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Diversity in Broadcast Television: An Empirical Study of Local News in the United States

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ABSTRACT: The relationship between the structure of a market and the diversity of its product offering has been extensively explored by theorists. We develop two measures of diversity and explore the content of local news for sixty stations and twenty DMAs in the United States. Using a relative station-level diversity metric, OLS estimates imply that relative diversity of local news content decreases as market concentration increases. This result is not, however, robust to an instrumental variables specification. Using a total market diversity metric, HHI is significant in OLS and robust to instrumental variable estimation. Since the total market diversity metric is arguably superior to the incremental metric as a measure of overall diversity, this result is useful – it suggests that the total diversity of local news content within a DMA is sensitive to the level of concentration.

1. Introduction

The relationship between the structure of a market and the extent to which the products of the market are differentiated has generated a substantial theoretical literature that has produced a wide range of predictions. While it was once conventional wisdom that competition would maximize diversity, theory has shown that the incentives to differentiate may plausibly imply a welfare maximizing structure that consists of a single firm. Empirically speaking, evidence for either of these positions is scant, although there are some suggestive contributions.

[1] We are grateful for the many helpful comments of two referees and Keith Brown. All views expressed in this paper are our own; they do not necessarily reflect the opinion or views of the Federal Communications Commission or any of its Commissioners.

In what follows, we use an archive of broadcast news and categorize the number of unique seconds of local news broadcasts. From this data we construct two measures of local news broadcast diversity – one station level and one DMA level. We then econometrically relate our measures of diversity back to structural and demographic characteristics.

Broadcast Media Literature. In commercial broadcast media industries, the essential theory can be partitioned into the early literature and the more recent.[2] Thus, for example, Steiner's (1952) seminal contribution to this literature demonstrated the plausibility of a welfare enhancing monopoly structure in broadcast television, since a monopoly structure may internalize the business stealing effects of competition. Steiner's work was extended by Beebe (1977) who demonstrated that optimal structure depends on the distribution of preferences and the extent of channel capacity. Spence and Owen (1977) showed that the fixed costs associated with program production often result in under-provision of certain types of programming since the broadcast revenues of such programs do not exceed the costs. They note that this bias is reduced under a pure pay-television framework relative to an advertiser supported structure. More recent contributions to this theoretical literature include Gal-Or and Dukes (2003), Anderson and Coate (2001), Nilssen and Sorgard (2001), Gabszewicz, Laussel, and Sonnac (2001), and Cunningham and Alexander (2004). In particular, the works of Gal-Or and Dukes and Gabszewicz, Laussel, and Sonnac predict that market concentration and program diversity are inversely related in television broadcast marketplaces.

[2] See also Hotelling (1929). Although his work was not focused on commercial media, his theoretical apparatus has been widely applied by those who study the industry. It is also important to note that while Hotelling suggested that concentration would lead to minimum differentiation, the more recent work of d'Aspremont, Gabszewicz, and Thisse (1979), under different assumptions regarding (preference) costs, suggest that firms would maximally differentiate.

Empirical literature related to the relationship between structure and diversity in commercial media is practically non-existent. In a study which uses the Telecommunications Act of 1996 to control for endogeniety of structure in the radio broadcast industry, Berry and Waldfogel (2001), show that concentration is positively associated with the number of radio formats.[3] Goettler and Shacher (2001), taking structure as given, show that television broadcasters differentiate within given time slots, but cluster on program type across time slots.

Moreover, the importance of a relationship between the structure (broadly defined) of mass media (e.g., television, radio, newspapers) and the diversity of output is not purely academic and has implications beyond simple product differentiation (strategies). Rather, embedded in these explorations is an issue of some political, social, and economic importance, e.g., the relevance of diverse information to voters.

As suggested by Demsetz (1989) there may exist a large "amenity" benefit (e.g., political influence) from control of the media, and recent work by Besley and Burgess (2000) and Djankov, et. al. (2001) provides empirical evidence of such a benefit. Besley and Burgess suggest that political incumbents may be able to successfully circumscribe the content of media ("capture theory"), in part via distribution of rents determined by regulatory agencies, and present econometric evidence that does not contradict their hypothesis. Moreover, Stromberg (2004b) finds that the expansion of radio in the 1930s helped rural Americans capture an increasingly greater percentage of government transfers, while Stromberg (2004a) suggests that advertiser supported, increasing returns to scale technology (e.g., television) induces the

[3] Alexander (1997) used sheet music to back out characteristics (e.g., harmonic structure, melody, etc.) of hit songs, and then related them back to structure. These results suggest mid-levels of industry concentration promote the highest levels of diversity in the product offerings of the music recording industry.

production of news targeted to large groups that are valuable to advertisers, while ignoring smaller fringe groups. George and Waldfogel (2000) document a similar phenomenon for newspapers, in which consumption reflects strong preference externalities. Since these media are the means by which politicians convey information to voters, preference externalities can introduce bias into public policy.

Additional contributions, relating to ownership structure of the media, include Coase (1974), Besley and Burgess (2002), and Besley and Pratt (2002), all of whom suggest that a competitive market structure induces greater accuracy in the reporting of news. Mullainathan and Shleifer (2003) suggest that competition in media does not produce greater accuracy in reporting (one can think of competition as being a necessary, but not sufficient condition); rather, a taste for content heterogeneity among consumers (within a competitive market environment) produces a convergence to some "average truth."

This broad literature can be partitioned, somewhat crudely, into three categories: (1) differentiated products in two-sided markets with welfare effects, (2) strategic interaction, and (3) political-economic. In this present work, we contribute mostly to the second branch, and hint at implications for the third.

Our Approach. We use an archive of broadcast news and catalogue and categorize the number of unique seconds of local news broadcasts across Big Three (CBS, NBC, and ABC) network affiliates, covering over sixty stations in twenty designated market areas (DMA).[4] From this data we construct our measure(s) of local news broadcast diversity at both the station and DMA level, since these results may be expected to vary. We then econometrically

[4] Given our database covers the year 1998, the penetration of other broadcast networks was practically nil. Thus, our sample consists of only CBS, NBC, and ABC affiliates.

relate our measure(s) of diversity back to structural and demographic characteristics, including number of broadcast stations, cable penetration, total market revenues, average income, and market structure (as measured by both the Herfindahl-Hirschman Index (HHI) and the number of stations in the market).

We cannot, from this data, shed any light on the Steiner hypothesis, since current broadcast television ownership rules preclude merger to monopoly. We can, however, provide some empirical evidence regarding the effect of firm-level and market-level concentration on the diversity of local news offerings. Thus, we may be able to contribute some insight to the "strategic interaction" literature branch noted above. Finally, while we offer no direct hypothesis, the current work might also provide modest interest relative to the political-economic literature. Specifically, if local news influences voting outcomes and hence the flow of funds to states, counties, cities, and towns (see Stromberg (2004b) for an excellent study on the penetration of radio into rural America in the 1930's), and if the fraction of voter relevant information is constant for any level of output, greater diversity might imply a greater level of information relevant to voters.

Summary of Main Results. Our OLS results suggest that market concentration as measured by the HHI has a negative impact on local news diversity, while the total number of stations in a market has a positive impact on local news story diversity. In short, our estimates suggest that increasing concentration appears to diminish diversity in local broadcast news, both at the firm and market level. This result is robust to the measure of diversity used in estimation and emerges after controlling for possible endogeneity in market structure. Moreover, there is an apparent link between broadcast news and substitutes (broadly defined) for local broadcast news – the number of broadcast firms at the market level and the presence of cable have a strong

positive effect on local news diversity. This might suggest that potential competition and the availability of substitute programming stimulates greater diversity in the offerings of local news broadcasts.

The paper is organized as follows. In Section 2, we describe our data and methodology. In Section 3, we detail our regression specifications and results. In Section 4, we discuss the results. In Section 5, we make some concluding remarks.

2. Data and Methodology

Diversity implies difference, but as a practical matter diversity is difficult to define with any precision, let alone measure. However, assuming we have a plausible measure of diversity (which assumes we have an adequate definition of diversity) it may be enlightening to relate this measure back to media market structure, as well as various demographic variables.

In this section, we describe our technique for measuring diversity in the content of broadcast news using an archive of local news content and relate the resulting diversity measure back to market structure and market level characteristics. The broadcast news archive (10,600 individual news stories from twenty designated market areas (DMAs) across sixty stations from 1998 local broadcasts) was obtained from the University of Delaware, and was originally gathered by the Project for Excellence in Journalism (hereafter PEJ).[5]

The use of DMA level data in determining markets is appropriate. According to Nielsen, "In designing the DMA regions, Nielsen Media Research uses proprietary criteria, testing methodologies and data to partition regions of the United States into geographically distinct television viewing areas, and then expresses them in unique, carefully defined regions that are meaningful to

[5] For more information on this database, visit http://www.localtvnews.org

the specific business we conduct."[6] The "specific business" referred to above is the sale of advertising time and space to advertisers. According to the California Newspaper Publishers Association:

> DMA is a term used by advertising agencies to define specific geographical areas where groups of people tend to live, work and conduct their normal day-to-day activities similar to others in the same general region. DMA boundaries are often defined by significant geographical changes in a region's landscape such as mountain ranges, deserts, or sparsely populated areas. These "natural barriers" often tend to create different and unique lifestyles among entire populations of people, creating unique and identifiable designated market areas. Each DMA generally has its own unique market characteristics and measurable consumer media usage patterns used by media buyers to help identify the newspapers, TV and radio stations most likely to reach the audience targeted by the client.[7]

In Table 1, we list the sampled DMAs and their market size ranking.

Table 1: Markets and DMA Rank

DMA	Rank	DMA	Rank
New York	1	Buffalo	44
Los Angeles	2	Louisville	48
Chicago	3	Albuquerque	49
Boston	6	Jacksonville	52
Washington, D.C.	8	Wichita	65
Atlanta	10	Tucson	72
Seattle	12	Burlington	91
Minneapolis/St. Paul	14	Evansville	98
Pittsburgh	20	Lansing	107
St. Louis	21	Tallahassee	109

From Table 1, it is clear that our database samples media content from a broad variety of markets.

[6] Federal Communications Commission document, letter from Nielsen Media Research to the Commission, April 3, 2003, 98-206. Geographic continuity is a standard feature of all 210 DMAs except three.

[7] California Newspaper Publishers Association, http://www.cnpa.com/snap/dma_map.htm.

Two Measures of Diversity. We employ two distinct, but related, measures of diversity.

First, for all local broadcast content within a particular DMA, we count the total seconds of local news coverage that are unique to the three major network affiliates (CBS, ABC, and NBC) within the DMA as contributing to diversity. We refer to this measure as *relative or marginal station-level diversity*, since this measure captures each network's incremental contribution to the total amount of coverage of unique stories. In this measure, if any two or more local news broadcasts cover the same story on the same day, only the seconds beyond the collective average of the respective overlapping broadcasts are counted as adding to diversity.[8]

Our marginal station-level diversity measure may not adequately capture the collective output of diverse content by the broadcasters in a DMA since it is measured on a relative basis. In order to investigate the robustness of our findings, we employ a second measure of diversity that counts the total time devoted to all unique stories covered by the three networks. This variable, which measures each network's contribution to the total amount of news coverage, is referred to as *total DMA diversity*. We find that the raw correlation between these two measures is .18, implying that the distinction between relative and total diversity is more than conceptual.

3. Specification and Results

In this section, we discuss our specification and present our OLS regression results. Before discussing our specification and results, we give a brief discussion regarding our prior expectations for the signs of the regression coefficients. Our independent variables include HHI, number of firms within DMA, industry revenue, cable penetration rate, average household income,

[8] We do not explore intra-story diversity given the highly subjective nature of this task.

computer ownership rate, population density, and fraction of the population over age 65.

1. Structure. Since market structure is often difficult to measure, we employ two measures of structure, the revenue HHI and the number of broadcast stations in the market. Loosely, one can think of the HHI as reflecting the state of *actual* competition within a market, while the number of firms reflects *potential* competition.[9]

It is possible that the (increasing) relative cost of producing diverse output may lead to a reduction in diversity as the market becomes more concentrated; moreover, ownership structure may influence diversity if the within-market stations are owned and operated by large broadcast networks. In this case, given the scale economies inherent in national program distribution, diverse output may become relatively more costly (although the output within any given DMA might still be "diverse" in one sense). Thus, we might expect that increasing concentration might lead to lower diversity. On the other hand, actual, emergent, or potential competition might promote greater diversity in content (such as the type found by Goettler and Shacher (2001)).

2. Total Industry Revenue. The total revenue of all stations is meant to capture the size of the television market. A large DMA may experience greater or lesser diversity; we do not have a strong prior expectation for the sign of the coefficient.

3. Cable Penetration Rate. The cable penetration rate measures the extent to which consumers within-DMA have access to cable broadcasting in addition to over-the-air signals. Ex-ante, we expect that as consumers have access to a broader set of broadcast choices, broadcast firms may have incentives to diversify their respective outputs in order to counter new entry.

[9] HHI refers to the sum of squared market shares of all firms in the market, and is calculated on a revenue basis.

4. Average Household Income. As average household income increases, consumers tend to diversify the items they purchase, generally speaking. Simply, rising income allows consumers to indulge their underlying "taste for diversity." Thus, we anticipate that as incomes grow, broadcast content may also become more diverse. Note the possible endogeneity problem inherent in this measure (see for example, Stromberg (2004a)).

5. Computer Ownership Rate. The computer ownership rate proxies for access to additional sources of news content. If consumers can access broad news content via the internet, local broadcast stations may have an incentive to produce news that is more local in content (i.e., they become more locally specialized), especially if internet news is broadly substitutable for local broadcast news. Or, possibly the content accessed by consumers via the internet complements the output of broadcast news stations, leading to a greater overall content diversity. Thus, we do not have an expectation regarding sign for the coefficient on this variable, ex-ante.

6. Population Density. If population density implies heterogeneity among consumers, we expect that the output of broadcast news will become more diverse. On the other hand, a large population which is concentrated in a small "footprint" may encounter a uniformity of events, thereby leading to uniformity in news coverage. For example, there is not much room for diverse perspectives on the weather in Manhattan. The same may not be true of an equally sized population spread across a broader area, such as the greater Los Angeles metropolitan area.

7. Population Over 65. Given that the population over 65 years old tends to be more homogeneous than a cross-section of the entire population, we expect that this cohort might reflect a "mass point" that induces greater homogeneity and hence less diversity in local broadcast news content. Thus, we expect the sign of the coefficient to be negative.

In light of the discussion above, we estimate two OLS regressions given by:

(1)

$$Diversity = \alpha_0 + \alpha_1 \ln HHI + \alpha_2 \ln IndustryRevenue + \alpha_3 CablePenetration + \alpha_4 \ln Income + \alpha_5 ComputerOwnership + \alpha_6 \ln PopulationDensity + \alpha_7 FractionOver65 + \varepsilon$$

and

(2)

$$Diversity = \alpha_0 + \alpha_1 NumberofFirms + \alpha_2 \ln IndustryRevenue + \alpha_3 CablePenetration + \alpha_4 \ln Income + \alpha_5 ComputerOwnership + \alpha_6 \ln PopulationDensity + \alpha_7 FractionOver65 + \varepsilon$$

In Table 2 we list the results from OLS estimation of specifications (1) and (2).

Table 2: OLS Results, Local News Data

Variable	(1)	(2)	(3)	(4)
HHI (log)	- 16.81 (.047)	-56.45 (.135)	-56.82 (.074)	- -
Number of Stations	- -	- -	- -	0.66 (.013)
Total Industry Revenue (log)	- 6.76 (.002)	-12.533 (.212)	-12.69 (.087)	-5.81 (.000)
Cable Penetration Rate	0.47 (.000)	-0.62 (.211)	-0.62 (.200)	.367 (.001)
Average Household Income (log)	31.58 (.002)	-1.20 (.974)	- -	31.92 (.000)
Computer Ownership Rate	- 0.33 (.046)	-0.53 (.381)	-0.54 (.283)	-0.41 (.005)
Population Density (log)	- 3.91 (.000)	4.74 (.142)	4.68 (.109)	-3.41 (.000)
% Population Over 65	- 1.18 (.015)	0.60 (.782)	0.61 (.777)	-1.59 (.003)
Constant	- 27.45 (.786)	692.45 (.057)	684.94 (.049)	-164.76 (.032)

Note: p-values in parentheses. In columns (1) and (4) the dependent variable is the average number of seconds devoted to unique stories by a given station. In columns (2) and (3) the dependent variable is the average number of seconds devoted to unique stories by all stations within a DMA.

4. Discussion

As can be seen from Table 2, columns (1) and (4) report OLS results using the relative station-level diversity measure as a dependent variable (giving us 60 observations). Columns (2) and (3) report OLS results using the total diversity measure as a dependent variable (giving us 20 observations). The only difference between columns (1) and (4), is that (4) substitutes the number of firms for HHI. All of the independent variables for the OLS

regression in columns (1) and (4) using the firm-level measure are significant at the 5% level.

Note that in column (3), average household income has been dropped from the regression. In column (2) this variable is not significantly related to the total diversity measure (p-value .97). When we use the total diversity measure as a dependent variable, we have a small sample of only 20 observations. Note that after dropping average household income (and hence gaining a degree of freedom), the signs of all the coefficients in (2) and (3) are identical and the magnitudes of the coefficients are nearly identical. However, the additional degree of freedom allows us to obtain more precise estimates of the coefficients on the remaining variables. Importantly, we observe statistical significance on two of the variables, HHI and Total Industry Revenue, in column (3).

Market Structure. Looking at the data in Table 2, there is a *prima fascia* case to be made that market structure influences the *total* and *relative* diversity of the product offerings in local broadcast news. More precisely, according to these OLS results, HHI is significantly negatively related to firm-level diversity in column (1) and total diversity in column (3). This result is robust to redefining our measure of market structure: in column (4), the number of firms exhibits a significant positive impact on relative firm-level diversity.

Total Industry Revenue. Total industry revenue has a significant negative effect on relative news diversity, implying that as industry revenue increases, relative diversity in the content of local broadcast news diminishes. The result in (3) using total news diversity is also significant.

Cable Penetration Rate. In specifications (1) and (4) the cable penetration rate has a strong positive relationship with diversity. More generically, the presence of an outside viewing option (by which we mean

alternative programming of a variety of types) is associated with increased diversity in the offerings of broadcast news outlets at the firm level. This might imply that firm-level broadcast news is responsive to the presence of alternative programming choices available to potential viewers. Thus, diversification of content may be one means by which local news broadcasts fight for viewers. While the sign is reversed for specifications (2) and (3), the results are not significant.

As can be seen in Table 2, various demographic variables, including age, population density, average household income, and computer ownership, are also significantly related to firm-level, but not DMA-level diversity.

Income. Average household income is positively related to diversity, implying that as incomes within a DMA increase, diversity increases. This does not contradict the idea that consumers' "taste for diversity" is increasing in income growth.

Computer Ownership. Computer ownership exhibits a small but significant negative relationship with local news broadcast diversity, which implies that the internet may be more complementary than substitutable for local broadcast news.

Population Density. Population density is also negatively associated with diversity. This implies that the greater the population density, the lower the overall level of diversity.

Age. The fraction of the population over 65 is negatively related to diversity, possibly the result of a homogenizing cohort or "mass point" effect.

5. Instrumental Variable Analysis.

There is a possibility that the results reported in Table 2 are not reliable since, in all likelihood, the level of broadcast news variety has an impact on industry structure and cable penetration. In other words, it is likely that

uniformity in news coverage may induce lower concentration and higher cable penetration rates due to viewer response. In the presence of such "reverse causality," standard OLS estimation can lead to biased coefficients. We employ an Instrumental Variables technique to reduce this bias, using lagged values of the HHI and Cable Penetration variables as instruments for market structure and the availability of outside media options. These results are given in Table 3. Column (1) reports lagged values of HHI and cable penetration using the relative diversity measure, while columns (2) and (3) report the total diversity measure. Note that in column (3), we have dropped average household income in response to the small sample associated with the total diversity measure.

Table 3: Instrumental Variables, Local News Data

(Lagged Values of HHI, Cable Penetration as Instruments)

Variable	(1)	(2)	(3)
HHI (log)	- 5.04 (.610)	-55.92 (.162)	-56.54 (.094)
Total Industry Revenue (log)	- 4.06 (.098)	-12.41 (.232)	-12.64 (.108)
Cable Penetration Rate	0.50 (.000)	-0.63 (.220)	-0.62 (.208)
Average Household Income (log)	25.75 (.022)	-1.51 (.966)	- -
Computer Ownership Rate	- 0.27 (.100)	-0.53 (.355)	-0.54 (.274)
Population Density (log)	- 3.86 (.000)	4.76 (.135)	4.69 (.116)
% Population Over 65	- 1.39 (.012)	0.60 (.793)	0.61 (.785)
Constant	- 90.10 (.400)	690.20 (.074)	682.35 (.059)

Note: p-values in parentheses. In column (1) the dependent variable is the average number of seconds devoted to unique stories by a given station. In columns (2) and (3) the dependent variable is the average number of seconds devoted to unique stories by all stations within a DMA.

In this specification, nearly all of the independent variables for the relative diversity measure (column (1)) are significant at the 10% level – however, the HHI is insignificant. This finding suggests that endogeniety plagues the OLS results given earlier, or, indicates weakness in the chosen instrument.[10] For this

[10] There are two reasons to believe this is an unlikely, but feasible, explanation for the findings in Table 3. First, a variable is a poor instrument when it is not tightly related to endogenous, or caused, variables. We have found that lagged values of the HHI are very highly correlated with current values of the HHI. In addition, lags of variables have been viewed as inappropriate instruments when a variable is, by its nature, forward-looking and caused by future values of the dependent variable (so that the lag is not truly exogenous). While this is often the case in financial markets, we believe it is a very remote possibility in broadcast media markets. For example, it is hard to believe that a viewer in Atlanta decides to subscribe to cable because s/he expects that next year local broadcast news will be less diverse.

reason, caution should be used in interpreting the previous findings pertaining to market structure. However, when the total diversity measure is employed as a dependent variable in column (3) the lagged value of HHI is significant at the 10% level. This finding is consistent with the earlier OLS results and suggests robustness in the negative relationship between market concentration and diversity in local television news broadcasts.

5. Conclusions

The relationship between the structure of a market and the diversity of its product offering has been extensively explored by theorists, and these theories have generated competing hypothesis. In this paper, we developed two simple measures of diversity and explored the diversity of local news content for sixty stations and twenty DMAs. The relevance of the project derives largely from the strategic interplay between competing firms, as well as the political-economic implications of variations in the diversity of news content. Because of ownership rules preventing merger to monopoly, we are not able to test the Steiner hypothesis directly.

Using a simple OLS framework, our preliminary findings suggest that market-level structure may influence the output of firms. Specifically, using the relative station-level diversity metric, we find that as the structure of the market becomes more concentrated, relative diversity of local news content is diminished. Importantly, this result is not robust to an instrumental variables specification. However, using the total market diversity metric, HHI is significant in OLS and robust to instrumental variable transformation. Since the total market diversity metric is arguably superior to the incremental metric as a measure of overall diversity, this result is useful – it suggests that total diversity within a DMA is sensitive to the level of concentration.

Future research using this data suggests several plausibly enlightening extensions. First, ownership structure may be a significant influence on diversity – perhaps as important as overall concentration. Specifically, we wonder whether stations that are part of a national broadcast chain might "over-utilize" national broadcast feeds. This technique for creating content is relatively less expensive than gathering news independently.[11] Since this option is not available to single-station owners, gathering local news is relatively less expensive for those stations associated with a national organization. Providing the overlap between national stories and local news is modest (as might be expected for most DMAs), single-station owners might contribute more to diversity than owned-and-operated chain stations.

[11] FCC rulemakings and public information given by television and radio broadcasters during merger applications often include programming efficiencies as a motivating factor. We are simply taking this explanation at face value.

6. References

Alexander, P., "Product Variety and Market Structure: A New Measure and a Simple Test," *Journal of Economic Behavior and Organization*, 1997, *32* (2), 207-14.

Anderson, S. and S. Coate, "Market Provision of Public Goods: The Case of Broadcasting," 2001, Working Paper, University of Virginia and Cornell University.

Beebe, J., "Institutional Structure and Program Choice in Television Markets," *Quarterly Journal of Economics*, 1977, *91* (1), 15-37.

Berry, S. and J. Waldfogel, "Do Mergers Increase Product Variety: Evidence from Radio Broadcasting," *Quarterly Journal of Economics*, 2001, *116* (3), 1009-10025.

Besley, T and R. Burgess, "The Political Economy of Government Responsiveness: Theory and Evidence from India," 2001, Suntory and Toyota International Centres for Economics and Related Disciplines, LSE, STICERD - Development Economics Papers.

Cunningham, B. and P. Alexander, "A Theory of Broadcast Media Concentration and Commercial Advertising," *Journal of Public Economic Theory*, 2004, forthcoming.

d'Aspremont, C., J. Gabszewicz, and J. F. Thisse, "On Hotelling's `Stability in Competition'," *Econometrica*, 1979, *47* (5), 1145-1150.

Demsetz, Harold, "The Amenity Potential of Newspapers and the Reporting of Presidential Campaigns," in Demsetz, H., *Efficiency, Competition and Policy*, 1989, Basil Blackwell, London.

Djankov, S., C. McLiesh, T. Nenova, and A. Shleifer, "Who Owns the Media?" *NBER Working Paper 8288*, 2001.

Gabszewicz, D. Laussel J. and N. Sonnac, "TV-Broadcasting Competition and Advertising," 2000, Discussion Paper 00/6, CORE, Universite Catholique de Louvain.

Gal-Or, E. and A. Dukes, "Minimum Differentiation in Commercial Media Markets," 2001, Working Paper, University of Pittsburgh.

George, L. and J. Waldfogel, "Does the *New York Times* Spread Ignorance and Apathy?" 2002, University of Pennsylvania Working Paper.

Goettler, R. L. and R. Shacher, "Spatial Competition in the Network Television Industry," *RAND Journal of Economics*, 2001, *32* (4), 624-656.

Hotelling, H., "Stability in Competition," *Economic Journal*, 1929, *39* (153), 41-57.

Nilssen, T. and L. Sorgard, "TV Advertising, Programming Investments and Product-Market Oligopoly," 2000, Working Paper, University of Oslo.

Spence, M. and B. Owen, "Television Programming, Monopolistic Competition and Welfare," *Quarterly Journal of Economics*, 1977, *91* (1), 103-126.

Steiner, P., "Program Patterns and Preferences and the Workability of Competition in Radio Broadcasting," *Quarterly Journal of Economics*, 1952, *66* (2), 194-223.

Stromberg, D., "Mass Media Competition, Political Competition and Public Policy," *Review of Economic Studies*, 2004a, *71* (1), 265-284.

Stromberg, D., "Radio's Impact on Public Spending," *Quarterly Journal of Economics*, 2oo4b, *119* (1), 189-221.