PAUL RUUD, AN INTRODUCTION TO CLASSICAL ECONOMETRIC THEORY 625 (2000).
[50] *See* JOHNSTON & DINARDO, *supra* note 48, at 395.
[51] Sources: Occupational Employment Survey, data from 1998 through Nov. 2003; BIA Financial Networks, Media Access Pro, data as of May 16, 2002.
[52] Source: BIA Financial Networks, Media Access Pro, data as of May 16, 2002.
[53] *See* JOHNSTON & DINARDO, *supra* note 48, at 399-401.