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Consumer Substitution Among Media

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Consumer Substitution among Media: Executive Summary

The past decade has seen a number of major changes in the availability and use of information through media channels. The use of some media – cable television, the Internet, and weekly newspapers – has grown, while the use of others – radio, broadcast television, and daily newspapers – has declined. Our question is whether the changes in availability or use of some media have brought about changes in the availability or consumers' use of other media, or whether different media serve as substitutes for one another for information consumers.

This question is important because FCC media ownership policies are predicated to varying degrees on the extent of substitutability of media for various purposes - news, entertainment, etc. This study examines the extent of substitutability across media for both of these purposes using a variety of demand and supply measures.

The specific tasks of this study are twofold. First, we survey the media landscape since the mid 1990s. To accomplish this we have assembled aggregate data on both the availability of media outlets and their use over time, as measured by listening, viewing, circulation, etc. across US local media markets. We then turn to our main task, documenting the extent of consumer substitution across media. In Part I we do this with aggregate data, by examining the relationship between changes in the availability and use across various media. For example, has broadcast TV use declined more in the markets where Internet use has increased most quickly?

In Part II, we reexamine this question using a large cross sectional data based with information on individuals' use of various different media. These data allow us to observe whether a person using one medium also uses another, for news and other

purposes. We explore substitution with these data by asking, for example, whether individuals using daily newspapers more use television less.

What do we find? Standing back, there is clearest evidence of substitution between Internet and broadcast TV, both overall and for news; between daily and weekly newspapers; and between daily newspapers and broadcast TV news. There is also evidence of substitution between cable and daily newspapers, both overall and for news consumption; between radio and broadcast TV for news consumption; and between the Internet and daily newspapers for news consumption. There is little or no evidence of substitution between weekly newspapers and broadcast TV, or between radio and either Internet or cable. There is also some indirect evidence of substitution in the greater use of national media by groups less targeted by local media.

This study leads to several conclusions. First, we can reject the view that various media are entirely distinct. As noted above, certain media appear to compete with each other for consumers' attention. Second, the study provides evidence of substitution by consumers between and among certain media outlets. It cannot completely answer the question of whether substitution is sufficiently effective that all media should be considered substitutes for news and information purposes. Existing research, however, may provide useful clues. While entertainment provided through media channels is an end in itself, news makes it easier for citizens to know what is at stake in electoral contests and, in turn, can make them more likely to vote. If substitution were complete, then the decline of local daily newspapers would be offset by increased use of other media. The civic behaviors affected by media consumption would also be unaffected by changes in availability or use of any particular medium. Yet, existing research on media

consumption and voting – reviewed in the study conclusion – suggests that, even if substitution operates, it is not complete in this sense.

Part I: Evidence from Aggregate Data

The past decade has seen a number of major changes in the availability and use of information through media channels. The use of some media has grown, for example cable television, the Internet, and weekly newspapers. The use of other media, including radio, broadcast television, and daily newspapers, has declined. An important question that we seek to address in this study is whether the changes in availability or use of one medium bring about changes in the availability or use of other media. In short, we are interested in whether different media serve as substitutes for one another. This is relevant to FCC policies which are predicated to varying degrees on the extent of substitutability across media for various purposes – news, entertainment, etc. This study examines the extent of substitutability across media both for both of these purposes using a variety of both demand and supply measures.

The specific tasks of this study are twofold. First, we will survey the media landscape since the mid 1990s. To accomplish this we have assembled aggregate data on both the "supply" of media outlets and the "demand" for the content provided through these outlets, as measured by listening, viewing, circulation, etc. across US local media markets. We begin by simply documenting levels and trends within each medium. Are television viewing, radio listening, and newspaper circulation rising or falling?

We will then turn to our second broad task, to document the extent of consumer substitution across media. We will address this question with two different sorts of data. First, in Part I of the study we will examine aggregate data on media outlets and use over time. In Part II we will turn to a large individual cross sectional data set on media use.

We would ideally like to know the answers to a number of questions: First, how does the supply of outlets in each medium respond to supply of outlets in other media? Second, how does the demand for information through each medium respond to the availability of outlets in other media? Finally, how does the use of each outlet relate to the use of other outlets?

These are difficult questions to answer, in particular to draw tight causal inferences. It would strain credulity, for example, to draw substitution inferences from the cross sectional relationship among markets' outlets in different media. For example, larger markets tend to have more outlets in all media; and this is not because these outlets are complements. Rather, it is because larger markets make more outlets viable in all media. An alternative strategy for drawing substitution inferences is to use the time-series variation in outlets to ask, for example, whether there is greater decrease in television viewing in markets with larger increases in Internet use.

This strategy has substantial strengths. To the extent that outlets, or use, of different media in each market are driven by fixed unobservable factors, examining changes allows these factors to be "differenced out." This, in turn, makes it possible to infer causal relationships among the use or availability of outlets in different media. At the same time, however, this strategy does not overcome all obstacles. If consumers in a place experience a change in their level of interest in information, this may bring about a change in their use of multiple media. In particular, this will tend to bring about a positive relationship among the changes in supply and demand for different media, as well as in their levels. This sort of effects makes it appear that different media are complementary. That is, this induces a bias away from detecting substitution among

media, if that substitution operates. As a practical matter, then, this approach is conservative, and the true extent of substitution may be greater than any we can document.

Bearing in mind the limitations of the approach, the relationships are still quite interesting to examine. In fact, we know very little about how consumers substitute among different media. Our ignorance is due to two factors. First, as discussed above, inferring causality is difficult. Second, the question has received little study. Researchers and policy makers have devoted significant attention to whether advertising in one medium is a substitute for advertising in another, but there little research (to my knowledge) on whether information provided through one medium serves as a substitute for information provided through another.[1] The question is important. If consumers substitute information across media, then the market for information may extend across media, raising questions about regulation of outlets within media. The importance of the question, in conjunction with our general ignorance about the answer, amply justify the adoption of sensible approaches to studying the question. This is the spirit in which we proceed.

II. Theoretical Background

Consumers seek information (news and weather, etc) and entertainment from media products. Suppose there are five relevant media (television, radio, newspapers, etc.), and each can be divided into news and entertainment components. Then there are ten products to examine. The usual economic way to conceive of this problem is through consumer theory: each consumer's demand for each of the ten products depends

(negatively) on the price of the own product and, if the other products are substitutes, negatively on the other products' prices. While this characterization is very helpful for organizing ideas, it is not literally useful in our context. Content is unpriced (free) on radio, broadcast television, and (for the most part) on the Internet. And while newspapers have subscriber prices, these prices vary little across markets, largely because newspapers rely primarily on advertising rather than subscriptions for revenue.

In this context the more useful variation is in availability of outlets within a medium rather than in the price that consumers pay for content. It is well known that larger markets have more local media outlets within each medium than small markets (see Berry and Waldfogel, 1999a; Waldfogel, 1999, 2001; George and Waldfogel, 2000). There are also changes over time in the numbers of outlets (see Berry and Waldfogel, 2001 for evidence about radio following deregulation). Conceptually, the change from having no outlets in a medium to having one is a price reduction from infinite levels to some (perhaps unmeasured) finite amount. Changes among positive numbers of outlets, from say one to two in a medium and a market, are similar in spirit. Such changes enhance the attractiveness of each consumer's most attractive alternative and in that sense can be viewed, metaphorically at least, as reducing the "price" of consumption in that medium. Given our context, then, we propose to study substitution chiefly by examining the relationship between use in one medium and availability of outlets in other media. If two media are substitutes, then greater availability of outlets in one medium will reduce the use of the other medium.

While this question is not much studied, there is some evidence in existing research on aspects of substitution. Berry and Waldfogel (1999a) provide a study

[1] We discuss related research in part I, section II below.

documenting high levels of substitutability across outlets within the commercial radio medium. Additional outlets draw most of their listeners from other stations, suggesting that stations are rather close substitutes for one another. Berry and Waldfogel (1999b) examine the extent of substitutability of public and commercial radio broadcasting news, classical music, and jazz. Although that study, too, is within medium, it is relevant here both because it documents substitutability and also because its approaches are adopted here. That study infers substitutability of public and commercial radio stations from a) the relationship between public and commercial radio outlets and b) the relationship between commercial listening and the numbers of commercial and public radio stations in the format. The study documents that markets with more commercial classical stations have greater commercial classical tendencies, while commercial classical listening is lower in markets with more public classical stations, all else constant. The latter result suggests that listeners view public and commercial classical radio stations as substitutes.

Other existing work provides evidence of substitutability of different types of media outlets. George and Waldfogel (2002) document that readers view national newspapers (the *New York Times*) as a substitute for local daily newspapers. In markets with greater increases in *Times* circulation, there is a larger decrease in local paper circulation in zipcodes containing educated persons targeted by the *Times*. This indicates that national papers are substitutes for local ones.

Finally, there is some indirect evidence of cross-medium substitution. It is well documented in a variety of studies that there are more local media outlets (and programming) in larger markets. Moreover, isolated groups face more outlets or programming of interest as they are in markets with more persons sharing their

preferences (see Waldfogel, 1999, 2001; Siegelman and Waldfogel, 2001; George and Waldfogel, 2000). In light of this, if consumers can use nonlocal media to substitutes for the relative paucity of local media, then we would see greater use of nonlocal media (such as the Internet or cable television) in markets where consumers were more isolated. Sinai and Waldfogel (2001) documents that in spite of their lower tendency to connect to the Internet overall, blacks are more likely to connect as they are more isolated in markets with proportionately few blacks. This suggests that isolated information consumers substitute nonlocal media for local ones.

Finally, there is evidence elsewhere to support the supposition that media matter for civic participation. Oberholzer-Gee and Waldfogel (2001) document that the presence of group-targeted media outlets (radio stations and weekly newspapers) affect the tendency for blacks to vote. George and Waldfogel (2002) find that in markets with greater distribution of the New York *Times*, not only do the targeted (educated) consumers purchase local papers less. They also come to vote less in local elections as *Times* penetration grows.

III. Data

Our basic data set in this part of the study is a panel with repeated observations on the number of outlets in each medium in each market, as well as measures of the use of each medium. Our data come from five sources (BIA's Media Access Pro, Duncan's American Radio, the Current Population Survey's Computer and Internet Use Supplements, Burrelle's Media Directory, and the U.S. Census) that collect data in different ways. Still, we ultimately have multiple years of use data, by market, for

broadcast television, cable, radio, daily newspapers, weekly newspapers, and the Internet. We have multiple years of outlet availability data for broadcast TV, radio, and daily and weekly newspapers. We describe these data in detail, and by medium, below.

1. Television

The television data are from BIA Media Access Pro. BIA provides supply data, the total number of stations in each market, by type (UHF vs. VHF, network vs. independent vs. public). BIA also provides market aggregate television viewing, derived from Nielsen data, for each of 210 DMAs. Aggregate HUT (households using television) is provided by year, 1994-2000. BIA also provides daypart specific viewing data (based both on HUT and total viewing) for a recent window of more frequent observations (quarterly, November 1999 to July 2001).

2. Daily and Weekly Newspapers

We document the number of daily newspapers available in each DMA using Burrelle's Media Directory for 1993 and 1999. Burrelle's also provides a measure of total circulation for each daily. We aggregate across products in each DMA to arrive at total circulation for dailies and weeklies in each market.

3. Radio

We have data on the number of radio stations, and their programming formats, in each of roughly 250 Arbitron markets, in 1993 and 1997. These data are derived from Duncan's American Radio (1994, 1998), based on Arbitron listening data as well as

Duncan's classification of programming formats. Notably for our purpose, we can distinguish news stations ("News" and "News/Talk") from other sorts of stations.

Duncan also provides AQH listening data, both for individual stations, as well as for entire markets. We employ the data based on the Arbitron Spring surveys in the respective year. Arbitron markets do not map neatly into DMAs, so we have undertaken effort to create a mapping that allows the radio data to be linked with data at the DMA level.

4. Internet Use

In 1997, 1998, and 2000 the Current Population Survey includes questions about Internet use. We focus on the following five questions, available in all three of these surveys: 1) whether the individual has Internet access at home, 2) whether the individual has Internet access at work, 3) use of the Internet for news, 4) use of the Internet for information, and 5) use of the Internet for email.

For this medium we cannot clearly distinguish availability of outlets from use of the medium. Thus, we really have only a "demand" measure for this medium. Moreover, the geographic identifier in these data is the MSA. We have created a mapping that allows CPS data to be linked to DMA data.

5. Cable Takeup

BIA reports the percent of households with cable, by year, 1994-2000, at the DMA level of geography.

6. Demographics

We obtain demographic data from various sources, derived from the 1990 US Census.

IV. Trends within each Medium

In this section we document trends in media supply and use in each medium. Following that, we examine the comovements in media supply and use in our attempt to learn about substitution among media. The latter exercise requires linking data on outlets and use of various media. While simple in principle, this task is quite complicated in practice because the data on various media are collected for different levels of geography. For example, the BIA television and cable data, as well as the Burrelle's newspaper data, are reported by DMA. The CPS data on Internet use are individual-level data, and the individual records include MSA identifiers. The Arbitron radio data reported in Duncan's American Radio, are reported by Arbitron metro area. These are similar, but not identical, to MSAs. We have had to construct mappings linking MSAs and Arbitron metro areas to DMAs.

The linked multi-media dataset covers a subset of geographic areas for which linking is feasible (roughly 140 of 210 DMAs). To address concerns about whether this sample is representative, we compare the trends in each medium's use in the linking sample against the measures for the medium's full sample.

1. Television

BIA reports two measures of the number of stations available in a DMA, the total number of stations and the number of rated stations. Neither variable is reported historically. BIA also provides two breakdowns of the number of stations: UHF/VHF and network/independent/public. The sums of each of these two breakdowns yield approximately the number of rated stations. Even though they do not yield precisely the current number of rated stations, we still view the change in the total number of UHF and VHF stations, and the change in (network + independent + public) stations over time as reasonable reflections of the time pattern of local broadcast TV station availability. Table 1 reports trends in the average numbers of stations of each type in each DMA. The top panel includes the full sample[2] while the bottom panel includes only the DMAs in the linked sample. Trends in both are quite similar: the total number of stations has increased slightly, from 8.4 in 1995 to 9.7 in 2000 (network + indep. + public measure in the linked sample). UHF stations have increased more quickly than VHF. The number of network-affiliated stations has increased as networks outside the traditional three majors have increased their reach. Almost by construction, this decreases the number of independents. The number of public stations has held steady. These trends are clearly visible in both samples.

Table 2 reports patterns of television and cable use. The percent of households with cable has increased steadily, from 63 percent in 1994 to 68 percent in 2000 (linked sample). We have an overall annual measure of television viewing (excluding cable) since 1994. The measure is "households using television." We also have quarterly

[2] The full sample includes 207 of the 210 DMAs in the US. Three DMAs are excluded because of missing data.

measures of television viewing by daypart, from November 1999 to July 2001. See Table 3.

Television viewing (not including cable channels) has declined steadily over the same period, from 37.3 percent in 1994 to 36.8 percent in 2000. The quarterly measures, in Table 3, indicate both a strong seasonal pattern – higher use in November and February, lower in May and July – and the same secular decline as the annual HUT figures. This decline appears both for the dayparts associated with news as well as all others. Because these rating figures do not include time spent watching cable networks, they do not capture overall viewing behavior.

2. Radio

As with television, the mid 1990s saw an increase in the number of outlets, as well as increase in the number of distinct programming formats on the air across 230 US markets. There were an average of 21.7 stations available in each market in 1993 and 24.8 in 1997. Of these, 15.0 broadcast from inside the metro area in 1993 and 16.6 in 1997.

Table 4 shows the distributions of programming formats in 1993 and 1997. The average number of formats available in each market grew from 11.6 in 1993 to 15.0 in 1997 (see Berry and Waldfogel, 2001). AQH listening declined steadily from 16.8 percent in 1993 to 15.7 percent in 1998.

We can separately document the evolution of commercial news radio[3]. As Table 5 shows, the average number of inside (total) news stations was 0.46 (0.78) in 1993 and

[3] These data exclude public radio. See Berry and Waldfogel (1999b) for information about public and commercial radio in 1993.

0.55 (0.94) in 1997 (using the overall sample).[4] Perhaps more important than how many is the question of inside news station presence. Among the 230 markets, the number of markets without an inside news station declined from 142 in 1993 to 135 in 1997. Interestingly, 28 markets went from having no inside news stations in 1993 to having one or more in 1997, while 21 markets went from having one in 1993 to having none in 1997.

Table 5 also shows how the number of formats available in each market increased from 11.6 in 1993 to 15.0 in 1997, consistent with Table 4.

3. Newspapers

The average numbers of daily newspapers per DMA declined from 8.05 in 1993 to 7.85 in 1999, while over the same period the number of weekly newspaper outlets grew from 44.18 to 46.21. Average daily circulation fell from 309,579 in 1993 to 295,950 in 1999. Weekly newspaper circulation, on the other hand, grew from 531,693 in 1993 to 728,804 in 1999. Similar patterns appear in the linked sample. See Table 6.

4. Internet

We lack data on the availability of the Internet, either on the availability of ISPs or, more important, on the number of local and national sites of interest to users. On the first question, since we are examining metropolitan areas, we assume that connection services are available everywhere in the sample by 1997 (see Downes and Greenstein, 2002). We have Internet connection data for 1997, 1998, and 2000. The Internet was virtually nonexistent prior to 1994, so we can document the entire history 1994-2000.

[4] By "inside" we mean stations broadcasting from inside a metro area.

As Table 7 shows, Internet use has grown rapidly, to 15.1 percent of households with home access in 1997 to 30.3 percent in 1998, and to 45.9 in 2000. The Table also shows the fraction of individuals using the Internet for email, news, and information, the latter two representing ways in which Internet use might substitute for the use of traditional media. Patterns are virtually identical in the linked sample of markets.

5. Summary

The mid 1990s has been a period with a shifting media landscape. Use of radio, daily newspapers, and traditional television have declined, while the use and availability of other media have increased. Cable television use has grown, as has the availability and use of weekly newspapers and the Internet. These comovements may reflect substitution, but the separate trends in each media cannot answer this. The question, addressed in the next section, is whether one medium grows in the places where others decline.

V. Substitution across Media

1. Availablity of Media Outlets

It is well documented that larger markets offer more local media products. This relationship holds for radio, television, daily newspapers, and even to some extent for the websites on the Internet.[5] These relationships are clearly visible in our data as well. Figure 1 shows the relationship between the numbers of media outlets in a DMA and

population for radio, television, daily newspapers, and weekly newspapers. The figure, on a log scale for ease of interpretation, clearly shows positive relationships between market size and the number of local outlets in each medium. In this figure we use radio and television outlets in 1997 and newspaper outlets in 1999. The cross sectional relationships for other years are nearly identical.

2. Use of Media and Availability of Media Outlets

Our data allow us to examine the relationships between outlet availability and medium use in two ways. First, we can examine the cross sectional relationships directly. Table 8 presents regressions of our use measures on outlets for the four media with outlet data (radio, television, and daily and weekly newspapers). Coefficients are positive and significant for all media. These regressions are vulnerable to the concern that the number of outlets is endogenous, or that more outlets enter in markets with greater tastes for the outlet in question. There are two obvious solutions to this problem, instrumental variables (IV) and panel data. First, the IV solution to this problem is an instrument determining the tendency for outlets to enter but that has no direct effect on the tendency to join the audience. Market size, measured by population, is a natural choice for local media and one that has been employed elsewhere in media entry studies. The latter half of Table 8 reports regressions of use on available for the four media, now instrumenting outlets with a population measure. The coefficients of interest are again positive, indicating that additional outlets within a medium attract persons to their audiences.

[5] See Berry and Waldfogel (1999b) and Waldfogel (1999) for radio evidence, Waldfogel (2001) for television evidence, George and Waldfogel (2000) for evidence on daily newspapers, and Sinai and Waldfogel (2001) for evidence about the Internet.

For Internet and cable we have no direct measure of local outlets. Still, we can examine the relationship between use and market size. Table 9 shows the relationship between medium use and market size for all of the media. Interestingly, while the local media have positive and significant relationships, cable and Internet use have essentially no relationship with market size. For these media, which do not originate locally, market size has a different natural interpretation. Rather than proxying the amount of content available locally within the medium, market size here measures the availability of content in *other* media.

The difference between the relationship between medium use and market size in local and nonlocal media thus provides our first piece of evidence, albeit indirect, about substitution. While the tendency to use local media *increases* in market size, the tendency to use the national media, relative to the tendency to use local media, is larger as markets are *smaller*. This suggests that in smaller markets, Internet and cable serve as substitutes for newspapers, local television, and radio. One obtains similar but even stronger relationships if one examines Internet use relative to television use. Define Δ_{I_TV} as the Internet use – broadcast TV use in a market. Then a regression of Δ_{I_TV} on log population yields a negative and significant coefficient.

We can also approach the question of whether outlets affect use employing the within-market variation in the number of outlets over time. Table 10 presents market fixed effects regressions of use on outlets, including year dummies as well as market fixed effects. We obtain positive and significant coefficients on outlets in the television and daily newspaper regressions. Coefficients are insignificant in the other regressions. One should not infer the absence of relationships from the absence of results here. There

simply is not a great deal of variation across markets in the change in the number of outlets over time, making it difficult to infer the relationships in question.

We take the weight of evidence in this subsection to indicate that additional outlets in a medium attract more of the population into the medium's local audience. In addition, the difference between the relationship between market size and medium use for national and local media suggests substitution.

3. Evidence on Substitution across Media from Cross-Media Relationships

We seek to measure whether different media are substitutes for one another using an approach related to our approach (above) to whether outlets attract use within media. Here, by contrast, the question is whether the availability of outlets in other media *reduces* the use of this medium. There are a variety of approaches one might adopt for this question in principle. For example, one might examine the cross section of markets at a point in time, asking whether markets with more, say, daily newspapers, have lower use of some other media. The endogeneity problems mentioned above are severe here. Larger markets are going to have more outlets in all media, giving rise to positive correlations among media outlet availability as well as use. Indeed, Table 11 reports the cross sectional correlations significant at the 10 percent level or higher among use and outlet measures, and they are all positive (and most are significant at the 5 percent level).

In principle one could address this problem with instruments. This approach requires an exogenous source of variation in the supply of each medium's outlets. Note that population, while it works for each individual medium, cannot simultaneously be

employed for multiple media. Since we lack instruments for each medium, this approach is not available.

We do have longitudinal data, however. While the number of outlets in each medium is endogenous to market size, the change in the number of outlets is not so clearly endogenous. Thus, we propose to draw inferences about substitution from the correlations between the changes in the availability and use of outlets in various media. This approach is in principle vulnerable to analogous endogeneity concerns (i.e. the kind of market with a growing number of TV stations is likely to be growing in other dimensions as well that simultaneously lead to growth in outlets in other media). Fortunately, we can ascertain the direction of likely bias: these concerns lead to positive relationships. Hence, any evidence of negative correlations is more strongly suggestive of substitution.

Table 12 reports the statistically significant correlations among changes in supply and use of outlets in various media. A striking feature of the Table, in contrast to the correlations among levels, is the presence of negative – as well as positive – correlations. The following correlations are negative and significant at the 10 percent level or higher:

Radio outlets and cable use,

Radio news outlets and: Internet use, overall and for news,

Daily paper outlets and: weekly paper outlets and cable use, and

Daily paper use and: and cable use.

The largest and most significant negative relationships in the Table are between daily and weekly newspapers.

One shortcoming of the direct correlations is that they cannot simultaneously account for changes in multiple media. For example, if the numbers of outlets in both radio and television are changing similarly, then their correlations with, say, newspaper use will both reflect the effects of both the change in radio and the change in television. One way around this problem, in principle, is to employ a multiple regression. That is, we can regress, say, the change in daily newspaper use on the changes in the numbers of outlets of each other medium. The coefficient on each variable shows the relationship between that variable and the dependent variable, holding other variables constant.

While appealing in principle, this approach has a shortcoming that merits discussion: if the explanatory variables are highly correlated, then it is difficult to isolate the effect of each variable separately. This said, we proceed with three sorts of regressions. First, we present regressions of changes in the numbers of outlets in each medium on changes in the numbers of outlets in each of the other media ("outlets on outlets"). This regression can pick up substitution in the sense that if one medium expands in an area sufficiently to not only draw audience from another but cause exit (or forestall additional entry) in another, then we can detect substitution as a negative effect. Second, we run regressions of the change in the share of population using each medium on the changes in the numbers if outlets in each medium ("use on outlets"). This regression can pick up substitutability short of cross effects that induce exit and is, *a priori*, the most appealing approach. However, recall that we do not have outlets measures for all media. For cable and Internet we have only use measures; and we would like to use the change in these media as explanatory variables. Third, we run regressions

of the change in the share of population using each medium on the changes in the share of population using each other medium ("use on "use").

Bearing all of our concerns in mind, we proceed to Tables 13-15. Table 13 presents regressions of the changes in number of outlets in each medium on changes in the numbers of outlets in other media (for which outlet data are available). The only consistent relationship to emerge from this table is the relationship between daily and weekly newspapers. Both coefficients are statistically significant. A one-paper decrease in dailies is associated with an eight-paper increase in weeklies. The reverse relationship is not entirely symmetric: a one-paper decrease in weeklies is accompanied by a 0.02 paper reduction in dailies. For each regression we report a test of the hypothesis that all cross effects are zero. We reject this hypothesis only for dailies and weeklies.

Table 14 proceeds to the relationship between the change in use of each medium and the change in the number of outlets in the medium as well as other media. The own-effects are fairly consistently positive. The only negative cross-effect significant at the 5 percent level is the coefficient on radio stations in the cable use regression (column 6). If one adopts a more liberal cutoff (a negative coefficient with a t-statistic exceeding 1 in absolute value), the relationships suggesting substitution are:

TV stations and: cable use, Internet news use

Radio stations and: TV viewing, daily and paper circulation, cable use;

Radio news stations and Internet news use;

Daily papers and: radio listening, cable use;

Weekly papers and radio listening.

Based on results in Table 14, there is some reason to doubt the no substitution view. Formally, however, we reject the zero cross effects hypothesis only for the cable and Internet news use regressions.

Table 15 reports the use on use regressions. The only negative coefficients that are significant by conventional standards are the coefficient on the change in cable use in the daily paper regression and its inverse (the coefficient on the change in daily paper use in the cable use regression). Other coefficients are suggestive of substitution. Using the liberal cutoff of 1 (in absolute value) for t-statistics, one can see suggestive evidence of substitution in the following relationships:

Cable use and weekly papers,

Radio news use and TV use,

Radio news use and Internet news use,

Cable use and weekly paper use, and

Internet news use and TV use.

In spite of these suggestions of substitution, we formally reject the hypothesis of zero cross effects for cable use only.

VI. Conclusion to Part I

We conclude our analysis of the aggregate data with the observation that there is some evidence of consumer substitution across media. This raises questions about whether media are sensibly viewed in isolation for policy purposes. We delve deeper into this question with our analysis of individual data on media use in Part II.

Part II: Evidence from Individual Data and Study Conclusion

Do consumers view different media as substitutes for one another? This study examines this question using a large cross sectional data based with information on individuals' use of various different media. This study is a companion to the aggregate data study in Part I.

The advantage of these micro data is that they literally allow us to observe whether a person using one medium also uses another. The dataset is large (nearly 180,000 observations) and detailed, containing information about both overall use and use for news in particular. These data therefore allow us to explore substitution by asking whether, for example, individuals using the newspapers more use television less. Or whether individuals using more radio news watch less television news, etc. Despite the substantial appeal of these data, consumption data have the drawback that individuals who use one medium heavily may also use others heavily. Indeed, in the companion study the cross sectional relationship among the uses of different media (across markets) revealed strong positive correlations masking possible substitution.

Our strategies for overcoming these problems are threefold: First, we will control for individual characteristics. Second, we will examine not only the use of each medium (and the use for news vs. other motivations) but also the use of each medium for news relative to its use for other purposes. Third, we will also employ an indirect approach to testing for substitution that avoids these problems: In particular we will ask whether persons facing little local media content of interest turn instead to national media (cable and Internet).

We proceed as follows. First, we describe the data. Then we descibe patterns of use of each medium. Third, we examine substitution. Then we will summarize in a way that synthesizes results from the companion study using aggregate data.

I. Data

Data for this part of the study are drawn from Scarborough Research. The version of the Scarborough Prime Next dataset employed in the study has information on the media and product consumption patterns for each of 178,784 individuals surveyed in the latter half of 1999 and the first half of 2000 in 66 large US markets (see http://www.scarborough.com/primenext/). The Primenext dataset has information at the individual level on the use of multiple media.

The Scarborough data set contains a large number of questions about media use. Here we describe the available measures, by medium.

1. Newspapers. We have a binary variable indicating whether a person reads any daily newspaper. In addition respondents report which newspaper section they regularly read (news, business, classifieds, comics, entertainment, food, sports, TV or radio listings).
2. Television. Respondents report which half hours of television they watched on each of 11 networks during one week during the 1999-2000 television season.[6] We aggregate these half hours in various ways, including to total half hours. In addition, by linking the Scarborough data with local television

[6] The eleven networks are ABC, CBS, Fox, NBC, PAX, Univision, Telemundo, WB, UPN, Independent, and PBS.

schedules for the markets, we are able to construct measures of local and national news viewing (between 4 and 12 PM) for individuals in the sample.[7]

3. Cable and Satellite. Respondents report whether they have cable. If they have cable, they report what sort of service they have (basic, expanded basic, premium). In addition, respondents indicate whether they have satellite service. Respondents also report which cable channels they regularly watch. We calculate the number of cable channels regularly viewed by sample individuals as a crude measure of the intensity of cable use. Because some of these are dedicated news channels (CNN, Fox News, MSNBC, CNBC), we can also calculate intensity of cable use for news as the number of dedicated news channels regularly viewed.
4. Radio. Respondents report which of the radio formats they listen to. The formats, which are listed in Table 4, include three news-related categories ("all news," "news/talk/information," and "business"). We calculate a measure of radio use for news as the number of news formats regularly used.
5. Internet. Respondents report whether they have Internet at home and whether at work. In addition, they report how they use the Internet at home and at work (whether they use it for each of the use categories in Table 6). A number of these uses are news-related ("local information," "news," "newspaper site," "other newspaper site," and "read a newspaper"). This allows us to calculate the number of news-related Internet uses for each individual along with the total number of uses. Finally, respondents indicate

[7] The schedule collection process is fairly time-consuming. Since most news is aired between 4 and 12 PM, our restriction allows us to save much effort without losing much information.

how many hours they spend on the Internet per week (using a categoric varable that takes values of none, 0-1 hour, 1-5 hours, 5-10, 10-20, and 20+, with which we assign cell midpoints and 20 for "20+") .

In sum, we have separate measure of overall use and news use for television, radio, Internet, and cable.

II. Media Use

1. Univariate Characterizations

a. Newspapers

Table 1 reports that 53 percent of the sample reports reading a daily newspaper. Of those reading a paper, 91 percent report reading the news section. Newspapers are clearly and important medium for the communication of news, as opposed to the delivery of entertainment. Other popular sections include entertainment (69 percent), business (62), comics (61), and sports (61). Respondents not buying a paper also report the sections they regularly read, and their tendencies to read each section are lower.

b. Television

The average number of weekly half hours of television viewed on the networks is 35.5. Of these, 5.3 half hours are broadcast news (viewed between 4 and 12PM). 73 percent of households have some sort of cable television (23 percent have basic, 29 percent have extended basic, and 22 percent have premium service). 14 percent of households have satellite TV. 80 percent have either cable or satellite. Individuals

(including those without cable) watch an average of 8.4 cable channels regularly. Of these, 0.8 are news channels.

c. Radio

In the sample 89 percent of persons report listening to at least one radio format regularly. Persons in the sample reports listening to an average of 2.3 radio formats. See Table 3. The 54 formats available are listed in Table 4. The most popular among these formats are news/talk/information (23 percent of persons listen), country (21), adult contemporary (18), oldies (15) contemporary hit radio (14), album oriented rock (12), and classic rock (11). Two formats that attract listeners in the sample are oriented toward news: news (5.4 percent) and news/talk/information. Roughly a quarter of persons get some news from radio. Average persons listen to 0.28 radio news formats.

d. Internet

As Table 5 indicates, just over half of people in the sample (55 percent) have Internet access at home. Roughly a third (32 percent) have access at work. Almost all of the persons with access at work also have access at home, so 56 percent have access either at home or at work. Because they are not connected, 45 percent of people spend no time on the Internet each week; 10 percent spend an hour or less; 22 percent spend 1 to 5 hours; 12 percent spend 5 to 10 hours, 7 percent spend 10 to 20 hours, and 5 percent spend over 20 hours. If we apply approximate values to each of the intervals[8], we can develop a measure of average time spend online each week. Calculated this way, the

average time online is 3.5 hours per week. Among online persons, the average is 6.4 hours.

Table 6 shows how people report using the Internet at work and at home. Some of the most popular uses include email (79 percent of home users), shopping (39), and news (31).[9] These data are important because they raise the possibility that the Internet provides a substitute for other media. If we sum together the number of uses for each individual (treating home and work uses separately), the average person (including nonusers) reports 3.97 uses, 0.64 of them news-related.

Table 8 summarizes the main measures of media use, overall and for news, that we employ below to study substitution with individual data. It is worth noting that some of these measures are more conventional than others as indicators of media use. For broadcast television and the Internet we have time spent with the medium per week. For newspapers, by contrast, we have only a binary measure of whether or not a person reads a daily paper. For radio and cable (as well as for the Internet) we have the number of distinct purposes for which the individual uses the medium. While at first blush an odd measure of usage, it is actually a slightly enhanced version of a binary "whether I use" measure, where users of the medium who use more than one type of service are coded with values above one. (Individuals using *N* types of Internet sites are coded with *N*; nonusers are coded 0). In the Internet context, where we have both a measure of time spent and our unconventional number of uses measure, we can validate the latter. Their correlation is 0.65, lending support to the use of this sort of measure. One should bear in

[8] We assume persons in the 0-1 category spend 1 hour each week, for the "1-5" group, we assume 2.5; for the "5-10" group, we assume 7.5; for the "10-20" group, we assume 15; and for the "20+" group we assume 20.

[9] Another 8 percent go to newspaper sites, and 15 percent "read a newspaper" when online at home.

mind that the virtue of this data source is its inclusion of some measure of individuals' use of a variety of media.

2. Determinants of Media Use

The use of each medium varies across persons with their characteristics, including age, education, gender, and race/Hispanic status. Table 7 characterizes the use of the media with regressions of various measures of media use on age dummies, education dummies, a gender dummy, race/Hispanic status dummies. The excluded age category is 18-20; the excluded education category is 8th grade or less, and the excluded race/Hispanic category is whites. The ten dependent variables are: broadcast TV half hours, TV news half hours, number of radio formats used, the number of radio news formats used, weekly Internet hours, number of Internet uses, number of Internet news uses, whether a person reads a daily newspaper, the number of cable channels used, and the number of cable news channels used.

The use of TV, overall and for news, rises with age and declines with education, although the decline with education is slight for news. Use of the radio overall declines with age and rises in education, while the use of radio for news in particular rises in both age and education. All measures of Internet use fall in age and rise in education. Daily newspaper use, like use of radio for news, rises in both age and education. Use of cable channels overall declines in age and education, while use of cable news channels rises in both age and education. With the exception of TV (and cable overall for blacks), blacks and Hispanics use these media less than whites. With the exception of TV, men use these media more than women.

III. Substitution

1. Direct Evidence

The Scarborough data are unusual in that they allow examination of how users of one medium also use other media. That is, they allow researchers to make statements of the form, "people who watch a lot of television use the Internet more (or less)." These are potentially interesting descriptive facts, and they are suggestive about consumer substitution across media. An important caveat is in order, however. It is possible that people differ in their interest in information, and this difference may manifest itself in a positive correlation among all sorts of media. That is, "media junkies" may read newspapers more, watch more television, and use the Internet more. One cannot draw firm inferences about substitutability from these data directly without additional assumptions. Still, because data of this sort have typically been absent in policy discusions, they merit a look before we turn to other attempts to infer substitutability.

The first approach one might use for studying substitution is examining correlation of use measures across media. The correlation of TV viewing and time spent on the Internet, for example, reveals whether persons who watch more television also spend more time online. Table 9 reports the correlations among our basic measures of media use across persons in the Scarborough data.

Broadcast TV use is negatively correlated with our measures of radio, Internet, and cable use. All other correlations in Table 9 are positive. The preponderance of positive correlations indicates that persons using more of one medium also use other

media more. In spite of this, the significant negative correlations with TV use suggest some avenues of substitution.

Table 10 reports the correlations of measures of the use of each medium for news. All of these correlations, except the Internet-TV relationship, are positive. Again, excepting Internet-TV, this indicates that persons who use more news through one medium also consume more news though other media.

Because we have separate measures of news and other ("entertainment") uses of multiple media, we can pose the substitution question a different way. We can calculate how much people use each medium for news, relative to their use of the medium for other purposes. Term this "relative news use" for each medium. Then we can ask how relative news use is correlated across medium. Do people who use television relatively more for news use other media relatively less for news? Table 11 reports the correlations that answer this question. The estimated correlations are negative and significant for TV & Internet, TV & radio, TV & cable, TV & newspapers, and cable & newspapers. These negative correlations are consistent with substitution among media.

A shortcoming of this empirical approach, however, is that it examines only two media at a time. In addition, the approach does not account for any of the characteristics of the individuals in the sample. To address these concerns, we run three sets of regressions that correspond to the three correlation tables above.

First, Table 12 reports regressions of individuals' overall use of each medium on their overall use of the other media, as well as a battery of individual characteristics (age, gender, race, income). For example, the first column reports a regression with overall broadcast TV viewing as the dependent variable and radio, Internet, newspaper, and cable

use as independent variables. The only negative coefficients in the entire table are two coefficients reflecting the relationship between television and Internet use.

Table 13 performs an exercise analogous to the exercise in Table 12, except that the measures are the use of each medium for news rather than overall. We use the same measure of newspaper use as above. In this table, as well, the only negative coefficients are the TV-Internet coefficients.

Table 14 revisits these regressions using the relative use of each medium for news. In this table there are a number of negative and significant coefficients, indicating that persons making relatively greater use of, say, the Internet for news make relatively less use of television for news. The following relationships are negative and significant: Internet & TV, newspapers & TV, newspapers & radio, newspapers & Internet, cable & newspapers. In all cases, both coefficients corresponding to the relationship in question are negative and significant. Putting these results into words, newspapers seem to serve as substitutes for TV news on broadcast and cable, radio news, and news on the Internet. In addition, the news on the Internet appears to serve as a substitute for news on broadcast television.

2. Indirect Evidence of Substitution

Existing research documents a strong positive relationship between the size of local population(s) and the availability of local media (see Waldfogel, 1999; George and Waldfogel, 2000; Waldfogel, 2001). Larger markets have more radio stations, more television stations, and more (and more extensive) daily newspapers. Existing studies

document a greater overall tendency for persons to consume each of these local media in larger media markets.

Even stronger than the overall relationship is the relationship between particular groups' tendencies to consume local media and their absolute or relative size in the local population. When particular groups of the local population share preferences for media content with each other, but not with the remainder of the population, those groups tend to listen to more radio, watch more television, and be more likely to purchase newspapers in markets where the group in question makes up a larger portion of local population. These results suggest that the supply of local media appealing to particular groups increase in the size of local group population. We can use this variation to see whether the group's media consumers are more likely to consume nonlocal media when, from small local group population, we can infer paucity of local group-targeted media supply.

Along these lines we propose to examine how use of local and nonlocal media among preference minorities vary with the size of their local populations. If nonlocal media (the Internet and cable television) are a substitute for local media, then we should see: (a) the group tendency to consume local media should increase in the size of the local group population (as has been documented elsewhere); and (b) the group tendency to consume nonlocal media should decline in the size of the local group population. This approach is also employed by Sinai and Waldfogel (2001), which documents this relationship for blacks' Internet use with the Current Population Survey data.

The next question is what groups to examine. Testing these hypotheses requires two conditions. First, preferences must differ across groups. Existing research shows that preferences in media products differ sharply by gender, age, race (black vs. non-

black) and Hispanic status.[10] Second, the relative numbers of persons in the different groups must differ across local markets. The percent black and Hispanic vary substantially across markets. The percent in each age category and gender vary substantially less. Consequently, even if these effects operate by age, they will be difficult to detect statistically by age or gender. Our strategy here is to examine these relationships along a number of dimensions (age, race, Hispanic status) to see whether we can detect the operation of the effects.

Tables 15-17 examine these relationships by age, race, and Hispanic status. In each table we regress our measures of media use on CMSA fixed effects, a group dummy, and the group dummy interacted with the CMSA percent in the group, with the last variable generating the coefficient of interest. Here we identify the effect from the relationship between the group percent in the CMSA and the gap between the group and non-group tendencies to use the medium examined in the regression. Essentially, these regressions ask whether the gap between, say, young and old persons' use of each medium is larger or smaller in markets with proportionally more young people. For media with local content, we expect young persons' use of media content (relative to older persons) to increase in the share of local population that is young. To the extent that young persons have different preferences from older persons, we expect their use of nonlocal media to be higher in places where young persons make up a small share of local population. This would provide evidence, at least indirectly, that nonlocal media provide a substitute for local media.

[10] See, for example, Waldfogel (1999) for evidence that blacks and whites, and Hispanics and non-Hispanics, listen to different radio stations. The formats attracting two thirds of black listening collectively attract less than 5 percent of white listening. Waldfogel (2001) documents similar differences between black and white preferences in television programming.

Three of the media have an important local component (radio, television, and newspapers). Since the supply of content in these media targeted each group grows in the size of the local group population, we expect the group use tendency to increase in the group's share of local population. For radio and television, this is what we find. We find no relationship for newspapers. For the media that are predominantly nonlocal (Internet and cable-or-satellite connection) we expect use to increase in the group's local isolation. This is what we find for both Internet and cable television use.

What do these estimates mean? A natural interpretation is that the local population distribution determines the supply of local media products; hence the positive relationships between local group share and the group's tendencies to consume local media. The negative relationships between local group share and the tendency to use nonlocal media is naturally interpreted as substitution of nonlocal for local media.

IV. Concluding Discussion

We have now examined consumer substitution among media using a variety of data sets and a variety of different approaches. To help sort out the results, we summarize them using a table. Essentially, we have examined the relationship among the use and numbers of outlets in multiple media. Measures of the following variables have appeared at various points in the studies:

1. TV use overall
2. TV outlets overall
3. TV news use
4. Radio use overall

5. Radio outlets overall
6. Radio use for news
7. Radio outlets for news
8. Daily newspaper use
9. Daily outlets
10. Weekly newspaper use
11. Weekly newspaper outlets
12. Internet use overall
13. Internet use for news
14. Cable use overall
15. Cable use for news.

Substitution is reflected by negative relationships among these 15 variables across media. Table 18 is a 15 x 15 matrix, partitioned by medium, summarizing the relationships we have documented from approaches geared to yield information about substitution.

An "A" in the table indicates a negative correlation among changes in aggregate measures of outlets or use across media (Table 12 in the aggregate study); "B", "C," and "D" indicates a negative coefficients from the aggregate changes on changes regressions with t-statistics above 1 in absolute value; they are rendered bold if significant at the 5 percent level (see Tables 13-15 in the aggregate study). An "E" indicates a significant negative correlation from Table 9 of this study; "F" and "G" indicate a significant negative correlation from Tables10 and 11; finally, "H," "I," and "J" indicate significant negative coefficients in the regressions in Table 12-14. Note that the correlations are treated as symmetric, so that a significant negative correlation results in two table entries

symmetric about the main diagonal. For regression coefficients we treat the column as the independent variable and the row as the dependent variable.

Standing back, there is clearest evidence of substitution between Internet and broadcast TV, both overall and for news; between daily and weekly newspapers; and between daily newspapers and TV news. There is also evidence of substitution between cable and daily newspapers, both overall and for news consumption; between radio and broadcast TV for news consumption; and between the Internet and daily newspapers for news consumption. There is little or no evidence of substitution between weekly newspapers and TV, or between radio and either Internet or cable. There is also some indirect evidence of substitution in the greater use of national media by groups less targeted by local media.

1. What does the Evidence Mean?

What do the results in this study say about the questions posed at the outset of the study? Do consumers treat different media as substitutes for one another? If there were no relationships among use or outlets across media, then one could conclude that there is no evidence for substitution. Instead we find negative relationships between a number of media. This at least suggests some degree of substitution.

Entertainment is an end product in itself, and while some persons ("news junkies") find news entertaining, one might also view the demand for news as a derived demand for the information that allows citizens to carry out their lives. Weather information helps parents dress their children – and themselves – appropriately in the

morning. Political information makes it easier for citizens to know what is at stake in electoral contests and, in turn, can make them more likely to vote.

If substitution is complete, then the decline of local daily newspapers will be offset by increased use of other media. We can define another sense in which substitution can be complete or incomplete. With complete substitution, the civic behaviors affected by media consumption will also be unaffected by changes in availability or use of any particular medium. One might term this the "behavioral neutrality" implication of complete substitution.

Existing research on media consumption and voting suggests that, even if substitution operates, it is not complete in the latter sense. Changes in availability of black-targeted radio stations and weekly newspapers, 1994-1998, affect the tendency for blacks to vote (see Oberholzer-Gee and Waldfogel, 2001). There would be no effect on voting if changes in use of other media offset the effects of changes in availability of black-targeted radio stations and weeklies. Although there is evidence (above, and Sinai and Waldfogel, 2001) that small groups substitute nonlocal media (such as cable and Internet) for local media where local products are unavailable, this substitution does not generate behavioral neutrality.

In another context there is additional evidence against behavioral neutrality. National newspapers serve as substitutes for local ones, in the sense that markets with faster growth in a major national paper's circulation experience greater decline in local daily paper circulation among readers targeted by the national paper (see George and Waldfogel, 2002). Behavioral neutrality fails in the sense that in markets with greater increase in the national paper's circulation, there is a greater decline in the tendency for

the targeted audience to vote in local (non-presidential) elections. Here again, although consumers view the products are substitutes, they do not have the same effect on civic behavior.

The conception of each medium as entirely distinct would be unduly restrictive because there is evidence (here and elsewhere) that consumers substitute across media. At the same time, however, substitution is not apparently so complete that the effects of changes in one medium are offset by changes in another to leave civic behavior unchanged. It is conventional and trite to conclude a study with a call for more research. Nonetheless, some of these questions will only be answered with additional research.

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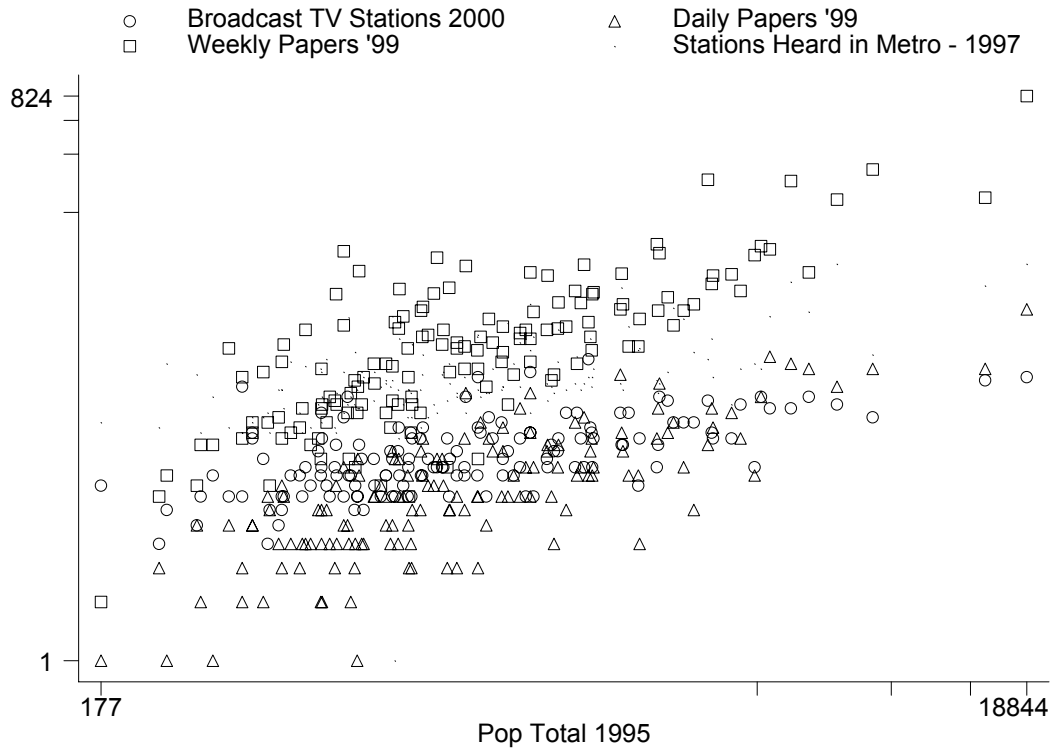
TABLES (AND FIGURE) FOR PART I

Figure 1: Media Outlets and Market Size



Notes: Log scales for population on the horizontal axis and the number of outlets in each medium on the vertical axis. See text for explanation.

Table 1: Television Outlets, 1994-2000

year	N	uhf	vhf	uhf+vhf	network	indep.	public	net+ind+pub
1994	207		2.29		2.63	2.46		
1995	207	2.96	2.29	5.25	2.72	2.52	1.71	6.96
1996	207	3.09	2.34	5.43	4.20	1.23	1.71	7.14
1997	207	3.19	2.35	5.54	4.29	1.25	1.71	7.25
1998	207	3.37	2.37	5.74	4.74	1.40	1.72	7.87
1999	207	3.54	2.37	5.91	4.94	1.46		
2000	207	3.65	2.39	6.04	5.02	1.57	1.73	8.32

linked sample

year	N	uhf	vhf	uhf+vhf	network	indep.	public	net+ind+pub
1994			2.64		2.88	3.33		
1995	143	3.76	2.63	6.38	3.01	3.37	2.04	8.42
1996	143	3.88	2.68	6.56	4.85	1.71	2.03	8.59
1997	143	3.98	2.69	6.67	4.95	1.72	2.03	8.71
1998	143	4.19	2.71	6.90	5.26	1.90	2.05	9.21
1999	143	4.40	2.71	7.11	5.43	1.99		
2000	143	4.55	2.73	7.28	5.52	2.13	2.07	9.72

Table 2: Cable and Television Use, 1994-2000

	All Markets			Linked Sample		
Year	N	hut %	cable %	N	hut %	cable %
1994	207	36.47	63.19	143	37.29	62.96
1995	207	36.41	63.88	143	37.18	63.93
1996	207	36.69	66.30	143	37.47	66.41
1997	207	36.04	67.05	143	36.85	67.21
1998	207	35.88	67.28	143	36.82	67.53
1999	207	35.66	66.90	143	36.86	67.43
2000	207	35.47	67.08	143	36.80	67.76

Table 3: Quarterly Use of Television, Overall and News, 1999-2001

		hut			
date		total day	prime time	Eve. News	Nightly News
Nov-99	207	36.11	56.41	50.44	41.79
Feb-00	207	36.67	57.57	52.24	43.55
May-00	207	33.74	54.44	46.36	43.33
Jul-00	207	33.42	48.60	44.97	42.07
Nov-00	207	37.55	57.06	51.81	43.31
Feb-01	207	37.22	57.58	52.89	43.52
May-01	207	33.66	54.07	46.03	43.39
Jul-01	207	33.67	48.47	44.79	42.38
		linked sample			
date		total day	prime time	Eve. News	Nightly News
Nov-99	143	37.46	57.81	51.36	43.31
Feb-00	143	37.85	58.81	52.92	44.80
May-00	143	35.07	55.98	47.22	44.90
Jul-00	143	34.83	50.21	45.79	43.43
Nov-00	143	38.95	58.47	52.76	44.78
Feb-01	143	38.53	58.98	53.69	44.87
May-01	143	35.15	55.80	47.09	44.94
Jul-01	143	35.06	50.03	45.77	43.72

		total share			
		total day	prime time	Eve. News	Nightly News
Nov-99	207	56.72	60.36	65.49	68.57
Feb-00	207	55.87	61.14	65.50	69.01
May-00	207	54.76	60.21	63.46	66.68
Jul-00	207	48.92		62.60	61.60
Nov-00	207	52.40	57.12	61.35	64.89
Feb-01	207	52.88	58.27	62.78	66.00
May-01	207	52.30	57.15	60.76	64.00
Jul-01	207	46.48	46.06	59.65	
		Linked sample			
date		total day	prime time	Eve. News	Nightly News
Nov-99	143	60.10	64.54	68.30	70.81
Feb-00	143	59.14	65.36	68.19	70.97
May-00	143	57.96	64.25	65.97	68.84
Jul-00	143	51.71		64.34	63.11
Nov-00	143	55.78	61.30	63.90	66.82
Feb-01	143	56.22	62.51	65.35	68.20
May-01	143	55.45	61.21	63.15	66.17
Jul-01	143	49.06	49.57	61.41	

Table 4: Radio Formats, 1993 & 1997

	1993			1997	
	N	%		N	%
Adult Contemp (AC)	462	8.44	AC	418	6.62
AC/Album Oriented Rock (AOR)	8	0.15	AC/AOR	4	0.06
AC/ Contemp. Hit Radio (CHR)	10	0.18	AC/CHR	128	2.03
AC/Full Service (FS)	1	0.02	AC/NR	42	0.67
AC/Oldies (O)	5	0.09	AC/SAC	8	0.13
AOR	565	10.32	AOR	375	5.94
AOR/AC	5	0.09	AOR/AC	3	0.05
Black (B)	281	5.13	AOR/NR	200	3.17
B/AC	13	0.24	AOR/P	80	1.27
B/Gospel (G)	4	0.07	B	236	3.74
B/O	3	0.05	B/AC	107	1.69
B/Talk (T)	4	0.07	B/G	32	0.51
Big Band/Nostalgia (BB)	213	3.89	B/O	26	0.41
BB/EZ	7	0.13	B/T	6	0.1
BB/FS	5	0.09	BB	315	4.99
BB/O	1	0.02	BB/EZ	3	0.05
Country (C)	772	14.1	BB/REL	1	0.02
C/FS	20	0.37	BB/T	1	0.02
CHR	488	8.91	C	904	14.32
CHR/AC	15	0.27	C/FS	14	0.22
CHR/Spanish (SP)	3	0.05	CHR	410	6.49
CHR/Urban (U)	9	0.16	CHR/AC	51	0.81
Classical (CL)	67	1.22	CHR/NR	9	0.14
Classic AOR(CL AOR)	151	2.76	CHR/U	56	0.89
Ethnic (E)	16	0.29	CL	70	1.11
Easy Listening (EZ)	2	0.04	CL AOR	284	4.5
EZ/New Age Contemp. (NAC)	1	0.02	CL HITS	83	1.31
EZ/SAC	3	0.05	E	14	0.22
FS	202	3.69	EZ	13	0.21
FS/T	41	0.75	EZ/SAC	1	0.02
G	55	1	FS	96	1.52
G/B	1	0.02	FS/T	81	1.28
Jazz (J)	59	1.08	G	62	0.98
News (N)	37	0.68	J	118	1.87
News/Talk (N/T)	161	2.94	KIDS	1	0.02
NAC/AOR	2	0.04	N	75	1.19
O	352	6.43	N/T	170	2.69
Religious (REL)	200	3.65	O	394	6.24
Soft Adult Contemp. (SAC)	379	6.92	REL	276	4.37
SP	172	3.14	SAC	253	4.01
Sports (SPRTS)	70	1.28	SP	296	4.69
Talk	247	4.51	SPRTS	172	2.72
T/O	4	0.07	T	408	6.46
Unknown	360	6.57	T/CL AOR	7	0.11
			T/J	5	0.08
			UNK	6	0.1

Total	5476	100	6314	100

Table 5: Radio Outlets and Listening

Year	N	Mean AQH List.	Stations Inside	Stations All	News Stations Inside	News Stations All	Formats
1993	230	16.83	15.00	21.73	0.46	0.79	11.60
1994	230	16.48					
1995	230	16.28					
1996	230	16.07					
1997	230	15.83	16.65	24.83	0.55	0.94	14.97
1998	230	15.65					

Linked Sample

	N	Mean AQH List.	Stations Inside	Stations All	News Stations Inside	News Stations All	Formats
1993	142	16.77	22.76	27.83	0.76	1.01	
1994	137	16.57					
1995	139	16.33					
1996	139	16.13					
1997	143	15.78	24.96	31.43	0.88	1.20	
1998	139	15.74					

Note: N=143 for all but AQH

Table 6: Newspaper Outlets and Circulation, 1993-1999

Year	N	Daily # Outlets	Daily Circulation	Weekly # Outlets	Weekly Circulation
1993	210	8.05	309580	44.18	531694
1999	210	7.85	295950	46.21	728804

Linked Sample

Year	N	Daily # Outlets	Daily Circulation	Weekly # Outlets	Weekly Circulation
1993	143	10.15	427775	56.98	737695
1999	143	9.92	409149	60.20	1025342

Table 7: Trends in Internet Use, 1997-2000

	Full Sample				
	connection		Use for	Use for	Use for
Year	home	work	mail	news	info
1997	15.14%		11.95%	7.08%	12.08%
1998	30.25%		19.82%	12.04%	15.73%
2000	45.90%		33.62%	19.59%	23.81%

	Linked Sample					
		connection		Use for	Use for	Use for
Year		home	work	mail	news	info
1997	143	15.64%	12.05%	12.52%	7.47%	12.36%
1998	143	30.94%	14.13%	20.80%	13.19%	16.89%
2000	143	46.56%	17.23%	34.65%	20.92%	25.39%

Table 8: Medium Use and Outlets, Cross Sectional Evidence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	TV HUT % '97	Radio AQH List. '97	Weekly Newspaper Circ/Pop. '99	Daily Newspaper Circ/Pop. '99	TV HUT % '97	Radio AQH List. '97	Weekly Newspaper Circ/Pop. '99	Daily Newspaper Circ/Pop. '99
TV Stations # uhf & vhf stations '97	0.7923				1.0346			
	(0.1052)**				(0.1278)**			
Radio Stations # Rec'd '97		0.0199				0.0374		
		(0.0049)**				(0.0083)**		
Newspapers # Weeklies '99			0.0827				0.1236	
			(0.0357)*				(0.0553)*	
Newspaper # Dailies '99				0.4121				0.2089
				(0.0551)**				(0.0750)**
Constant	31.5121	15.2567	31.9608	16.1550	29.8973	14.7054	29.5078	18.1791
	(0.7706)**	(0.1751)**	(3.7091)**	(0.7280)**	(0.9121)**	(0.2742)**	(4.5009)**	(0.8995)**
Observations	141	141	141	141	141	141	141	141
Method	OLS	OLS	OLS	OLS	IV	IV	IV	IV
R-squared	0.29	0.11	0.04	0.29	0.26	0.02	0.03	0.22

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%. IV regressions use log population as the instrument for the number of outlets.

Table 9: Medium Use and Market Size

	(1)	(2)	(3)	(4)	(5)	(6)
	HUT % '97	AQH List. '97	% Int at home '98	Weekly Circ/Pop. '99	Daily Circ/Pop. '99	% Cable '97
1995 Pop. (000)	0.9505	0.1701	0.3851	2.6237	0.8302	-0.1345
	(0.1418)**	(0.0358)**	(0.3252)	(1.3116)*	(0.2336)**	(0.2774)
Constant	35.1828	15.5939	30.2242	32.4655	18.8534	67.3699
	(0.4075)**	(0.1027)**	(0.9343)**	(3.7686)**	(0.6713)**	(0.7971)**
Observations	141	141	141	141	141	141
R-squared	0.24	0.14	0.01	0.03	0.08	0.00

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%

Table 10: Outlets and Media Use: Fixed Effects Regressions

	(1)	(2)	(3)	(4)	(5)
	HUT	AQH List.	AQH News List.	Daily Circ. pc	Weekly Circ. pc
TV Stations	0.3133				
	(0.1365)*				
Radio Stations		-0.0156			
		(0.0157)			
Radio News Stations			0.2412		
			(0.0369)**		
# Weeklies					0.0518
					(0.0364)
# Dailes				1.2074	
				(0.2201)**	
Year=1995	0.6581				
	(0.2640)*				
Year=1996	0.8933				
	(0.2537)**				
Year=1997	0.2337	-0.8340	-0.2167		
	(0.2481)	(0.1010)**	(0.0373)**		
Year=1998	0.1435				
	(0.2397)				
Year=1999	0.1172			-1.2545	0.0904
	(0.2348)			(0.2608)**	(0.7614)
Constant	34.4717	17.2034	0.3859	9.4843	33.7189
	(1.0068)**	(0.4437)**	(0.0451)**	(2.2506)**	(2.1361)**
Observations	846	281	281	282	282
Number of DMA -- Nielsen	141	141	141	141	141
R-squared	0.03	0.45	0.32	0.32	0.02

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%

TABLE 11: Correlations among Cross Sectional Measures of Outlets and Use of Various Media

	TV '99	Radio (In) '97	Radio News (In) '97	Dailies '99	Weeklies '99	TV '98	Radio '97	Radio News '97	Radio News In '97	Dailies '99	Weeklies '99	Internet '98	Internet News '98
Outlets:													
TV '99	1												
Radio (In) '97	0.7555*	1											
Radio News (In) '97	0.4699*	0.5618*	1										
Dailies '99	0.6505*	0.6661*	0.2919*	1									
Weeklies '99	0.5342*	0.6449*	0.3391*	0.8096*	1								
Use:													
TV '98	0.5366*	0.3936*	0.2521*	0.3909*	0.2921*	1							
Radio '97	0.3569*	0.3395*	0.3175*	0.2356*	0.3144*	0.3338*	1						
Radio News '97	0.2511*	0.2489*	0.7148*	0.2152*	0.2553*	0.2091*	0.3348*	1					
Radio News In '97	0.2459*	0.2091*	0.7001*	0.1949*	0.2173*	0.2043*	0.3167*	0.9870*	1				
Dailies '99		0.2080*		0.5356*	0.3669*					1			
Weeklies '99		0.1573	0.1959*		0.1925*		0.1511			0.1428	1		
Internet '98	0.1415											1	
Internet News '98								0.1619	0.1659*			0.7804*	1
Cable '98			0.2266*					0.1543		0.2354*	0.1946*		

Note: Correlation reported if significant at 10% level; star indicates 5% significance level.

TABLE 12: Correlations among Changes in Measures of Outlets and Use of Various Media

	Δoutlets TV	Δoutlets Radio	Δoutlets Radio News	Δoutlets Daily Papers	Δoutlets Weekly Papers	Δuse TV	Δuse Radio	Δuse Radio News	Δuse Radio News (Inside)	Δuse Daily Papers	Δuse Weekly Papers	Δuse Internet	Δuse Internet News
Change in Outlets:													
TV	1												
Radio	0.1407	1											
Radio News		0.2774*	1										
Daily Papers				1									
Weekly Papers				-0.4411*	1								
Change in Use:													
TV						1							
Radio							1						
Radio News			0.5306*					1					
Radio News (Inside)			0.5470*					0.9610*	1				
Daily Papers				0.4218*						1			
Weekly Papers											1		
Internet			-0.1782*									1	
Internet News			-0.1638									0.7991*	1
Cable		-0.2319*		-0.1727*	0.1559	0.2025*				-0.1654*			

Note: Correlation reported if significant at 10% level; star indicates 5% significance level.

Table 13: The Relationship among Changes in Media Outlets

	(1)	(2)	(3)	(4)	(5)
	Chg. TV Stns. '94-'00	Chg. Daily Papers '93-'99	Chg. Weekly Papers '93-'99	Chg. Inside Radio Stns '93-'97	Chg. Inside News Radio Stns '93-'97
Chg. Inside Radio Stns '93-'97	0.0346	0.0211	-0.1113		
	(1.52)	(0.95)	(0.28)		
Chg. Daily Papers '93-'99	0.1354		-7.9469	0.3099	-0.0367
	(1.55)		(5.76)**	(0.95)	(0.56)
Chg. Weekly Papers '93-'99	0.0038	-0.0245		-0.0050	0.0018
	(0.78)	(5.76)**		(0.28)	(0.48)
Chg. TV Stns. '94-'00		0.1276	1.1592	0.4787	0.0408
		(1.55)	(0.78)	(1.52)	(0.65)
Constant	0.8435	-0.3134	0.4616	1.8602	0.0843
	(7.93)**	(2.57)*	(0.21)	(4.13)**	(0.94)
H_0: Cross effects=0 (p-val)	(0.16)	(0.00)	(0.00)	(0.23)	(0.73)
Observations	141	141	141	141	141
R-squared	0.04	0.22	0.20	0.03	0.01

Notes: Absolute value of t statistics in parentheses. * significant at 5%; ** significant at 1%

Table 14: Changes in Use and Change in Outlets

	(1) Chg. HUT Viewing '95-'00	(2) Chg. Daily Paper Circ. per cap '93-'99	(3) Chg. Weekly Paper Circ. per cap '93-'99	(4) Chg. AQH List '94-'98	(5) Chg. AQH News List '93-'97	(6) Chg. Cable Use '94-'00	(7) Int Use '00	(8) Int News Use '00
Chg. TV Stns. '94-'00	0.6104	-0.0157	0.1023	0.0779	-0.0259	-0.3002	-0.7365	-0.6838
	(1.84)	(0.07)	(0.14)	(1.33)	(0.78)	(1.06)	(0.91)	(1.49)
Chg. Inside Radio Stns '93-'97	-0.0898	-0.1078	-0.1958	0.0091		-0.1842	-0.1856	
	(1.01)	(1.67)	(1.02)	(0.56)		(2.43)*	(0.85)	
Chg. Daily Papers '93-'99	-0.2157	1.4125	-0.1983	-0.0929	0.0028	-0.2911	1.3533	0.8029
	(0.63)	(5.72)**	(0.27)	(1.56)	(0.08)	(1.00)	(1.62)	(1.70)
Chg. Weekly Papers '93-'99	0.0075	0.0203	0.0444	-0.0033	0.0024	0.0180	0.0504	0.0198
	(0.39)	(1.48)	(1.09)	(1.01)	(1.24)	(1.11)	(1.08)	(0.75)
Chg. Inside News Radio Stns '93-'97					0.3252			-1.1253
					(7.25)**			(1.82)
Constant	-0.9343	-1.0182	0.4078	-0.9183	-0.1944	5.3499	47.7075	21.7674
	(1.88)	(2.83)**	(0.38)	(10.05)**	(4.10)**	(12.62)**	(39.01)**	(33.21)**
H_0: Cross effects=0 (p-val)	(0.53)	(0.17)	(0.76)	(0.28)	(0.50)	(0.01)	(0.41)	(0.09)
Observations	141	141	141	135	140	141	141	141
R-squared	0.03	0.21	0.02	0.03	0.29	0.09	0.03	0.06

Notes: Absolute value of t statistics in parentheses. * significant at 5%; ** significant at 1%

Table 15: Changes in Use and Changes in Use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Chg. HUT Viewing '95-'00	Chg. Daily Paper Circ. per cap '93-'99	Chg. Weekly Paper Circ. per cap '93-'99	Chg. AQH List '94-'98	Chg. AQH News List '93-'97	Chg. Cable Use '94-'00	Int Use '00	Int News Use '00
Chg. AQH List '94-'98	0.3922	0.1176	-0.7387			-0.2400	-0.8745	
	(0.78)	(0.29)	(0.68)			(0.61)	(0.72)	
Chg. Daily Paper Circ. per cap '93-'99	0.0377		0.1188	0.0054	0.0065	-0.1676	0.0271	-0.0074
	(0.35)		(0.51)	(0.29)	(0.51)	(2.01)*	(0.10)	(0.05)
Chg. Weekly Paper Circ. per cap '93-'99	0.0083	0.0166		-0.0048	0.0010	-0.0376	0.1299	0.0619
	(0.21)	(0.51)		(0.68)	(0.21)	(1.19)	(1.33)	(1.10)
Chg. Cable Use '94-'00	0.2905	-0.1809	-0.2903	-0.0119	-0.0017		0.2656	0.1563
	(2.66)**	(2.01)*	(1.19)	(0.61)	(0.13)		(0.98)	(1.02)
Int Use '00	0.0126	0.0030	0.1042	-0.0045		0.0276		
	(0.35)	(0.10)	(1.33)	(0.72)		(0.98)		
Chg. HUT Viewing '95-'00		0.0251	0.0396	0.0121	-0.0117	0.1794	0.0749	-0.1268
		(0.35)	(0.21)	(0.78)	(1.14)	(2.66)**	(0.35)	(1.03)
Int News Use '00					-0.0073			
					(1.01)			
Chg. AQH Inside News List '93-'97								-0.8342
								(0.76)
Constant	-2.0030	-0.7021	-3.6352	-0.5326	-0.0025	3.1950	44.3660	19.8568
	(1.14)	(0.49)	(0.94)	(1.74)	(0.02)	(2.35)*	(24.24)**	(21.73)**
H_0: Cross effects=0 (p-val)	(0.17)	(0.45)	(0.55)	(0.85)	(0.75)	(0.02)	(0.62)	(0.63)
Observations	135	135	135	135	140	135	135	140
R-squared	0.07	0.04	0.03	0.02	0.03	0.10	0.66	0.65

Notes: Absolute value of t statistics in parentheses. * significant at 5%; ** significant at 1%

TABLES FOR PART II

Table 1: Newspaper Use

	Read a Daily?	
	No	Yes
Business pages/section	29.00%	62.23%
Classified Advertising	36.72%	55.76%
Comics	33.12%	60.88%
Entertainment	41.52%	68.73%
Food	29.05%	58.77%
News	55.19%	90.77%
Sports	31.61%	60.77%
TV or Radio Listings	27.42%	55.22%
N	83224	95560

Table 2: Cable and Satellite

	percent
Basic	22.76%
Basic/Extended plus Pay	21.93%
None	26.71%
Extended	28.59%
N	178784
	percent
No Satellite	86.13%
Have Satellite	13.87%
DirectTV	6.35%
Dish	3.02%
Other Provider	3.66%
Primestar	0.91%
USSB	0.47%
N	178784

Table 3: Radio Use

Number of Formats Listened to	percent
0	11.39%
1	19.83%
2	27.68%
3	21.15%
4	11.44%
5	5.25%
6	2.10%
7	0.76%
8	0.30%
9	0.09%
10	0.02%
	178784

Table 4: Radio Format Use

Format	percent listening to format
Adult Contemporary	18.29%
Other	0.25%
Adult Standards	4.44%
Album Adult Alternative	2.52%
Album Oriented Rock	11.81%
All News	
	5.35%
All Sports	5.19%
Alternative	7.25%
Black	0.26%
Business	
	0.00%
Childrens Radio (Rel.2 Only)	0.40%
Classic Country	0.79%
Classic Rock	11.08%
Classical	7.62%
Contemporary Christian	2.81%
Contemporary Hit Radio	14.41%
Pop Contemporary Hit Radio	6.03%
Country	21.22%
Rhythmic Contemporary Hit Radio (Rel. 2 Only)	1.74%
Dance	0.00%
Easy Listening	0.72%
Educational (Rel.2 Only)	0.86%
Ethnic	0.39%
Gospel	1.40%
Hot AC	9.67%
Modern AC	3.69%
Jazz	1.68%
New AC/Smooth Jazz	4.86%
New Age	0.00%
New Country	1.43%
New Rock	2.17%
News/Talk/Information	
	23.02%
Nostalgia	1.40%
70's Rock	0.01%
70's Oldies/Classic Hits	2.72%
Oldies	15.26%
Religious	5.97%
Rhythm & Blues	0.38%
Rhythmic Oldies	3.27%
Soft Adult Contemporary	5.81%
Spanish News/Talk (Rel.2 Only)	0.70%
Spanish Contemporary	2.44%

Spanish Regional	2.17%
Spanish Language	0.50%
Spanish Tropical	0.91%
Southern Gospel	0.50%
Talk/Personality	3.91%
Urban AC	3.48%
Tejano	0.33%
Urban Contemporary	6.18%
Urban Oldies	0.67%
Variety	3.67%
Spanish label var viety	0.28%
Format Not Provided	0.00%

Notes: News-related formats underlined in table.

Table 5: Internet Use

hours/week	percent
0	45.15%
0-1	9.93%
1-4	21.76%
5-9	11.59%
10-19	6.59%
20+	4.98%
None	43.96%
Home Only	23.82%
Work Only	1.18%
Both	31.03%
N	178784

Table 6: Internet Uses among Home and Work Users

use	% using at home for…	% using at work for…
Auction site	11.6%	4.5%
Automobile information	19.5%	8.8%
Cable network site	2.9%	1.7%
Chat or community site	16.8%	5.8%
Research/education	79.1%	84.2%
E-mail	24.5%	20.9%
Financial information/services	28.6%	9.2%
Games	17.0%	13.2%
Job/employment search	9.8%	6.7%
Local cable system site	1.2%	0.5%
Local information		
	22.1%	15.2%
Local television station site	3.7%	2.0%
Magazine site	7.0%	5.6%
Medical services/information	6.3%	5.3%
News		
	18.5%	10.0%
Newspaper site		
	31.0%	31.0%
Other use	7.6%	7.1%
Other newspaper site		
	1.0%	1.1%
Maintain own home page	17.1%	13.3%
Purchase item or service	21.4%	12.0%
Listen to audio programming/radio station	7.6%	5.3%
Radio station site	5.4%	4.2%
Real estate listings	14.6%	13.1%
Read a magazine	12.0%	5.7%
Read a newspaper		
	37.7%	37.3%
Shopping	39.0%	18.6%
Sports scores/updates	18.4%	12.4%
Television network site	5.7%	3.3%
Watch video programming	1.7%	1.0%
Work-related use	12.5%	49.2%
Users	98067	57592

Notes: News-related uses underlined.

Table 7: Who Uses Each Medium?

	(1) TV Half Hours per Week	(2) TV News Half Hours (4-12pm)	(3) # Radio Formats Used	(4) # Radio News Formats Used	(5) Weekly Internet Hours	(6) # Internet Uses	(7) # Internet News Uses	(8) Daily Newspaper	(9) # Cable Channels Used	(10) # Cable News Channels Used
age 21-20	0.8925	0.0363	-0.2160	-0.0206	-0.2466	-0.2701	0.0258	-0.0663	-0.1293	-0.0383
	(0.4452)*	(0.0882)	(0.0211)**	(0.0069)**	(0.0787)**	(0.0725)**	(0.0180)	(0.0070)**	(0.0994)	(0.0159)*
age 25-29	2.0167	0.2560	-0.2765	0.0145	-0.4463	-0.4199	0.0157	-0.0740	-0.0644	-0.0300
	(0.4102)**	(0.0813)**	(0.0194)**	(0.0063)*	(0.0725)**	(0.0668)**	(0.0166)	(0.0065)**	(0.0916)	(0.0146)*
age 30-34	2.1558	0.3457	-0.2838	0.0688	-0.6439	-0.6339	-0.0258	-0.0289	0.0019	0.0034
	(0.4020)**	(0.0797)**	(0.0190)**	(0.0062)**	(0.0710)**	(0.0654)**	(0.0162)	(0.0063)**	(0.0898)	(0.0143)
age 35-39	3.7367	0.8860	-0.3352	0.1219	-1.1255	-1.0243	-0.0870	0.0367	-0.2464	0.0702
	(0.3954)**	(0.0784)**	(0.0187)**	(0.0061)**	(0.0699)**	(0.0644)**	(0.0160)**	(0.0062)**	(0.0883)**	(0.0141)**
age 40-44	4.3695	1.1062	-0.4043	0.1545	-1.1787	-1.2470	-0.1260	0.0990	-0.4371	0.0797
	(0.3979)**	(0.0789)**	(0.0188)**	(0.0061)**	(0.0703)**	(0.0648)**	(0.0161)**	(0.0063)**	(0.0889)**	(0.0142)**
age 45-49	5.7908	1.4608	-0.5088	0.1886	-1.1845	-1.3372	-0.1535	0.1343	-0.3011	0.1193
	(0.4081)**	(0.0809)**	(0.0193)**	(0.0063)**	(0.0721)**	(0.0664)**	(0.0165)**	(0.0064)**	(0.0911)**	(0.0146)**
age 50-54	11.6471	3.1224	-0.7699	0.2179	-1.7841	-2.4368	-0.3524	0.1679	-0.6137	0.2417
	(0.4139)**	(0.0820)**	(0.0196)**	(0.0064)**	(0.0731)**	(0.0674)**	(0.0167)**	(0.0065)**	(0.0924)**	(0.0148)**
age 55-59	14.4908	3.8996	-1.0045	0.2675	-2.0782	-2.9276	-0.4371	0.2074	-0.8676	0.3164
	(0.4367)**	(0.0866)**	(0.0207)**	(0.0067)**	(0.0772)**	(0.0711)**	(0.0176)**	(0.0069)**	(0.0975)**	(0.0156)**
age 60-64	18.0567	4.5624	-1.1911	0.2889	-2.5092	-3.5055	-0.5042	0.2502	-0.9295	0.3856
	(0.4539)**	(0.0900)**	(0.0215)**	(0.0070)**	(0.0802)**	(0.0739)**	(0.0183)**	(0.0072)**	(0.1014)**	(0.0162)**
age 65-69	22.3543	5.5710	-1.4182	0.3061	-2.9543	-4.0423	-0.5726	0.2947	-1.0745	0.4448
	(0.4623)**	(0.0916)**	(0.0219)**	(0.0071)**	(0.0817)**	(0.0752)**	(0.0187)**	(0.0073)**	(0.1032)**	(0.0165)**
age 70+	26.5446	6.5158	-1.7677	0.2882	-3.5353	-4.5105	-0.6388	0.3131	-1.6902	0.4344
	(0.3943)**	(0.0782)**	(0.0187)**	(0.0061)**	(0.0697)**	(0.0642)**	(0.0159)**	(0.0062)**	(0.0881)**	(0.0141)**
some high	2.4028	0.5135	0.3248	0.0450	0.0443	-0.1540	-0.0280	0.1312	0.6736	0.0816
	(0.4605)**	(0.0913)**	(0.0218)**	(0.0071)**	(0.0814)	(0.0750)*	(0.0186)	(0.0073)**	(0.1028)**	(0.0164)**
high	0.7760	0.4254	0.5415	0.1066	0.4578	0.1872	0.0214	0.2388	1.1956	0.2117
	(0.3919)*	(0.0777)**	(0.0186)**	(0.0060)**	(0.0692)**	(0.0638)**	(0.0158)	(0.0062)**	(0.0875)**	(0.0140)**
some coll	-1.2629	0.1224	0.7507	0.1759	1.4572	1.4282	0.2349	0.2952	1.2157	0.3311
	(0.4052)**	(0.0803)	(0.0192)**	(0.0062)**	(0.0716)**	(0.0659)**	(0.0164)**	(0.0064)**	(0.0905)**	(0.0145)**
college	-2.7839	-0.0888	0.8960	0.2711	1.9110	2.2537	0.4021	0.3429	0.8698	0.3998
	(0.4129)**	(0.0818)	(0.0195)**	(0.0064)**	(0.0730)**	(0.0672)**	(0.0167)**	(0.0065)**	(0.0922)**	(0.0147)**
some grad	-3.5798	-0.2026	1.0047	0.3400	2.3446	2.9443	0.5184	0.3710	0.6776	0.4200
	(0.5137)**	(0.1018)*	(0.0243)**	(0.0079)**	(0.0908)**	(0.0836)**	(0.0207)**	(0.0081)**	(0.1147)**	(0.0183)**
grad schl	-5.1676	-0.3416	0.9257	0.3576	2.5269	3.1556	0.5609	0.3936	0.5327	0.4503
	(0.4345)**	(0.0861)**	(0.0206)**	(0.0067)**	(0.0768)**	(0.0707)**	(0.0175)**	(0.0069)**	(0.0970)**	(0.0155)**
Black	9.9758	0.7268	-0.2975	-0.1157	-0.7968	-0.8268	-0.1161	-0.0329	0.8888	-0.0499

	(0.2393)**	(0.0474)**	(0.0113)**	(0.0037)**	(0.0423)**	(0.0389)**	(0.0097)**	(0.0038)**	(0.0534)**	(0.0085)**
Asian	-1.5797	-0.2753	-0.7174	-0.0073	1.0704	1.0196	0.2998	-0.0705	-0.9865	0.0418
	(0.5068)**	(0.1004)**	(0.0240)**	(0.0078)	(0.0895)**	(0.0825)**	(0.0205)**	(0.0080)**	(0.1132)**	(0.0181)*
Oth Non-Hisp	0.2576	-0.0468	-0.3040	-0.0452	-0.0221	0.0079	0.0094	-0.0597	0.1378	-0.0144
	(0.4750)	(0.0941)	(0.0225)**	(0.0073)**	(0.0839)	(0.0773)	(0.0192)	(0.0075)**	(0.1061)	(0.0169)
Hisp	5.5291	1.1266	-0.1834	-0.0862	-1.1152	-1.1895	-0.1600	-0.0846	-1.2080	-0.1447
	(0.2541)**	(0.0504)**	(0.0120)**	(0.0039)**	(0.0449)**	(0.0414)**	(0.0103)**	(0.0040)**	(0.0568)**	(0.0091)**
Male	-6.6350	-0.0570	0.1505	0.0972	1.0631	1.2149	0.2628	0.0656	1.6841	0.2348
	(0.1445)**	(0.0286)*	(0.0068)**	(0.0022)**	(0.0255)**	(0.0235)**	(0.0058)**	(0.0023)**	(0.0323)**	(0.0052)**
Constant	28.6164	2.7419	2.3282	-0.0764	3.5133	4.2392	0.5687	0.1356	7.3119	0.2946
	(0.5149)**	(0.1021)**	(0.0244)**	(0.0079)**	(0.0910)**	(0.0838)**	(0.0208)**	(0.0081)**	(0.1150)**	(0.0184)**
Observations	178784	178784	178784	178784	178784	178784	178784	178784	178784	178784
R-squared	0.11	0.12	0.16	0.11	0.08	0.16	0.09	0.10	0.03	0.05

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%.

Table 8: Sample Statistics

	mean
TV Half Hours/Week	35.47
News Half Hours (4-12 PM)	5.31
Whether Listen to Radio	88.61%
# Radio Formats Listened to	2.32
# Radio News Formats Used	0.28
Whether Use Internet	54.85%
# Internet Uses	3.97
# Internet News Uses	0.64
Weekly Time Online	3.50
Whether Cable or Satellite	79.81%
# Cable Channels Used	8.40
# Cable News Channels Used	0.82
Whether Daily Newspaper	53.45%

Table 9: Correlations among Overall Use Measures

shortname	Variable	view	radall	dradio	itime	iuses	dint	cab_num	dcabsat	any_daily
view	Television Half Hours per week	1								
radall	Radio Formats Listened to	-0.1149	1							
		0								
dradio	Whether Listen to Radio	-0.0937	0.5387	1						
		0	0							
itime	Weekly Time Online	-0.1044	0.117	0.0808	1					
		0	0	0						
iuses	Number of Internet Uses	-0.144	0.1787	0.1148	0.6536	1				
		0	0	0	0					
dint	Whether online	-0.1785	0.2015	0.1516	0.5745	0.6533	1			
		0	0	0	0	0				
cab_num	Number of Cable Channels Used	-0.015	0.0712	0.0465	0.1196	0.1539	0.0933	1		
		0	0	0	0	0	0			
dcabsat	Whether Use Cable or Satellite	-0.0684	0.0088	0.0121	0.0584	0.057	0.0806	0.4788	1	
		0	0.0002	0	0	0	0	0		
any_daily	Whether Read a Daily	0.0536	0.0299	0.0208	0.0022	0.003	0.0066	0.0393	0.0712	1
		0	0	0	0.3458	0.2071	0.0052	0	0	

Note: probability values appear below correlations in table.

Table 10: Correlations among News Use Measures

		TVnews	inews_~s	rnews	cab_news	any_da~y
TVnews	TV News Half Hours (4-12PM)	1				
inews_uses	Number of Internet News Uses	-0.0909 0	1			
rnews	# of Radio News Formats Used	0.0513 0	0.0542 0	1		
cab_news	# of Cable News Channels Viewed	0.0758 0	0.145 0	0.0961 0	1	
any_daily	Whether Daily Newspaper	0.0909 0	0.0092 0.0001	0.1556 0	0.1182 0	1

Table 11: Correlations among Gap (News-Ent) Measures

		TVgap	igap	radgap	cab_gap	any_da~y
TVgap	TV: News-Ent	1				
Igap	Internet: News-Ent	-0.108 0	1			
Radgap	Radio: News-Ent.	-0.0679 0	0.1417 0	1		
cab_gap	Cable: News-Ent.	-0.0083 0.0005	0.1264 0	0.1119 0	1	
any_daily	Whether Daily Newspaper	-0.0218 0	0.0021 0.3706	0.0675 0	-0.0013 0.5748	1

Table 12: Do People Using One Medium More Use Other Media Less?

	(1)	(2)	(3)	(4)	(5)
	TV Half Hours per Week	# Radio Formats Used	Weekly Internet Hours	Daily Newspaper	# Cable Channels Used
# Radio Formats Used	0.0620		0.0572	0.0271	0.1476
	(0.0501)		(0.0088)**	(0.0008)**	(0.0111)**
Weekly Internet Hours	-0.1286	0.0041		0.0007	0.1208
	(0.0134)**	(0.0006)**		(0.0002)**	(0.0030)**
Daily Newspaper	1.0543	0.2448	0.0826		0.6196
	(0.1505)**	(0.0071)**	(0.0265)**		(0.0334)**
# Cable Channels Used	0.0937	0.0067	0.0758	0.0031	
	(0.0107)**	(0.0005)**	(0.0019)**	(0.0002)**	
TV Half Hours per Week		0.0001	-0.0040	0.0003	0.0046
		(0.0001)	(0.0004)**	(0.0000)**	(0.0005)**
Constant	28.0960	2.2279	2.9283	0.0399	6.3276
	(0.5341)**	(0.0248)**	(0.0944)**	(0.0085)**	(0.1185)**
Observations	178784	178784	178784	178784	178784
R-squared	0.11	0.16	0.09	0.11	0.04

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%. Regressions include individual controls for education, age, race, and gender.

Table 13: Do People Using News from One Medium More Use News from Other Media Less?

	(1)	(2)	(3)	(4)	(5)
	TV News Half Hours (4-12pm)	# Radio News Formats Used	# Internet News Uses	Daily Newspaper	# Cable News Channels Used
# Radio News Formats Used	0.0726		0.0945	0.0611	0.0479
	(0.0304)*		(0.0061)**	(0.0024)**	(0.0054)**
# Internet News Uses	-0.0851	0.0141		0.0048	0.1316
	(0.0117)**	(0.0009)**		(0.0009)**	(0.0021)**
Daily Newspaper	0.2909	0.0585	0.0310		0.1166
	(0.0298)**	(0.0023)**	(0.0060)**		(0.0053)**
# Cable News Channels Used	0.2306	0.0092	0.1691	0.0233	
	(0.0133)**	(0.0010)**	(0.0027)**	(0.0011)**	
TV News Half Hours (4-12pm)		0.0004	-0.0035	0.0018	0.0073
		(0.0002)*	(0.0005)**	(0.0002)**	(0.0004)**
Constant	2.6885	-0.0962	0.5313	0.1256	0.1876
	(0.1023)**	(0.0080)**	(0.0206)**	(0.0081)**	(0.0182)**
Observations	178784	178784	178784	178784	178784
R-squared	0.13	0.12	0.11	0.11	0.07

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%. Regressions include individual controls for education, age, race, and gender.

Table 14: The Relationship among News – Entertainment Gaps across Media

	(1)	(2)	(3)	(4)	(5)
	TV: News-Ent.	Radio: News-Ent.	Internet: News-Ent.	Daily Newspaper	Cable: News-Ent.
Radio: News-Ent.	0.1459		0.0253	-0.0140	0.1848
	(0.0408)**		(0.0055)**	(0.0008)**	(0.0095)**
Internet: News-Ent.	-0.1766	0.0046		-0.0027	0.1586
	(0.0175)**	(0.0010)**		(0.0003)**	(0.0041)**
Daily Newspaper	-0.4370	-0.1230	-0.1302		-0.3693
	(0.1210)**	(0.0070)**	(0.0164)**		(0.0282)**
Cable: News-Ent.	0.1089	0.0114	0.0535	-0.0026	
	(0.0101)**	(0.0006)**	(0.0014)**	(0.0002)**	
TV: News-Ent.		0.0005	-0.0032	-0.0002	0.0059
		(0.0001)**	(0.0003)**	(0.0000)**	(0.0006)**
Constant	-22.5271	-2.3618	-2.7368	0.0710	-5.5855
	(0.4341)**	(0.0247)**	(0.0588)**	(0.0085)**	(0.1011)**
Observations	178784	178784	178784	178784	178784
R-squared	0.07	0.22	0.16	0.11	0.05

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%. Regressions include individual controls for education, age, race, and gender.

Table 15: Media Use and Local Isolation (Youth)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	TV Half Hours per Week	TV News Half Hours (4-12pm)	# Radio Formats Used	# Radio News Formats Used	Weekly Internet Hours	# Internet Uses	# Internet News Uses	Daily Newspaper	# Cable Channels Used	# Cable News Channels Used
Young Dummy x % Young	17.7282	0.7965	1.4439	0.2378	-5.0205	-4.4882	-0.3347	-0.1909	-4.4077	0.3820
	(7.7469)*	(1.6857)	(0.6156)*	(0.3073)	(2.0370)*	(2.0037)*	(0.4528)	(0.1195)	(2.1918)*	(0.3080)
Young Dummy	-29.0308	-5.7107	0.6771	-0.4433	5.0475	5.8596	0.7056	-0.2223	3.0691	-0.6197
	(3.5611)**	(0.8013)**	(0.2855)*	(0.1464)**	(0.9059)**	(0.9139)**	(0.2069)**	(0.0541)**	(0.9692)**	(0.1419)**
Constant	53.5560	8.7510	0.8253	0.2005	0.1374	-0.1971	-0.0515	0.4057	5.9245	0.6815
	(0.7917)**	(0.1823)**	(0.0355)**	(0.0107)**	(0.1014)	(0.1033)	(0.0196)**	(0.0089)**	(0.1427)**	(0.0210)**
Observations	178784	178784	178784	178784	178784	178784	178784	178784	178784	178784
R-squared	0.10	0.13	0.16	0.14	0.08	0.16	0.09	0.11	0.04	0.06

Notes: Robust standard errors in parentheses – se's are clustered on CMSA. * significant at 5%; ** significant at 1%. All specifications include age dummies, education dummies, and a gender dummy.

Table 16: Media Use and Local Isolation (Blacks)

	(1) TV Half Hours per Week	(2) TV News Half Hours (4-12pm)	(3) # Radio Formats Used	(4) # Radio News Formats Used	(5) Weekly Internet Hours	(6) # Internet Uses	(7) # Internet News Uses	(8) Daily Newspaper	(9) # Cable Channels Used	(10) # Cable News Channels Used
Black x % Black in Metro Area	24.4042	0.9195	1.0901	0.0128	-0.4154	-0.9014	-0.2193	-0.0380	-3.0696	-0.3915
	(5.0254)**	(0.9571)	(0.2897)**	(0.0752)	(0.7065)	(0.5800)	(0.1472)	(0.0465)	(1.1183)**	(0.1086)**
Black	4.8300	0.3711	-0.4620	-0.1101	-0.6671	-0.5818	-0.0835	-0.0072	1.3547	0.0057
	(1.0996)**	(0.1903)	(0.0589)**	(0.0140)**	(0.1558)**	(0.1257)**	(0.0286)**	(0.0110)	(0.2028)**	(0.0238)
Constant	30.8601	3.3045	2.1940	-0.1175	3.0567	3.7750	0.5251	0.1002	6.8837	0.2454
	(0.7954)**	(0.1807)**	(0.0436)**	(0.0197)**	(0.1554)**	(0.1498)**	(0.0243)**	(0.0084)**	(0.1744)**	(0.0219)**
Observations	178784	178784	178784	178784	178784	178784	178784	178784	178784	178784
R-squared	0.11	0.13	0.16	0.15	0.08	0.16	0.09	0.11	0.04	0.06

Notes: Robust standard errors in parentheses – se's are clustered on CMSA. * significant at 5%; ** significant at 1%. All specifications include age dummies, education dummies, and a gender dummy.

Table 17: Media Use and Local Isolation (Hispanics)

	(1) TV Half Hours per Week	(2) TV News Half Hours (4-12pm)	(3) # Radio Formats Used	(4) # Radio News Formats Used	(5) Weekly Internet Hours	(6) # Internet Uses	(7) # Internet News Uses	(8) Daily Newspaper	(9) # Cable Channels Used	(10) # Cable News Channels Used
Hisp. Dummy x % Hisp.	4.5915	0.7486	1.5035	-0.1005	-3.1912	-2.6137	-0.3580	0.0805	-4.4903	-0.6898
	(5.6911)	(1.2777)	(0.1913)**	(0.0646)	(0.7296)**	(0.9577)**	(0.1688)*	(0.0566)	(1.7455)*	(0.2320)**
Hispanic	2.7389	0.9868	-0.4575	-0.0700	-0.6133	-0.7520	-0.0787	-0.0845	-0.2282	-0.0054
	(1.2216)*	(0.2256)**	(0.0364)**	(0.0213)**	(0.1490)**	(0.1678)**	(0.0324)*	(0.0091)**	(0.2548)	(0.0368)
Constant	30.9175	2.9045	2.2312	-0.0971	3.4554	4.1867	0.5670	0.1283	7.4749	0.2913
	(0.7707)**	(0.1155)**	(0.0436)**	(0.0144)**	(0.1139)**	(0.1146)**	(0.0261)**	(0.0083)**	(0.1372)**	(0.0194)**
Observations	178784	178784	178784	178784	178784	178784	178784	178784	178784	178784
R-squared	0.10	0.13	0.16	0.15	0.09	0.16	0.09	0.12	0.04	0.06

Notes: Robust standard errors in parentheses – se's are clustered on CMSA. * significant at 5%; ** significant at 1%. All specifications include age dummies, education dummies, and a gender dummy.

Table 18: Summary of Statistical Results on Substitution

	TV all use	TV all outlets	TV news use	Radio all use	Radio all outlets	Radio news use	Radio news outlets	Dailies use	Dailies outlets	Weeklies use	Weeklies outlets	Internet use	Internet news use	Cable use	Cable news use
TV all use				E		D						E H	D	E	
TV all Outlets															
TV news use						G		G J					F G I J		G
Radio all use	E														
Radio all outlets	C							C		C				A **C**	
Radio news use								J					C		
Radio news outlets			G									A	A		
Dailies use													J	A **D**	G J
Dailies outlets											A B			A C	
Weeklies use														D	
Weeklies outlets				C					A B						
Internet use	E H						A								
Internet news use			F G H I			D	A	J							
Cable use	E				A			A **D**	A	D					
Cable news use			G					G J							

Symbols denote significance at 5% level (except as noted below). We register the correlation measures (A, E, F, G) symmetrically. For the measures based on regression coefficients, we treat the column as the dependent variable and the row as the independent variable.

Key:
A = correlation of changes on changes in aggregate data (see Part I, Table 12), listed if significant at 5% level
B = regression of N on N in changes (agg data – see Part I, Table 13), listed if t-stat>1, bold if significant at 5% level
C = regression of use on N in changes (agg data – see Part I, Table 14), listed if t-stat>1, bold if significant at 5% level
D = regression of use on use in changes (agg data – see Part I, Table 15), listed if t-stat>1, bold if significant at 5% level
E = correlation of overall use (micro data – see Part II, Table 9)
F = correlation of news use (micro data – see Part II, Table 10)
G = correlation of news-ent gap (micro data – see Part II, Table 11)
H = micro regression of use on use (overall media use measures – see Part II, Table 12)
I = micro regression of use on use (news measure – see Part II, Table 13)
J = micro regression of use on use (gap measure – see Part II, Table 14)