

Local Media Ownership and Media Quality

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Executive Summary

The United States Federal Communications Commission regulates local media ownership to promote competition, diversity and the provision of local programming. This study investigates how local media cross-ownership, co-ownership and ownership diversity are associated with media market outcomes. It does so by regressing changes in local-market media quality variables on changes in local-market media ownership variables. Little robust evidence is found to indicate that local media ownership affects local media usage or programming.

1. Introduction

This study was commissioned by the United States Federal Communications Commission (“FCC”) as part of its 2010 Quadrennial Review of Media Ownership Rules. The study analyzes media usage and ownership data to determine how changes in local media market ownership structure are associated with changes in local media market outcomes, mainly from the standpoint of competition and the provision of local programming.

Section 1.1 explains the relevant rules that the FCC is reviewing and section 1.2 discusses the relevant academic literature. Section 2 describes the conceptual background for the analysis, the technical details, and the data. Section 3 presents the results and section 4 relates the results to the specific media ownership rules to be reviewed.

The FCC’s policy goals for its Review of Media Ownership Rules are competition, localism and ownership diversity. The current analysis will produce three sets of descriptive results that are relevant to these goals. First, it will examine how media cross-ownership and co-ownership are associated with media competition from a consumer perspective, as measured by media usage. Second, it will determine how media cross-ownership and co-ownership are associated with localism, as measured by the amount of local news provided in the market. The term “media quality” is used to refer to the collection of variables measuring media usage and local news provision. Third, it will determine how media ownership diversity, as measured by station ownership characteristics, is related to media quality.

1.1. Regulatory Background

Three media ownership rules are relevant to the present analysis. This section gives just a brief overview of the rules. FCC (2010) provides a complete explanation.

Newspaper/Broadcast Cross-Ownership Rule: Since 1975, the FCC has restricted the common ownership of a broadcast station and a newspaper when, roughly speaking, the station's footprint contains the newspaper's distribution area. Waivers to this rule may be granted when common ownership is judged to be aligned with the public interest. In 2007, the waiver criteria were relaxed so that common ownership would be presumed to be not inconsistent with the public interest in the 20 largest media markets. Common ownership is still presumed to be inconsistent with the public interest in smaller media markets unless (1) one of the two media outlets were "failed" or "failing," or (2) the joint entity would significantly increase the amount of news available in the market.

Local TV Ownership Limit: One entity may own multiple television stations within the same market if (1) their signals do not overlap (this case is rare), or (2) one of the stations is not ranked in the top four stations in the market based on market share, and there are at least eight independently-owned stations in the market. This second provision essentially rules out multiple station ownership in smaller markets, as they are typically served by fewer than eight stations.

Local Radio/TV Cross-Ownership Rule: The application of this rule depends on the number of "voices"—TV stations, radio stations, newspapers and a cable system—in a media market. In markets with at least 20 independently-owned voices, one entity may own one TV station and up to seven radio stations or two TV stations and up to six radio stations, subject to the Local TV Ownership Limit. In markets with 10-19 independently-owned voices, one entity may own up to two TV stations and up to four radio stations. In smaller markets, an entity that owns a TV station may not own more than one radio station.

Among these rules, the Newspaper/Broadcast Cross-Ownership Rule is of particular interest. Newspaper advertising revenues (print and online) fell 44% in the three years ended December 31, 2009, and circulation revenues fell 6% over the same period. These changes led newspapers to reduce their professional editorial staff by 25%. The situation continues to worsen, as newspapers were the only medium in which ad revenue fell in 2010 (PEJ 2011).

These changes are troubling from a policy perspective, as newspaper readership has been associated with increased voter information and participation. Historically, the entry of a newspaper into local markets increased voter turnout (Gentzkow, Shapiro and Sinkinson, forthcoming). Subsequent television station entry into local markets correlated with sharp drops

in both newspaper consumption and voter turnout (Gentzkow 2011). Survey evidence suggests that knowledge of local politics drops during newspaper strikes (Mondak 1995). Taken together, these findings suggest that newspapers have played a special role in informing the public about local politics.

This special role may come from fundamental differences in the way that television and newspaper media present the news, since television faces tighter time constraints and often requires supplementary video. Milburn and McGrail (2001) argued that television news presentation typically follows a dramatic narrative arc. A controlled experiment showed that dramatic presentation simplifies consumer thinking and reduces recall of news stories. Chiricos, Eschholz, and Gertz (1997) found that an individual's fear of crime is positively correlated with their television and radio news consumption but not with newspaper or news magazine consumption.

Further, newspapers and television differ in the range of news stories they cover. Baldwin et al. (2010) found that local newspapers provided far more coverage of city government than local television stations. Semetko and Valkenburg (2001) found that newspapers devoted a higher proportion of coverage to crime and education stories than television news programs. TV news reported proportionally more foreign affairs and "human interest" stories.

It seems possible that allowing mergers between newspapers and television stations could lead to substantial economies of scope and may improve product offerings by enabling cross-media promotions and integrated delivery. Many newspapers now offer some video content online, and many television stations' websites provide large repositories of text news stories. To better understand the potential consequences of such mergers, however, it is necessary to discern how they correlate with local news availability and quality.

1.2. Literature Review

Academic research on the impact of media ownership on media market outcomes goes back at least to Steiner (1952). Steiner showed that commonality in viewer preferences regarding program types can result in a tyranny of the majority in program provision. When there are two broadcasters and two program types, one of which is preferred by more than two-thirds of the viewing population, both broadcasters will air a program of the popular type. Attracting half of the larger audience is more profitable than attracting all of the smaller audience, so the less

popular program is not offered. A two-channel monopoly can deliver better results than duopoly because it airs both programs and serves the entire market. Steiner argued that the degree to which this result holds in a multi-period model with competing broadcasters depends on the “shiftability” of consumer preferences—that is, the extent to which media consumers prefer certain programs at certain times, such as news in the morning, or entertainment after dinner.

Modern treatments of media markets recognize that media outlets serve multiple groups of customers, including viewers, advertisers and content producers. This framework is called “multi-sided platform industries” (or “two-sided markets”), and its key insight is that user charges reflect both the cost of platform provision and the effect of the agent’s platform usage on agents of other types. The pioneering treatment in this area was Anderson and Coate (2005), whose model captured the nonrival nature of television program consumption by viewers, the influence of viewers on advertising revenues, and the negative impact of advertising sales on audiences. These authors predicted that ownership consolidation raises media and advertiser profits at the expense of consumer welfare, with an ambiguous effect on social welfare. This occurs because media consolidation reduces competition for viewers and increases the amount of advertising carried by the media.

The subsequent theoretical literature pushed the bounds of the Anderson-Coate framework in a number of directions. The following discussion is limited only to those papers that directly examine the effects of entry or consolidation on competition, and the findings are discussed in the context of the television industry, although most of these models could be applied to any mass media industry. Crampes, Haritchabalet and Jullien (2009) showed that, with endogenous program quality decisions, free entry may lead to a suboptimally high number of media outlets, as program development costs are inefficiently spread across a larger number of media outlets. Cunningham and Alexander (2004), in contrast, found that greater concentration among media may either increase or reduce the amount of programming time served to consumers, depending on the elasticity of viewing in response to advertising time. Dukes (2006) endogenizes advertiser competition in the product market and finds, counterintuitively, that advertisers may be better off with greater media concentration, since this may lead to an equilibrium where their messages are more dispersed, softening price competition. Gal-Or and Dukes (2006) investigate mergers among media stations, and find, in contrast with standard results in product market oligopoly, nonconsolidating media mergers become increasingly

profitable as media concentration falls. Gentzkow and Shapiro (2008) reviewed a large body of literature and argued that media competition depends crucially on the number of consumers who receive news from multiple sources, as this constrains the degree to which news media compete in the marketplace of ideas. Kind, Nilssen and Sorgard (2009) consider how two types of competition influence media outlets' business models. They found that media content differentiation leads to greater reliance on advertising-supported models, while a greater number of media outlets encourages subscription pricing. Reisinger, Ressler and Schmidtke (2009) model TV stations which compete for advertisers as well as viewers. Their model overturns many of the previous literature's results, finding, for example, media profits and advertising levels can actually *rise* with the number of independent media outlets.

To summarize the theoretical literature, competition may either increase or decrease media market economic performance, depending primarily on (1) differentiation among media platforms, (2) the number of media platforms, (3) the rate at which viewers switch media in response to advertising, (4) the elasticity of advertiser demand, and (5) the degree to which platforms compete for advertisers. Regrettably, the literature contains many opposing predictions, so general conclusions are not available.

There has been a limited amount of empirical work related to the questions of interest in this study. Perhaps closest is Brown and Alexander (2005), who used 1952 TV station license allocations as an instrument to identify the effect of media ownership consolidation on station ratings and ad prices. The identifying assumption was that the number of station licenses granted in 1952 was likely to be correlated with media market structure in 1998 but independent of unobserved determinants of ratings and advertising in 1998. Using a system of equations estimated on a cross section of US media markets, they found that a 20% increase in concentration raises advertising price by 9% and ratings by 0.8%.

Two empirical studies of the newspaper industry are related to the questions posed here. Chandra and Collard-Wexler (2009) examined data from a four-year merger wave in which 75% of Canadian newspapers changed hands. They found that newspaper prices rose substantially during this period, but subscription price rises were no higher at acquired newspapers than at non-acquired newspapers. Argentesi and Fillistrucchi (2009) proposed a structural framework to estimate reader responsiveness to newspaper cover price and advertising quantity on one side, and advertiser responsiveness to advertising price and circulation figures on the other. They used

their estimates to infer Italian newspaper markups under a variety of competition/collusion assumptions. Comparing their results to markup data in newspaper financial reports, they found evidence consistent with collusive behavior on cover prices and competitive behavior on advertising prices.

Another body of relevant literature is the research commissioned by the FCC during its previous ownership reviews. Most closely related is Shiman et al. (2007), who estimated a panel regression controlling for market, affiliated network and time-specific factors with three-way fixed effects. They found that television stations that are cross-owned with newspapers or radio stations provided more news than other stations, but other ownership variables did not have any impact on news provision. The main differences in the current analysis are the range of outcomes considered and a reliance on *changes* in media ownership variables to identify their associations with competition and localism.

2. Research Methodology

This section describes the research design, the empirical approach and the data.

2.1. Research Design

Three observations guided the research design.

First, the usage of each station in a market depends on the programming of all stations in that market, and the programming of each station in the market depends on the ownership of all stations in the market, as was explored in depth in section 1.2. This observation leads logically to a data analysis done at the level of the media market rather than the individual media outlet, since individual media outlets' choices are made interdependent by market competition.

Second, it is exceedingly difficult to disentangle media market ownership from media market competition and localism. Ownership decisions may be made in anticipation of long-run trends in media supply or demand that are observable to the station owners but not in the available data. This suggests a possible correlation in the media ownership variables and the residuals in any regression, a problem that has no clear solution. Therefore, this study is purely descriptive; it makes no claims of causality. Causal interpretations of the empirical results would need to rely on the assumption that media ownership variables are determined prior to media quality variables. An alternate research design would be to rely on an instrumental-variables

approach. A candidate instrument would have to be correlated with the media outlet’s market share but uncorrelated with its profits, since station ownership decisions are likely based on station profits. However, since profits typically rely on market share, finding such an instrument is a challenging task.

Third, purely cross-sectional or purely intertemporal analyses may produce misleading results, so panel analysis is required. Cross-sectional regressions risk spurious findings because unobserved variables may influence both media ownership and media quality. For example, George and Waldfogel (2003) found that newspapers in cities with larger concentrations of black, white or Hispanic consumers have higher proportional readerships among these groups relative to cities with less minority representation. The implication is that newspaper content is responsive to local demographic composition. This market characteristic may be imperfectly measured using traditional demographic statistics, but may be correlated with both media market structure and media usage. A cross-sectional regression might find a spurious correlation between media ownership and media quality due entirely to the dependence of each variable on cultural homogeneity. Only a panel analysis can rule out spurious correlation due to market-specific factors.

2.2. Empirical Approach

The analysis undertaken here regresses a vector of local market media quality variables on a set of local media ownership variables and exogenous controls. The model is designed to fit the available data, which is characterized by the “large N , small T ” property common to many survey panel datasets.

2.2.1. Model

This section presents the model. y_{mt}^q represents quality variable q in market $m = 1, \dots, M$ in time $t \in \{0, 1, 2\}$ (corresponding to 2005, 2007 and 2009). The vector of quality variables is y_{mt} .

Similarly, x_{mt} represents a vector of media ownership variables. Variable selection and definitions are discussed in section 2.3.

Equation (1) is used to predict media quality variable q ,

$$y_{mt}^q = \alpha_m + \alpha_t + x_{mt}\beta_q + \varepsilon_{mt}^q, \quad (1)$$

where α_m represents all market characteristics that may influence media quality, α_t is a time fixed effect, β_q is a parameter vector to be estimated and the object of primary interest, and ε_{mt}^q captures idiosyncratic shocks that vary across markets, time periods and quality variables. Media usage is typically thought to be influenced by long-term habit formation, so equation (1) should be thought of as a moving-average representation that likely includes serial correlation in ε_{mt}^q . If the precise form of the serial correlation were known, equation (1) could equivalently be expressed as an auto-regressive model with lags of the dependent variable appearing as regressors on the right-hand side.

The market-specific fixed effects in equation (1) are problematic because they are too numerous to estimate with the available data. A random effects specification would also be problematic, since market-specific realizations of the random effects would be correlated with the observed ownership variables, as discussed above. Therefore, equation (1) is differenced so the market-specific effects drop out:

$$(y_{mt}^q - y_{mt-1}^q) = \gamma_t + (x_{mt} - x_{mt-1})\beta_q + (\varepsilon_{mt}^q - \varepsilon_{mt-1}^q), \quad (2)$$

where $\gamma_t = \alpha_t - \alpha_{t-1}$. The next section discusses a variety of approaches to estimate β_q in equation (2).

2.2.2. Estimation

Three sets of estimates are presented in section 3. A common approach would be to apply Ordinary Least-Squares (OLS) regression to equation (2). This is commonly known as the “Differences-In-Differences” estimator and has been used widely in recent years.

The problem with the OLS approach is that, when serial correlation is present in the errors, the standard errors of the parameter estimates may be severely biased. This has been known since Cochrane and Orcutt (1949). Recently, Bertrand, Duflo and Mullainathan (2004) explored the extent to which this issue affects policy-oriented econometric research. They generated random treatments in their data and estimated the effects of these “placebo laws” on female wages. They found that 45% of the placebo treatments’ parameter estimates were statistically significant at the 95% confidence level. This is quite strong evidence against OLS estimation of equation (2). Yet while OLS is not viewed as a desirable model in the current setting, it is presented in section 3 to provide a familiar benchmark.

Bertrand, Duflo and Mullainathan (2004, §IV.E) advocate using clustered standard errors, showing that this alternative to OLS performs about as well as nonparametric estimation in monte carlo simulations. The second set of estimates presented below follows this advice. This allows for autocorrelation in the errors and uses an unstructured “sandwich” estimator to control for possible correlation among the error terms, as in Arellano (1987).

While the previous approach is feasible, it does not exploit the available information on how error terms may be linked across media markets or quality variables. Therefore, the preferred approach is to allow for the errors to be correlated across media markets, quality variables, and time periods. This is implemented using the multi-way clustering approach of Cameron, Gelbach and Miller (2011).

A final word is in order about one estimation technique that is not used. The recent dynamic panel estimation literature (e.g., Arellano and Bond 1991) has advocated using lags and previous levels as instruments for future changes in variables. For example, if the error term exhibits one-period autocorrelation, then the value of the dependent variable in period t may be used as an instrument for the change in the error from period $t + 1$ to period $t + 2$. Since only three time periods of data are available in the present application, this necessitates throwing away at least half of the data. Further, it would only be valid if the autocorrelation is of order one, an assumption that is untestable and considered unlikely to hold.

2.3. *Data*

This section describes the dataset, variables and definitions.

2.3.1. *Data Sources, Markets, Time Periods, and Exogenous Controls*

The dataset contains information about 210 local media markets in each of three time periods from two sources. Media ownership variables and market demographic variables were provided by the FCC. Media ownership variables correspond to three snapshots in time: December 31, 2005, December 31, 2007, and December 31, 2009.

The second dataset consists of television ratings provided by Nielsen Media Research Galaxy ProFile. The ratings correspond to the November and May “sweeps” months in the 2005-06, 2007-08 and 2009-10 television seasons. Nielsen selects participants through geographic randomization and provides financial incentives to participate. In larger media markets, Nielsen

measures television viewing with PeopleMeters, which record television usage and tuning continuously and prompt viewers to indicate their presence via remote control once or twice per hour. In smaller markets, audimeters attached to televisions measure set usage and tuning continuously. Viewer presence is measured via self-reported diaries. Nonresponsive participants are removed from the sample quickly. Responsive participants are replaced at regular intervals.

The Nielsen data were inconsistently reported. Many datapoints and some entire market-month datasets were missing from the data. These issues affected the variable definitions in three ways. First, five markets (Alpena, Biloxi, Miami, New Orleans and West Palm Beach) were dropped since a balanced panel could not be constructed for these markets. Second, because the measurement technology is more reliable for households than for demographic groups, the analysis focuses on household ratings. Demographic group ratings are excluded as these are more often missing. Third, even in the household-level ratings, about 20% of the possible observations are missing. Therefore, the analysis focuses on four-week average ratings within the evening news daypart. The four-week average ratings are available in over 94% of the possible observations, making them the most reliable source of information in the data.

Nielsen's data reporting methodology remains less than fully clear, despite repeated inquiries and careful scrutiny of all available documentation. It is thought that the five geographic markets were missing for exogenous technical reasons. Further, it is assumed that Nielsen does not report station ratings when the number of people using television in its local sample is relatively low, since it would be difficult to reliably estimate stations' viewing shares based on a small number of viewers. The frequency of data availability (that is, the frequency with which data were not missing) was roughly constant across weekdays but slightly higher for smaller markets than for larger markets. It appeared that data availability was driven more by variation in Nielsen's sample sizes across media markets rather than by variation in television usage over time within a market.

2.3.2. *Media Quality Variables*

This section defines the set of media quality variables, y_{mt} . Quality variables were chosen according to their relevance to the FCC's policy goals and the reliability with which they could be measured. The quality variables are:

LocalEveningRating: The average percentage of households in a market watching any local station between the hours of 5-7 p.m. EST, 4-6 p.m. CST, 4-6 p.m. MST, or 5-7 p.m. PST. This is the daypart with the highest coincidence of local programming and ratings data. Since syndicated programming is typically available during this daypart, it measures the degree to which the entire television viewing market is served, not just the segment interested in local news.

LocalNewsHours: The number of hours of local news offered on all TV stations in the market.

LocalNewsRating: The average rating for all local news programs whose ratings are observed.

NewspaperCirculation: The estimated number of daily newspaper copies per capita distributed in the market over the course of one week.

RadioNewsStations: The number of radio stations in the market classified as “News” format.

Values are expressed in per capita terms to correct for the common occurrence that more populous markets are assigned more station licenses, and therefore would naturally have more radio stations. As in Berry and Waldfogel (2001), counts of stations by format are used because (a) data on stations’ listenership were not available and (b) the number of stations supported should be a measure of usage as well as availability, since radio stations may easily switch formats if listeners do not patronize news stations. An additional variable, the count of stations classified as “News/Talk” format, was considered but produced results which were qualitatively identical to *RadioNewsStations*, so this variable was dropped to simplify the exposition.

To summarize, *LocalEveningRating* addresses the FCC’s competition goal; *LocalNewsHours* addresses the FCC’s localism goal; and *LocalNewsRatings*, *NewspaperCirculation* and *RadioNewsStations* address both the competition and localism goals.

2.3.3. Media Ownership Variables

This section defines the set of media ownership variables. Ownership variables were chosen according to their relevance to the media ownership rules, but their number was limited to prevent multicollinearity from inflating the standard errors of the estimates. Three ownership variables were reliably measured and varied extensively, and therefore are included in the base set of ownership variables w_{mt} :

Co-ownedTV: The number of television station parents that control more than one television station in the same media market.

TV/Radio: The number of television stations whose parent controls at least one radio station in the same market.

LocalOwnerTV: The number of television stations in the market controlled by entities located within the market.

Two additional ownership variables are available:

TV/Newspaper: The number of television stations whose parent controls at least one newspaper in the same market. This ownership variable exhibits the least variation. It changed in only one market in 2005-2007, and changed in five markets in 2007-2009.

MinorityOwnerTV: The number of television stations in the market with an identifiable controller who was a member of a minority race/ethnicity. This variable was only measured reliably in 2007 and 2009; see Turner (2006) for further discussion.

Unfortunately, *TV/Newspaper* does not show meaningful variation in 2005-2007, and *MinorityOwnerTV* data are not available for 2005. Therefore, these two variables must be excluded from the base set of ownership variables. However, both can be included in a regression based on 2007-2009 data alone. Therefore, these two variables are included in an “augmented” set of ownership variables below.

All ownership variables are defined as count data. Percentage definitions were found to be misleading, as they are influenced by changes in the base number of television stations in the market. Small independent TV stations sometimes start or stop broadcasting, which then changes all cross-ownership and co-ownership percentage variables in the market. However, because these changes typically occur on the fringe of the TV market, they seldom indicate meaningful changes in station ownership concentration.

Another ownership diversity variable measured the number of television stations in each market with an identifiable controller who was female. However, the data collection methodology for this variable indicated it was only reliably available for 2007. Since the empirical approach relies on differences, and only a single year of data was available for this variable, it was dropped from the analysis.

To summarize the ownership variables, *TV/Newspaper* is relevant to the Newspaper/Broadcast Cross-Ownership Rule; *Co-ownedTV* is relevant to the Local TV Multiple

Ownership Rule; *TV/Radio* is relevant to the Local Radio/TV Cross-Ownership Rule; and *LocalOwnerTV* and *MinorityOwnerTV* are relevant to the impact of ownership diversity on media market competition and localism.

3. Empirical Results

This section presents the estimation results. First, raw correlations are discussed. Then, the full sample is used to estimate parameters for the base set of ownership variables. Finally, the second half of the sample is used to estimate parameters for the augmented set of ownership variables.

3.1. Correlations

Table 1 presents raw correlations between the changes in ownership variables and the changes in media quality variables. Two features of the correlations are notable. First, none of the correlations is particularly large and none are significant at the 95% confidence level. This suggests that perhaps the media ownership variables do not exert a very strong influence on the media quality variables. Second, the correlations in 2005-2007 differ substantially from the correlations in 2007-2009. For example, increases in co-ownership of television stations are negatively correlated with evening television ratings (-.09) in the first half of the sample, but this correlation is positive (.01) in the second half of the sample. Many pairwise correlations show similar differences in sign and magnitude between the two halves of the sample. This pattern suggests that both sets of variables may be driven by common factors, such as time effects, and motivates the use of regression analysis.

3.2. Results: Base Ownership Variables, Full Sample

Table 2 reports estimation results for the base set of ownership variables in the full sample. The regressions explained about 28% of the variance in the quality variables, a reasonable figure for a difference-based regression like this one. The three columns of estimation results correspond to the three sets of assumptions about the error covariance matrix presented in section 2.2.2. The preferred set of estimation results are given in the third column, since this uses information on market, quality variable and time period to add structure to the error covariance matrix.

The first thing to notice is that the point estimates are virtually unchanged under all estimation techniques. The only changes occur in the standard errors.

Second, only two parameter estimates are statistically significantly different from zero. Increases in local ownership of television stations are associated with reductions in the number of news radio stations in the market and reductions in the amount of local television news provided in the market. Further interpretation of these results is given in section 4.

3.3. Results: All Ownership Variables, Limited Sample

Table 3 reports model estimation results for the augmented set of ownership variables based on the second half of the sample. The estimation was limited to the 2007-2009 changes because *TV/Newspaper* showed almost no variation in 2005-2007 and because *MinorityOwnerTV* was not available for 2005. The preferred estimates are shown in the third column of the table.

Again, the point estimates are virtually unchanged across models. However, this time the regressions explained about 42% of the variance in the media quality variables, substantially more than in Table 2. Since the sample size fell by half, this must be because the new ownership variables added a substantial amount of information. Not only did the overall model fit rise, but many parameters which were imprecisely estimated in the full sample were precisely estimated in the restricted sample. These changes in parameter estimates were to be expected, as the changes in media ownership variables are correlated among themselves, and the 2005-2007 correlations were observed to differ markedly from the 2007-2009 correlations.

Still, it is important to remember that these two sets of estimates have different interpretations, so they are not directly comparable. The estimates in Table 2 show the effects based on the full sample, whereas estimates in Table 3 show the effects based on the 2007-2009 data alone.

The results indicate that changes in *MinorityOwnerTV* are associated with increases in the hours of local TV news available in a market, but they are not associated with any other effects. There are no significant correlations between *TV/Newspaper* and any quality variables, as one might expect with only five nonzero changes in *TV/Newspaper* in the sample.

Further, when these two ownership variables are added to the analysis, some of the qualitative conclusions on previously considered ownership variables change. For example, Table 3 shows that the number of news radio stations in a market is significantly positively related to TV/radio cross-ownership and negatively related to increases in TV station ownership concentration; both parameter estimates are insignificant in Table 2. Further, local ownership of

TV stations is not found to have any significant effects, but previously it had two significant effects.

It is striking to note that no parameter estimate is statistically significant in *both* the full dataset in Table 2 and the 2007-2009 subsample in Table 3. This suggests a lack of consistent directional relationships between individual ownership variables and media quality variables.

4. Summary and Conclusions

This paper investigated a panel of local media markets to present evidence on how changes in media ownership variables are correlated with changes in media quality variables. The general lesson from this analysis is that there is no clear evidence that changes in local media ownership produce large changes in media competition or localism. Still, the following results may contribute to the policy discussion on the FCC's media ownership rules and media ownership diversity policies.

Newspaper/Broadcast Cross-Ownership Rule: The point estimates in Table 3 indicate that newspaper-broadcast cross-ownership is positively associated with radio news availability and local TV news provision, and negatively associated with newspaper circulation, average local TV news ratings and aggregate evening TV ratings. However, there were only a few changes in this variable during the sample, so none of these directional effects can be distinguished from random noise. The lack of television/newspaper integration since the Newspaper/Broadcast Cross-Ownership Rule waiver criteria were loosened in 2007 leads the authors to question the economic basis for keeping the rule in place, given the influence of newspapers on voter information and turnout, the recent declines in newspaper revenues and news production expenditures, and the potential economies of scope available to joint owners of news outlets in multiple media.

Local TV Multiple Ownership Rule: Television station ownership concentration was negatively related to radio news availability and local TV news provision in 2007-2009. No other evidence is found that television station ownership concentration is associated with media competition or localism. It is worth noting that the rule in place limited the amount of television station concentration that could be observed in the data, as no entity is permitted to control two large stations in a single market. The authors would hesitate to

extrapolate from these results beyond the range of TV station ownership concentration observed in the data. Significant loosening of the rules may produce fundamentally different patterns in the data. This is an area in which some experimentation may be an advisable policy.

Local Radio/TV Cross-Ownership Rule: Increases in television/radio cross-ownership were positively associated with radio news availability and average TV news viewership and negatively associated with local TV news provision in 2007-2009. Radio/TV cross-ownership had no significant effects in the full sample.

Ownership Diversity: Minority ownership of local television stations was positively related to the number of hours of local news provided in 2007-2009. Mixed results are found with regards to local television station ownership. In the full sample, this variable is associated with reductions in news radio station formats and hours of local TV news provided, but in the 2007-2009 subsample, it is not found to have a significant association with any of the quality variables.

The evidence provided in this report is intended to contribute to the policy debate around the media ownership rules. However, it does not provide any conclusive basis for policymaking. This paper describes statistical relationships without any claims of causality. Its findings are limited by the range of the available data and the reader is reminded that an absence of evidence is not evidence of absence.

Works Cited.

- Anderson, Simon and Stephen Coate 2005. Market Provision of Broadcasting: A Welfare Analysis. *Review of Economic Studies*, 72, 4, 947-972.
- Arellano, M. 1987. Computing Robust Standard-Errors for Within-Group Estimators. *Oxford Bulletin of Economics and Statistics*, 49,4, 431-434.
- Arellano, M., S. Bond. 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58, 2, 277-297.
- Argentesi, E., L. Fillistrucchi. 2009. Estimating Market Power in a Two-Sided Market: the Case of Newspapers. *Journal of Applied Econometrics*, 22, 1247-1266.
- Baldwin, T., D. Bergan, F. Fico, S. Lacy, S. S. Wildman. 2010. News Media Coverage of City Governments in 2009. http://quello.msu.edu/images/uploads/PEJ_City_Govt_report-final.pdf, accessed March 2011.
- Berry, S., J. Waldfogel. 2001. Do Mergers Increase Product Variety? Evidence from Radio Broadcasting. *Quarterly Journal of Economics*, 116, 1009-1025.

- Bertrand, M., E. Duflo, S. Mullainathan. 2004. How Much Should We Trust Differences-In-Differences Estimates? *Quarterly Journal of Economics*, 119,1, 249-275.
- Brown, K., P. J. Alexander. 2005. Market Structure, Viewer Welfare, and Advertising Rates in Local Broadcast Television Markets. *Economics Letters*, 86, 331-337.
- Cameron, A. C., J. B. Gelbach, D. L. Miller. 2011. Robust Inference with Multi-Way Clustering. *Journal of Business and Economics Statistics*, 29, 2, 238-249.
- Chandra, A., A. Collard-Wexler. 2009. Mergers in Two-Sided Markets: An Application to the Canadian Newspaper Industry. *Journal of Economics & Management Strategy*, 18, 4, 1045-1070.
- Chiricos, T., S. Eschholz, M. Gertz. 1997. Crime, News and Fear of Crime: Toward an Identification of Audience Effects. *Social Problems*, 44, 3, 342-357.
- Cochrane, D., G. H. Orcutt. 1949. Application of Least-Squares Regression to Relationships Containing Auto-Correlated Error Terms. *Journal of the American Statistical Association*, 44, 245, 32-61.
- Crampes, C., C. Haritchabalet, B. Jullien. 2009. Advertising, Competition and Entry in Media Industries. *Journal of Industrial Economics*, 42, 1, 7-31.
- Cunningham, B. M., P. J. Alexander. 2004. A Theory of Broadcast Media Concentration and Commercial Advertising. *Journal of Public Economic Theory*, 6, 4, 557-575.
- Davidson, Russell, James G. MacKinnon. 1993. *Estimation and Inference in Econometrics*. New York: Oxford University Press.
- Dukes, A. 2006. Media Concentration and Consumer Product Prices. *Economic Inquiry*, 44, 1, 128-141.
- Federal Communications Commission. 2010. Notice of Inquiry. http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-92A1.pdf, accessed March 2011.
- Gal-Or, E., A. Dukes. 2006. On the Profitability of Media Mergers. *Journal of Business*, 79, 2, 489-525.
- Gentzkow, M. 2011. Television and Voter Turnout. *The Quarterly Journal of Economics*, 123, 1, 931-972.
- Gentzkow, M., J. M. Shapiro. 2010. What Drives Media Slant? Evidence from U.S. Daily Newspapers. *Econometrica*, 78, 1, 35-71.
- Gentzkow, M., J. M. Shapiro. 2008. Competition and Truth in the Market for News. *Journal of Economic Perspectives*, 22, 2, 133-154.
- Gentzkow, M., J. M. Shapiro, M. Sinkinson. Forthcoming. The Effect of Newspaper Entry and Exit on Electoral Politics. *American Economic Review*.
- George, Lisa, J. Waldfogel. 2003. Who Affects Whom in Daily Newspaper Markets? *Journal of Political Economy*, 111, 4, 765-784.
- Kind, H. J., T. Nilssen, L. Sorgard. 2009. Business Models for Media Firms: Does Competition Matter for How They Raise Revenue? *Marketing Science*, 28, 6, 1112-1128.
- Milburn, M. A., A. B. McGrail. 2001. The Dramatic Presentation of News and its Effects on Cognitive Complexity. *Political Psychology*, 13, 4, 613-632.
- Mondak, J. J. 1995. Newspapers and Political Awareness. *American Journal of Political Science*, 39, 2, 513-527.
- Oberholzer-Gee, F., J. Waldfogel. 2009. Media Markets and Localism: Does Local News en Espanol Boost Local Voter Turnout? *American Economic Review*, 99, 5, 2120-28.
- Project for Excellence in Journalism (PEJ). 2011. Newspapers: by the Numbers. <http://stateofthedia.org/2011/newspapers-essay/data-page-6/>, accessed March 2011.

- Reisinger, M., L. Ressler, R. Schmidtke. 2009. Two-Sided Markets with Pecuniary and Participation Externalities. *Journal of Industrial Economics*, 42, 1, 32-57.
- Semetko, H. A., P. M. Valkenburg. 2001. Framing European Politics: A Content Analysis of Press and Television News. *Journal of Communication*, 50, 2, 93-109.
- Shiman, D., K. Lynch, C. Stroup, P. Almogera. 2007. Television Station Ownership Structure and the Quantity and Quality of TV Programming. 2007 FCC Media Ownership Study #4.
- Steiner, P. O. 1952. Program Patterns and Preferences, and the Workability of Competition in Radio Broadcasting. *The Quarterly Journal of Economics*, 66, 2, 194-223.
- Turner, S. D. 2006. Out of the Picture: Minority & Female TV Station Ownership in the United States. http://www.freepress.net/files/out_of_the_picture.pdf, accessed March 2011.
- US Federal Communications Commission. 2010. Notice of Inquiry. http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-92A1.pdf, accessed March 2011.
- Zellner, A. 1962. An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias. *Journal of the American Statistical Association*, 58, 977-992.

Table 1. Correlations

Change in Media Ownership Variables	Change in Media Quality Variables				
	<i>Newspaper Circulation</i>	<i>RadioNews Stations</i>	<i>LocalNews Hours</i>	<i>LocalNews Rating</i>	<i>Local Evening Rating</i>
Full Sample (410 obs.)					
<i>TV/Newspaper</i>	0.03	0.05	-0.01	-0.02	-0.01
<i>Co-ownedTV</i>	-0.01	0.03	0.02	0.03	-0.07
<i>TV/Radio</i>	0.01	0.04	0.03	0.03	0.02
<i>LocalOwnerTV</i>	-0.03	-0.07	-0.03	0.00	-0.02
<i>MinorityOwnerTV</i>	--	--	--	--	--
2005-2007 only (205 obs.)					
<i>TV/Newspaper</i>	0.09	-0.01	0.00	0.00	0.01
<i>Co-ownedTV</i>	0.02	0.06	0.02	0.01	-0.09
<i>TV/Radio</i>	0.02	0.01	0.04	0.01	0.07
<i>LocalOwnerTV</i>	0.01	-0.10	-0.04	0.00	0.00
<i>MinorityOwnerTV</i>	--	--	--	--	--
2007-2009 only (205 obs.)					
<i>TV/Newspaper</i>	0.00	0.09	0.00	-0.05	-0.03
<i>Co-ownedTV</i>	0.03	-0.05	-0.07	0.07	0.01
<i>TV/Radio</i>	0.11	0.05	-0.10	0.10	0.00
<i>LocalOwnerTV</i>	-0.08	-0.03	-0.01	0.00	-0.07
<i>MinorityOwnerTV</i>	-0.11	0.03	0.04	-0.04	0.02

Table 2. Estimation Results: Base Ownership Variables, Full Sample

Media Qual.	Media Ownership	OLS		Clustered S.E.		Multi-Way Clustered S.E.	
		Point Est.	Std. Err.	Point Est.	Std. Err.	Point Est.	Std. Err.
<i>Change in NewspaperCirculation</i>							
	Change in <i>Co-ownedTV</i>	.004	(.432)	.004	(.005)	.004	(.004)
	Change in <i>TV/Radio</i>	.010	(.547)	.010	(.015)	.010	(.018)
	Change in <i>LocalOwnerTV</i>	-.006	(.422)	-.006	(.006)	-.006	(.012)
	Year 2007 Intercept	-.025	(.263)	-.032	(.150)	-.032	(.048)
	Year 2009 Intercept	-.062	(.259)	.444	(.168) **	.444	(.070) **
<i>Change in RadioNewsStations</i>							
	Change in <i>Co-ownedTV</i>	.070	(.432)	.070	(.211)	.070	(.403)
	Change in <i>TV/Radio</i>	.189	(.547)	.189	(.314)	.189	(.201)
	Change in <i>LocalOwnerTV</i>	-.343	(.422)	-.343	(.345)	-.343	(.166) *
	Year 2007 Intercept	-.032	(.263)	-.032	(.150)	-.032	(.048)
	Year 2009 Intercept	.444	(.259)	.444	(.168) **	.444	(.070) **
<i>Change in LocalNewsHours</i>							
	Change in <i>Co-ownedTV</i>	-.339	(.432)	-.339	(.929)	-.339	(.597)
	Change in <i>TV/Radio</i>	-.284	(.547)	-.284	(.892)	-.284	1.028)
	Change in <i>LocalOwnerTV</i>	-.478	(.422)	-.478	(.852)	-.478	(.137) **
	Year 2007 Intercept	1.905	(.263) **	1.905	(.551) **	1.905	(.143) **
	Year 2009 Intercept	6.876	(.259) **	6.876	(.571) **	6.876	(.074) **
<i>Change in LocalNewsRating</i>							
	Change in <i>Co-ownedTV</i>	.069	(.432)	.069	(.095)	.069	(.073)
	Change in <i>TV/Radio</i>	.090	(.547)	.090	(.094)	.090	(.156)
	Change in <i>LocalOwnerTV</i>	-.007	(.422)	-.007	(.065)	-.007	(.020)
	Year 2007 Intercept	-.306	(.263)	-.306	(.074) **	-.306	(.030) **
	Year 2009 Intercept	-.340	(.259)	-.340	(.051) **	-.340	(.032) **
<i>Change in LocalEveningRating</i>							
	Change in <i>Co-ownedTV</i>	-.093	(.432)	-.093	(.061)	-.093	(.107)
	Change in <i>TV/Radio</i>	.108	(.547)	.108	(.128)	.108	(.069)
	Change in <i>LocalOwnerTV</i>	-.050	(.422)	-.050	(.052)	-.050	(.103)
	Year 2007 Intercept	-.308	(.263)	-.308	(.059) **	-.308	(.010) **
	Year 2009 Intercept	-.607	(.259) **	-.607	(.051) **	-.607	(.042) **
	Num. Obs. = 2050	* Significant at the 95% confidence level.					
	R-squared = .2808	** Significant at the 99% confidence level.					
	Adj. R-squared = .2719						

Table 3. Estimation Results: All Ownership Variables, 2007-2009 Data Only

Media Qual.	Media Ownership	OLS		Clustered S.E.		Multi-Way Clustered S.E.	
		Point Est.	Std. Err.	Point Est.	Std. Err.	Point Est.	Std. Err.
Change in <i>NewspaperCirculation</i>							
	Change in <i>MinorityOwnerTV</i>	-.031	(.96)	-.031	(.02)	-.031	(.02)
	Change in <i>TV/Newspaper</i>	-.003	(1.70)	-.003	(.02)	-.003	(.03)
	Change in <i>Co-ownedTV</i>	.005	(.79)	.005	(.01)	.005	(.01)
	Change in <i>TV/Radio</i>	.039	(1.14)	.039	(.04)	.039	(.05)
	Change in <i>LocalOwnerTV</i>	-.019	(.73)	-.019	(.01)	-.019	(.02)
	Year 2009 Intercept	-.061	(.27)	-.061	(.01) **	-.061	(.01) **
Change in <i>RadioNewsStations</i>							
	Change in <i>MinorityOwnerTV</i>	.153	(.96)	.153	(.43)	.153	(.20)
	Change in <i>TV/Newspaper</i>	1.435	(1.70)	1.435	(1.73)	1.435	(1.14)
	Change in <i>Co-ownedTV</i>	-.442	(.79)	-.442	(.37)	-.442	(.12) **
	Change in <i>TV/Radio</i>	.449	(1.14)	.449	(.37)	.449	(.19) **
	Change in <i>LocalOwnerTV</i>	-.217	(.73)	-.217	(.34)	-.217	(.27)
	Year 2009 Intercept	.489	(.27)	.489	(.17) **	.489	(.05) **
Change in <i>LocalNewsHours</i>							
	Change in <i>MinorityOwnerTV</i>	1.216	(.96)	1.216	(1.64)	1.216	(.25) **
	Change in <i>TV/Newspaper</i>	.395	(1.70)	.395	(2.78)	.395	(1.15)
	Change in <i>Co-ownedTV</i>	-1.694	(.79) *	-1.694	(1.45)	-1.694	(.27) **
	Change in <i>TV/Radio</i>	-3.564	(1.14) **	-3.564	(1.76) *	-3.564	(.29) **
	Change in <i>LocalOwnerTV</i>	-.252	(.73)	-.252	(1.56)	-.252	(.29)
	Year 2009 Intercept	6.927	(.27) **	6.927	(.61) **	6.927	(.11) **
Change in <i>LocalNewsRating</i>							
	Change in <i>MinorityOwnerTV</i>	-.109	(.96)	-.109	(.09)	-.109	(.09)
	Change in <i>TV/Newspaper</i>	-.257	(1.70)	-.257	(.13)	-.257	(.18)
	Change in <i>Co-ownedTV</i>	.158	(.79)	.158	(.13)	.158	(.24)
	Change in <i>TV/Radio</i>	.337	(1.14)	.337	(.24)	.337	(.16) *
	Change in <i>LocalOwnerTV</i>	-.008	(.73)	-.008	(.07)	-.008	(.10)
	Year 2009 Intercept	-.346	(.27)	-.346	(.05) **	-.346	(.06) **
Change in <i>LocalEveningRating</i>							
	Change in <i>MinorityOwnerTV</i>	.042	(.96)	.042	(.09)	.042	(.14)
	Change in <i>TV/Newspaper</i>	-.155	(1.70)	-.155	(.14)	-.155	(.13)
	Change in <i>Co-ownedTV</i>	.025	(.79)	.025	(.08)	.025	(.05)
	Change in <i>TV/Radio</i>	.026	(1.14)	.026	(.13)	.026	(.18)
	Change in <i>LocalOwnerTV</i>	-.138	(.73)	-.138	(.06) **	-.138	(.04) **
	Year 2009 Intercept	-.621	(.27) **	-.621	(.05) **	-.621	(.04) **
Num. Obs. = 1025		* Significant at the 95% confidence level.					
R-squared = .4169		** Significant at the 99% confidence level.					
Adj. R-squared = .3993							