Basic cable network segmentation toward minorities and other niche audiences in the U.S.: An empirical study

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Abstract

Primarily using a database of 78 ad-supported basic cable TV networks operating in 2010, we generally find that cost per thousand (CPM) advertising rates increase with total audience size, suggesting limits to the ability of cable networks to “narrowcast” to niche audiences. Contrary to some previous research, we find no evidence that advertisers place lower value on black or Hispanic audiences. We also find that much of the variation in the size of black and Hispanic audiences on basic cable networks is explained by programming investment levels. We thus attribute an apparent “undersupply” of black and Hispanic-oriented programming on these networks to program supplier incentives to spend more on content that has broad appeal.

I. Introduction

Continuous technological change and intensifying competition among cable TV, DBS and other multichannel television program distributors (MVPDs) in the United States have dramatically increased opportunities for television networks to enter the market, and sharply focus toward niche audiences, including racial and ethnic minorities. Channel capacity has steadily expanded since cable programming networks began forming in the 1970s. Since the mid-1990s, digital transmission and compression have accelerated capacity expansion and also permitted specialized networks to be more efficiently placed on higher tiers offered to subscribers for additional charges.

In theory, these developments should increase economic rewards to sharper program focus. Similar to magazines, basic cable networks can earn per subscriber fees as well as advertising revenues. Either income stream can potentially be increased by moving away from the "common denominator" constraint that inherently limits broad appeal programming, such as that on the major national broadcast TV networks. In at least print media, it is well-established that advertisers are willing to pay higher prices per viewer for audiences that are segmented toward particular demographic segments (Chandra, 2009; Chandra & Kaiser, 2011). Further, descriptive data and advertising practice strongly suggest that in television, certain demographic groups are more valuable to advertisers than others. For example, average cost-per-thousand (CPM) advertising rates in broadcast television are generally higher for the 18-34 age group and for higher income audiences. Also, sharper focus on product interest may increase ad rates as well as subscriber fees. With regard to advertising, many specialty magazines, for example, focus on particular topics (eg, photography, antiques), for example, which increases opportunities for specialty product advertisers.[1]

In cable television, however, empirical experience suggests limitations to the "narrowcasting" model. With respect to racial and ethnic groups, for example, consider the **B**lack Entertainment Network (BET), one of the only major cable TV network clearly oriented toward African-American viewers in the U.S. Although self-identified blacks make up about 14% of the U.S. population, BET ranked 20th among all basic cable networks in total revenues in 2010 (*SNL* Kagan, 2011). This result seems to fall short of expectations many held

[1] Chandra and Kaiser (2011) reported, however, that content variables were dominated by demographics in determining magazine CPM rates .

in the 1970s for cable television to serve racial and ethnic minorities and other niche audiences like classical music fans, much like radio stations have successfully done. One possible factor is that in contrast to radio, appealing TV programming is expensive to produce, as are advertisements themselves. Advertisers also want to reach high proportions of their target audiences to fulfil campaign objectives. A related factor is that historically, the maximum audience reach of cable networks has been restricted to TV households that subscribe to cable or another MVPD service (currently 85% to 90% of US TV homes), and many networks reach much fewer homes because MPVDs choose not to carry them. An engaging empirical suggestion of cable TV's overall limits to narrowcasting is that average CPM rates of cable networks in the U.S. are reportedly far *below* those of the major broadcast networks, even though the latter more frequently reach larger, evidently more "mass appeal" audiences overall.[2]

We present an empirical economic study of over 90 basic cable programming networks operating in 2010. In the first part, we explore the determinants of cable network advertising rates. As the source of approximately two-thirds of total revenues of the several hundred basic cable TV networks, advertising revenues are critical to the economic success of the cable TV narrowcasting model. Among the main questions we address: How sensitive are advertising rates to the total number of viewers watching, and in particular to the national subscriber reach of the network and to its Nielsen ratings? What is the marginal value to cable advertisers of segmentation toward various demographic groups, including blacks and Hispanics?[3]

In the second part of the paper, we focus on the distribution of viewing by black and Hispanic audiences among our sample of cable networks. To what extent do these audiences isolate their viewing to a particular set of networks? What mainly determines the distribution of racial and ethnic cable viewing: programming content, or the production quality of that programming?

Although our answers to these broad questions are incomplete and preliminary in nature, we seek to lay a useful foundation for understanding the narrowcasting potential of

[2] Monday to Sunday prime time CPMs for broadcast networks in 2011-12 are $19.48, compared to $10.61 for cable networks. Other daypart comparisons are similar (TV Dimensions, 2012, p. 111).
[3] "Black," "Hispanic" and "white" are the self-identified labels assigned by Nielsen to these groups and we use those throughout the paper.

multi-channel programming distribution as well as to give insights into the even finer segmentation potential of Internet-distributed video media.

II. Prior Research

"Targeted" advertising has attracted recent academic interest among economists following commercial development of Internet, since highly efficient targeting becomes feasible. Internet search is the most obvious example, but banner and other types of advertising can be customized based on detailed information about user characteristics, including demographics. Ostensibly, sharper segmentation would appear to increase advertising prices, although some authors have shown that equilibrium outcomes of competition in such markets could actually result in lower advertiser prices or profits (Athey & Gans, 2010; Ben Elhadj-Ben Brahim, Lahmandi-Ayed, & Laussel, 2011; Bergemann & Bonatti, 2011). Empirical studies have been few, however, at least with respect to documenting the premiums that advertisers pay for sharp targeting (eg, Goldfarb & Tucker, 2011). For surveys of Internet advertising, see Evans (2009) and Anderson (2012).

There have been several studies showing the value of targeting in print media. Chandra (2009) found that competitive newspapers charge higher ad rates because they can more efficiently segment the audience and thus deliver more homogenous groups of readers to advertisers. In the course of his study, he found significant effects of age, gender, and race, and that advertising rates tend to increase with demographic homogeneity. Several studies have involved the magazine industry, for which relatively good data have been available. Empirical studies by Depken II and Wilson (2004) and Koschat and Putsis Jr (2002) suggested that homogeneity of magazine audiences may increase ad rates. In a detailed study of magazine advertising, Chandra and Kaiser (2011) found that readership homogeneity with respect to age, gender and income increased advertising rates.

Studies in television media over many years have established that advertising prices (in $ terms) rise with audience size, and various demographic characteristics have been identified as significant determinants. Fisher, McGowan and Evans (1980) found that daypart and median household income affected broadcast TV ad rates, and suggestive evidence that higher ratings lead to higher CPM rates. A later study by Fournier and Martin (1983) found significant effects of demographics on CPM rates. Some more recent studies of broadcast TV markets found significant differences in advertising prices for different demographic segments as collateral findings of broader empirical research projects (Baker & George, 2010; Bel & Domenech, 2009). In a study involving the effects of MSO buying power, Chipty and Snyder (1999) found that total cable network advertising revenues increased, but at a decreasing rate, with higher national subscriber reach.

A number of authors have studied media appeal to racial and ethnic minorities, and how those groups affect advertising rates. Conventional wisdom in the U.S. is that racial and ethnic minorities may be "underserved" by electronic media (McDowell & Dick, 2005; Wildman & Karamanis, 1998). Webster and Phalen (1997), Ofori (1999), Napoli (2002), Brown and Cavazos (2002), and McDowell and Dick (2005) all found evidence that black and/or Hispanic audiences are undervalued by television or radio advertisers relative to white populations. Rogers and Woodbury (1996) investigated how market size affects the availability of minority programming. In their study of 115 local radio markets, they found that the presence of black and Hispanic audiences leads to higher program diversity in terms of 11 defined radio formats.

In another stream of research related to this paper, Waldfogel (2003) considered both programming supply and listening in 247 U.S. radio markets. He found that blacks and Hispanics had relatively intense preferences for black-oriented and Hispanic-oriented radio stations, respectively. He further showed that as the absolute sizes of black and Hispanic populations increased, the number of stations with formats oriented to those groups, as well as overall radio listening, significantly increased. He also found evidence of negative preference externalities: that is, as white audiences rose, minority oriented listening declined. Wang and Waterman (2011) found similar negative preference externalities in a study of U.S. radio stations broadcasting in 19 different foreign languages. In a study of preference externalities in U.S. local newspaper markets, George and Waldfogel (2003) reported that newspaper purchase rates by blacks were positively related to the size of the black population, but inversely related to the size of the white population.

III. Background on basic cable television networking

U.S. cable TV networks initiated their competition with national broadcast networks beginning in the mid-1970s after launch of the first geostationary commercial satellites capable of television transmission. Many networks, including CNN, HBO, MTV, and Lifetime, entered and became established by the mid-1980s. Cable TV channel capacity has kept expanding, driven mainly since the mid-1990s by digital technologies which permit much more efficient utilization of bandwidth. Cable TV systems began adding “digital tiers” in the mid-1990s which generally compressed 12 channels into the space of one analog channel, and also created the opportunity for high definition (HD) channels. In response, a new wave of cable network entry began in the 1990s, and many newer networks came to be carried on higher digital tiers for extra charges. By 2010, the FCC had identified several hundred national cable TV networks in business (FCC, 2012), thus dividing the relatively fixed U.S. television audience more and more finely, bringing questions we ask in this paper further to the forefront.

Cable networks are mostly of two types: “basic” networks, like TBS and CNN, earn revenues both from advertising and per-subscriber fees paid by MVPDs for the right to carry them, and are generally marketed to subscribers in bundles; “premium” networks, like HBO, generally do not sell advertising but charge higher per-subscriber prices, and are often sold a la carte. Our focus in this study is entirely on basic networks.

Basic cable TV networking is a typical two-sided media market, but with its own idiosyncrasies. A decision by a network to charge higher per-subscriber fees, or to offer itself for placement on a higher tier for extra charges, for example, will limit advertising revenues by reducing MVPD demand to carry the network, or by reducing the network’s audience exposure due to higher tier carriage. Thus, the market is a complex one in which advertising revenues depend on tier position and per subscriber fees as well as audience size and other characteristics, along with a variety of other elements, such as the type of programming. Subscriber reach of a network, for example, is partially determined by tier position choice, license fee rates, years since the network was launched, etc.

In this study, we do not attempt to capture all these details of the industry, but instead use single equation models, and in some cases instrumental variable techniques, to explain advertising rates and the distribution of black and Hispanic audiences.

IV. Determinants of cable advertising rates

A. Database and descriptive data

Our primary database was supplied by A.C. Nielsen and includes audience-related data for 97 basic networks in business during 2010. For each network, we obtained 2010 annual averages for the network's TV household reach, and average households delivered in a number of categories, including: total, racial/ethnic (black, Hispanic, white), four age categories, ten income categories, and gender. The Nielsen data permitted us to calculate each network's rating and the percentage audience composition among the income, gender, race/ethnic, and age categories. The Nielsen data also include cost-per-thousand (CPM) advertising rates and advertising revenue data, although these items were available only for 89 networks.

We supplemented the Nielsen data by calculating tier positioning: the % of cable subscribers that had the network available on the lowest priced (basic or expanded basic) tier, rather than on a tier that required extra charges, using the 2010 Television & Cable Factbook (Warren Publishing, 2010). These data were available for 64 networks. We further obtained data from SNL Kagan Research for network launch dates and total expenditures on programming for 86 of the Nielsen networks. Finally, we obtained descriptive content information, in this case for 89 of the Nielsen networks, in 10 genre categories at a Wikipedia site (originating from National Cable & Telecommunications Association, NCTA), as well as more detailed content descriptions directly from the NCTA website.

Table 1 indicates the specific variables we employ in our models, their definitions, and basic statistics. For our study, we define CPM advertising rates in two ways. One, that we label *CPM-narrow,* is a measure of actual prices paid per 30 second commercial by each network, estimated by Nielsen in real time as part of a service to advertisers working in the cable industry. Like other data items, Nielsen supplied annual averages of these data to us. Nielsen then used these data to project total advertising revenues of each network for the full year. With the latter data we employ a second definition of advertising rates also used in the industry, *CPM-broad*: total advertising/average audience delivered, a fraction which more generally measures the overall ability of the network to raise advertising revenues. These 2 definitions may significantly differ, for example, if certain networks end up selling relatively few advertising spots per hour compared to others.

Figures 1-4 illustrate bivariate relationships between these two CPM measures and the network's audience reach and its rating for the 78 networks having complete data for the CPM regression models that follow. As indicated in Table 1, *reach* is defined as the % of total US TV households that can receive the network. *Rating* is the 24 hour average percentage of those households that are able to receive the network who actually watch it. A positive relationship between both measures of CPM and network reach is suggested by Figures 1 and 2, but a relationship between CPMs and rating is less evident (Figures 3 and 4). The graphical relationship between CPMs and reach is also more pronounced for the broader CPM definition (*CPM-broad*), suggesting a number of networks that have high advertising prices per spot but which sell relatively few of those spots. (A more complete bivariate correlation matrix including empirical model variables appears in Appendix Table 3).

Most of the networks on the far right of the reach graphs were launched in early years of the industry and had achieved virtually 100% MVPD subscribership reach by the 1980s or '90s. Note, however, that even the most widely carried cable networks still fell short in 2010 by about 13% of all TV households because those TV households receive only broadcast signals. Thus, all cable networks have at least the 13% national coverage handicap. A number of other networks in the sample have relatively high CPMs and low reach, and appear to be outliers in Figure 1. These networks are largely from the second wave of network entry, many in response to digital cable tiers rolled out in the mid-1990s. Among them are several sports networks, including NBA Network, NFL Network, Versus, and NBC Sports, which were launched after 2000 and have in more than one case been involved in high profile disputes with cable operators over subscriber fees and tier placement. Regarding the less evident relationship between CPMs and ratings shown in Figures 3 and 4, we note that our sample has a selection bias in that many existing networks (up to several hundred in fact according the FCC's latest counts) are not covered by Nielsen ratings. In the great majority of these cases, the network does not achieve the minimum criteria to be rated by Nielsen in terms of household coverage and average audience size.[4] Thus, existing networks not in our sample can overwhelmingly be assumed to have smaller audiences than those in the sample.

[4] Networks with audiences sizes meeting Nielsen's minimum criteria could also be excluded from the database if they do not subscribe to Nielsen's rating service, but we did not observe any notable examples of such omission.

B. Empirical specifications and estimation strategy

Our general empirical model is as follows:

$$(1)\ CPM = \beta_0 + \beta_1 reach + \beta_2 rating + \beta_3 \mathrm{a}ge\text{18-34} + \beta_4 \mathrm{i}ncome + \beta_5 \%Black + \beta_6 \%Hispanic + \beta_7 \%male + \beta_8 \%income + \beta_9 \mathrm{m}ale\text{-}hhi + \beta_{10} agehhi + \beta_{11} racehhi + \beta_{12} Genre\ dummies + error$$

Our hypothesis is that CPMs will be positively related to *reach* since advertisers presumably value homogenously distributed, geographically complete national audiences. *Rating* may have either a positive or a negative effect. Other things equal, smaller audience sizes suggest sharper audience segmentation, which should increase advertising rates. As discussed above, however, smaller audience size may at some point diminish advertiser demand either because, for example, too low a percentage of the network's target audience is reached, or because targeted commercials cannot be cost-effectively produced.

Audience characteristics are primarily represented by Nielsen demographic data. Viewers aged 18-34 are the most desirable age group to advertisers. Similarly for females (suggesting a negative coefficient for "*%male*."). CPMs should also increase in income. Although we do not have prior expectations for the effects of *%black* or *%Hispanic*, previous research reported above suggests these variables may have negative coefficients. The three HHI terms are intended to represent the value of focussed segmentation within any of the relevant demographic categories.

Finally, network characteristics are represented by the 10 genre dummy variables described in Table 1. CPM rates are likely to be higher for certain types of content, such as sports, independently of demographics. These variables may also represent varying levels of network competition within these programming categories, which other things equal, may tend to reduce CPM rates.

We estimated several variations on the basic model set out in equation (1). First, we used different permutations or functional forms of the rating and reach variables, using an interaction term, *inter* = *reach* × *rating*, which is equivalent to average audience delivered; squared terms for *reach, rating* and *inter,* and log forms of the model. The purpose of these variations is to allow for a range of different functional forms that the relationship between reach and rating with CPMs might take, given that we do not have prior expectations for these functional forms. For the dependent variable, we estimated identical sets of models for each of the two alternative CPM definitions.

We first estimated all models by ordinary least squares, using the sample of 78 Nielsen networks which had complete data. OLS estimates might be problematic, however, because of potential endogeneity of some independent variables, notably *reach*, and thus *inter*. That is, CPM rates may be expected to positively affect network reach by making MVPD carriage of those networks more desirable. We therefore used instrumental variables to estimate *reach* and *inter*. We selected three instrumental variables: *log netage* (the time since the network's launch), *progexp* (estimated total expenditures on the network's programming), and *tier* (the % of the network's subscribership reach that is on a basic or expanded basic tier). The rationale for choosing these variables are as follows. We expect that these variables are exogenous to CPM rates conditional on the other controlled variables; and they are likely to be related to *reach* and *inter*. For example, *tier* has a direct impact on *reach*. However it is reasonable to assume that *tier* affects CPM rates only through its effect on *reach,* and would affect CPM rates only through their effect on *reach* and *inter*. Similarly, conditional on other controlled variables, we expect that changes in *progexp* and *netage* would have direct effects on *reach*.

C. Results

For each of the two CPM definitions, we report OLS results of seven basic models that are the same except for different permutations or functional forms of the network *reach* and *rating* variables (Tables 2 and 4). In Tables 3 and 5, we report comparable models in which *reach* and/or *inter* were instrumented on (a) *log netage* and *progexp*, and (b) *log netage*, *progexp* and *tier*. In these text tables, however, we report only those among the seven model forms that passed the Stock-Yogo weak instrument test (Stock & Yogo, 2002) at least at the 15% level (The models that do not pass the weak instrument test at this level are reported in Appendix Tables 1 and 2). .

Tables 2 and 3 for *CPM-broad* consistently indicate a positive and significant relationship between CPM rates and average audience delivered (*inter*) and network reach (*reach*), with exception of OLS Model 7, which shows a positive effect of rating. OLS Models

(2) and (6), and IV Models (2) and (5) suggest ad rates to increase at a decreasing rate with average audience delivered.

Turning to other variables, there were mostly negative effects of *%male* and mostly positive effects of %*age18-34*, and sporadic positive effects of *%Hispanic*, but no significant effects of *income* or *%black*.. None of the HHI variables were significant, except for a positive effect of *race-hhi* in one model. (*age-hhi* had to be eliminated from the models because it is highly correlated to *%age18-34.*) Confirming industry wisdom, "*sports*" programming commanded generally higher CPM rates, and "*kids and family*" lower rates. Note that one genre category, "*general entertainment*," was chosen for omission from the models.

For the *CPM-narrow* price definition (Tables 4 and 5), OLS results were distinctly different, although there was relatively little significance of any variables. OLS Model 4 shows a U-shaped function for *reach*, indicating that CPM declines at first with *reach*, but then increases at an increasing rate. This functional form may reflect Figure 1 above, in which a few of the recently launched networks, notably sports, have high CPM rates and low reach. In OLS model 7, *reach* is also negatively, and *rating* positively, related to *CPM-narrow*. IV estimates for *CPM-narrow* generally showed more significant and expected relationships: positive effects of *inter*, and in at least one model, significant positive effects of *rating*. Significance of other coefficients also increased in the *CPM-narrow* models. *%age18-34* and *income* were significantly positive in several cases. *%black* and *race-hhi* were positive in several cases. There was also positive, though weaker evidence in these models that "*Kids and family"*programming had lower, and "*Sports*" higher, CPMs.

Overall, our models for CPM ad rates consistently show a positive effect of average audience delivered, and some evidence that the effects of this variable are increasing at a decreasing rate. Our attempts to parse the effects of *rating* and *reach* separately did not lead to consistent findings, although signs were mostly in the positive direction for either variable. Effects of demographic and other variables were mostly as expected in the case of age, income, and gender, but notably insignificant, or in several cases positive for *%black* and *% Hispanic*. There was thus no corroborating evidence, as suggested by previous research, that advertising rates are lower for blacks or Hispanics

V. black and Hispanic audience distributions

In this section, we investigate the extent to which black or Hispanic viewing of cable networks is disproportionately skewed toward a particular set of networks, or is evenly distributed among them. We then investigate the roles of programming content vs. programming investments in explaining these audience distributions.

A. Descriptive data

Eighty-four of the 97 networks in our sample had complete content and production investment, as well as black/non-black and Hispanic/non-Hispanic audience data. To more completely describe content, we added some additional information from the detailed NCTA network programming descriptions for each network: dummy variables identifying networks with the words "black" or "African-American" and "Hispanic" or "Spanish" oriented content.

Figures 5 and 6 illustrate the frequency distribution of "*%black*" audience composition among the 84 networks. In Figure 5, *%black* is ordered from lowest to highest, suggesting black viewing to be fairly uniform, but sharply higher for four networks, at least three of which have content descriptions that indicate black or African-American specific content (TVOne, BET and Centric). When these same data are ordered in Figure 6 by average black audience delivered (*aablack*), BET remains prominent (2^{th} ranked), but the other three networks with the highest % of black viewers shift well to the left, indicating that these networks have relatively small total audiences. In addition to BET, the four networks delivering the largest total black audiences—Nickelodeon, Turner Network Television, Disney Channel, and USA Network—also had the highest overall ratings in our sample. For Hispanic audiences, the general pattern is similar. Figure 7 suggests a relatively even distribution of Hispanic viewers among the 84 networks except for much higher percentages for two networks, Mun2 and Galavision, both of which have "Hispanic" or "Spanish" specific programming. When networks are ordered in Figure 8 by average Hispanic audience delivered (*aaHispanic*), Galavision, a well-establish Spanish-language general entertainment network, remains near the top in audience delivered, but Mun2, a relatively small cable network, is much lower. Again, most of the top networks in terms of total Hispanic households delivered are among the most popular networks overall. In addition to Galavision, the top 5 in terms of Hispanic viewers delivered, are Nickelodeon, Disney Channel, The Cartoon Network and MTV. Note also that in our sample, the mean % black audience composition is 19.3% vs. only 9.7% for Hispanics. A likely reason for these contrasts is that some other large Spanish-language broadcast networks, including Telemundo, are not included in our cable network sample. Overall, Hispanic HHs make up approximately 16% of the US population (only a little more than blacks at 14%), but are widely known to heavily skew their TV viewing toward Spanish language programming.

These descriptive data suggest that vertical differentiation of networks in terms of programming investments may be an important driver of these black and Hispanic audience patterns.

We also calculated a segregation or "isolation" index for the distribution of black vs. non-black households across our full sample of 97 networks, and a second index for Hispanic vs. non-Hispanic households. This segregation index is similar to the bivariate "ideological isolation" index calculated by Gentzkow and Shapiro (2011) for Internet, cable, and other news media in the U.S., using 2008 data. Their index is in turn derived from the literature on racial segregation (Cutler, Glaeser, & Vigdor, 1999; white, 1986).

Our measure of segregation, for blacks:

$$S_m = \sum_{j \in J_m} \left(\frac{Black\ HH\ delivered\ by\ network_j}{Total\ Black\ HH\ delivered_m} \cdot \frac{Black\ HH\ delivered\ by\ network_j}{Total\ HH\ delivered_j} - \sum_{j \in J_m} \left(\frac{non-Black\ HH\ delivered\ by\ network_j}{Total\ non-Black\ HH\ delivered_m} \cdot \frac{Black\ HH\ delivered\ by\ network_j}{Total\ HH\ delivered_j}\right)\right.$$

where J_m is all 97 networks in our sample.

The isolation index for blacks and non-blacks measures the extent to which all blacks watch one set of cable networks and all non-blacks watch the other set (index = 1); or if blacks and non-blacks proportion themselves evenly over all of the networks in the sample (index = 0). These calculations produce two summary statistics: a 7.5% isolation index for blacks/non-blacks and 5.2% for Hispanics/non-Hispanics.

For comparative perspective, Gentzkow and Shapiro's (2011) bivariate ideological isolation indices for internet and other news content are calculated using ComScore and MRI survey data in which users self-identified as "conservative" or "liberal." ("Moderates" are excluded from the index.) The Internet news index (the focus of their paper) thus shows the extent to which conservatives all use one set of Internet news sites, and liberals another, or at the other extreme, if they apportion themselves equally among different sites. They find roughly comparable, low levels of ideological isolation on Internet news (7.5%), although they report even lower levels for some comparative media, ranging from 1.8% for national broadcast network news, 3.3% for cable news, up to 10.4% for national newspapers. They report media isolation in generally to be much lower than for real life: geographic distribution in neighborhoods (18.7%) or for face-to-face political discussions (39%).

Using the 2008 MRI survey data, Gentzkow and Shapiro also report parenthetically some racial (black/non-black) segregation indices that are relatively very low for media: a high of 12.4% for local newspapers, but less than 10% for other media, including cable news and Internet news. These compare, for example, to a real life black/non-black geographic racial segregation index of 49.1% for U.S. zip codes and 81.9% for person-to-person political discussions. p. 1829-30).

Finally, Gentzkow and Shapiro report that ideological segregation of Internet news is strongly correlated with the overall size rank of sites in terms of total users. That is, sites that are strongly segregated ideologically tend to be relatively small, while the most popular sites apparently have relatively broad ideological appeal, that is, more evenly visited by both conservatives and liberals. Although Gentzkow and Shapiro do not have cost data, they infer from these correlations that vertical differentiation drives ideological segregation, a pattern similar to that suggested by Figures 6-9 above for black and Hispanic cable audiences.

B. Regression models

In general, two broad factors determine a network's audience size and composition: programming content and programming investments. To better understand the relative contributions of content vs. quality to the distribution of black and Hispanic viewing among cable networks, we conducted a series of OLS regressions of the following basic form:

$$(2)\ aaBlack(or\ \%Black) = \beta_0 + \beta_1 netage + \beta_2 Black\ AfricanAmerican + \beta_3 Hispanic| + \beta_4 genrdummies + \beta_5 progexp + error$$

We expect the *black/African-American* content variables to be significantly positive and similarly for age of the network and production investment. For comparison, we replaced *aablack* with *%black* as the dependent variable. In that model, we also expect content variables to be significant determinants, but if higher programming investments affect black, Hispanics and white viewers the same, *progexp* should have no explanatory power. We estimated comparable sets of models for *aaHispanic*, *% Hispanic*, *aawhite*, and %*white*.[5]

C. Results

We report in Tables 6-8 a set of identical models for blacks, Hispanics, and whites. Each set contains the same five permutations of the explanatory variables. *Log netage* appears in all models. The variable, *log progexp* performed consistently better than *progexp*, and we report only results with the log form.

Turning first to black audiences (Table 6), *black/African-American* specific content has consistently positive effects on both *aablack* and *%black*, while Hispanic oriented content has in some cases a significantly negative effect. Production investment is positive and significant in the *aablack* models, but as expected is insignificant in the *%black* models. For Hispanics (Table 7), the pattern is similar, although the effects of *Hispanic/Spanish* language content are consistently significant only in the %Hispanic models. Production investment positively affects *aaHispanic*, but not *%Hispanic*. Models for whites (Table 8) show the same pattern, although in this case *black/African-American* and *Hispanic/Spanish* specific content significantly reduces white viewing, at least in the *%white* models.

While these results are generally as expected, it is instructive to compare the models in terms of the % of variance explained (Table 9). Three main patterns are evident. First, in models with only the black/Hispanic or genre dummies included as independent variables, these content variables explain a higher percentage of the variance in the *%black/%Hispanic/%white* models than in the *aablack*/*aaHispanic*/*aawhite* models. This pattern is expected since the "%" models are independent of the effects of vertical differentiation. Secondly, models with only production investment (*log progexp*) explain a substantial proportion of variance in the average audience models--but virtually none in the

[5] Note from Table 1 that "white" and "%white" in these models are defined by those indicating "white" instead of "black", or "other." among the 3 possible choices in one of the Nielsen questions. "whites" as defined by this question may thus include some Hispanics.

"%" audience models, confirming that the positive effects of production investment work independently of race or ethnic origin.

A third pattern is that in the average audience models, production investment alone accounts for a higher percentage of the total variance than do the black/Hispanic dummies alone. Of course, we do not know how completely these model variables, or their functional forms, represent the actual effects of content or production investment. Also, of course, production investment and content decisions can be changed in the long run. Nevertheless, these models take a step toward answering a fundamental question in the economics of media: the roles of programming content vs. programming cost in explaining the distribution of audiences.

In summary, we find persuasive evidence that both programming content and vertical differentiation are major factors explaining the distribution of black and Hispanic audiences among cable networks

VI. Conclusion

First using a sample of 78 U.S. basic cable networks in 2010, we employed a range of model specifications and estimation methods to investigate the determinants of cost-per-thousand (CPM) advertising rates. In nearly all cases we found CPMs to be increasing in total audience size (in terms of average audience delivered). Results of our attempts to break down the source of this total audience size effect into its components--the network's national TV household reach, and its audience rating—were less clear, although coefficient signs on these variables were mostly positive and significant in several cases. Coefficients on demographic factors of age, income, and gender) were generally in the expected directions, although their statistical significance was sporadic. Confirming industry wisdom, some types of content, such as sports, command significantly higher, and "kids and family" programs lower, CPM rates.

Overall, these findings suggest that there are economic limits on the profitability of segmenting cable network content toward finer and finer audience segments, although we found little evidence about the reasons for those limits.

Turning to our investigation of apparent shortages of basic cable network programming that is oriented toward black and Hispanic audiences, insignificant or in some cases significantly positive coefficients on "*%black*" and "*%Hispanic*" variables in our CPM models are contrary to findings or suggestions of previous research that advertisers undervalue these minority groups. Thus, advertiser valuations do not appear to contribute to any "underservice" of these groups by cable networks.

Our investigation of the distribution of black and Hispanic audiences among 84 networks showed that both content variables (specifically black or Hispanic oriented content, and genre labels) and network programming investments are both strongly positive determinants of average black and Hispanic audiences delivered by cable networks. Content variables are even stronger determinants of the % of cable network audiences made up by blacks and Hispanics, but production investments have zero explanatory power in these models.

The implication of these results is that vertical differentiation is a major driver of cable audiences without regard to race or ethnic background. Quality factor thus appears to trump content for many black and Hispanic viewers. In effect, our results suggest a preference externality outcome arising from programming quality. Cable network program producers have a strong incentive to produce a higher variety of higher quality programming that primarily serves majority population segments, and that minority groups rather watch this programming than cheaper productions whose content they would otherwise prefer. The end result is more textured. Producers have the strongest incentive to invest in high quality programs that have broadest appeal among both minority and majority populations.

Whether the outcomes of cable network programming incentives are socially beneficial is another question. Of course, there is much to be said for consumer sovereignty. But small minorities are unlikely to be served by high quality programming that is sharply focussed to them, and this outcome in the media could serve to diminish real life social and cultural cohesion of these groups.

We acknowledge a number of shortcomings in this study. We have employed relatively simple models that do not explicitly take account of the 2-sided nature of the cable television networking industry. Our samples are also limited in size and for a single year, and exhibit a good deal of network to network heterogeneity. Further, our analysis excludes a number of other basic cable networks that were in business in 2010 and are not rated, as well as a number of national broadcast networks that competitively interact with basic cable networks.

Our results nevertheless take a step toward understanding fundamental and important questions about the ability of profit motives to robustly act upon the finer and finer audience segmentation that technology allows in multi-channel television—in particular, to produce high quality programming that successfully serves racial and ethnic, and other niche audiences. For the future, we have developed a panel data set using SNL Kagan Research and MRI data over several years that will permit us to extend our research on CPM rates. Beyond that research, our next objective is to evaluate the success of Internet delivered video in serving niche audiences, including racial and ethnic minorities. Does a "tyranny of the majority" extend its influence into this medium?

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Table 1: Model variables and summary statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max	Definition	Source
CPM-narrow ($)	80	3.73	1.46	1.10	8.79	Actual Cost-per-thousand/30 sec spot rate	Nielsen
CPM-broad ($)	80	628.84	347.66	5.84	1708.30	Total advertising revenue ($ 000) / average audience delivered (000)	Nielsen
%Hispanic (%)	92	0.08	0.04	0.00	0.25	% average audience delivered that is Hispanic	Nielsen
%black (%)	92	0.20	0.15	0.00	0.88	% average audience delivered that is black	Nielsen
%male (%)	92	0.49	0.15	0.20	0.81	% average audience delivered that is male	Nielsen
income ($ 000)	92	46.22	6.29	31.66	60.31	Average income (calculated)	Nielsen
%age18-34 (%)	92	0.23	0.09	0.04	0.45	% average audience delivered, age 18 to 34	Nielsen
male-hhi (%)	92	0.55	0.05	0.50	0.70	$\%male^2 + \%female^2$	Nielsen
age-hhi (%)	92	0.66	0.10	0.51	0.92	$\%age18\text{-}34^2 + \%other\ age^2$	Nielsen
race-hhi (%)	92	0.60	0.11	0.37	0.94	$\%white^2 + \%hispanic^2 + \%black^2$	Nielsen
reach (%)	92	0.68	0.18	0.32	0.87	HHs reached by the network/total TV HH	Nielsen
rating	92	0.37	0.33	0.01	1.74	Average audience delivered/HHs reached by the network	Nielsen
inter (*reach* x *rating*)	92	0.29	0.30	0.01	1.51	(*rating* X *reach*) = Avg. audience delivered/total TV HH	Nielsen
Documentaries	89	0.12	0.32	0	1	primary genre, documentary = 1	Wikipedia (NCTA)
Entertainment	89	0.27	0.45	0	1	Primary genre, Entertainment = 1	Wikipedia (NCTA)

Table 1 Continued

Variables	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Definition**	**Source**
Kids and Family	89	0.15	0.36	0	1	Primary genre, Kids and Family-1	Wikipedia (NCTA)
Lifestyle & Culture	89	0.12	0.32	0	1	Primary genre, Lifestyle & Culture = 1	Wikipedia (NCTA)
Movies	89	0.06	0.25	0	1	Primary genre, Movie = 1	Wikipedia (NCTA)
Music	89	0.09	0.29	0	1	Primary genre, Music = 1	Wikipedia (NCTA)
News and information	89	0.09	0.29	0	1	Primary genre, News and information = 1	Wikipedia (NCTA)
Religion	89	0.01	0.11	0	1	Primary genre, Religion= 1	Wikipedia (NCTA)
Sports	89	0.09	0.29	0	1	Primary genre, Sports = 1	Wikipedia (NCTA)
netage	92	16.50	9.68	0	35	Years since network launch	FCC
aablack (000)	92	63.60	78.52	0	360	black average audience delivered	Nielsen
aaHispanic (000)	92	28.13	43.42	0	304	Hispanic average audience delivered	Nielsen
black/African-American	92	0.02	0.15	0	1	“black” or “African-American” contained in NCTA network programming = 1	NCTA
Hispanic/Spanish	92	0.02	0.15	0	1	“Hispanic”/”Spanish” contained in NCTA network programming summary = 1	NCTA
tier (%)	65	0.52	0.43	0	0.996	% of subscribers on basic/expanded basic tier Cable	Television & Cable Factook
progexp ($ mil)	86	215.78	546.56	6.47	4924.13	Total annual expenditure on programming	Kagan Research

Table 2: *CPM-broad* OLS models

Variables	(1) *CPM-broad*	(2) *CPM-broad*	(3) *CPM-broad*	(4) *CPM-broad*	(5) *CPM-broad*	(6) *log CPM-broad*	(7) *log CPM-broad*
inter	335.59***	1199.28***		22.04			
	(2.94)	(4.08)		(0.15)			
inter^2		-751.86***					
		(-3.15)					
reach			885.93***	885.95***	-2724.53		
			(3.10)	(3.00)	(-1.62)		
reach^2					2697.83*		
					(2.00)		
rating			20.76		439.26		
			(0.16)		(1.15)		
rating^2					-318.79		
					(-1.48)		
log inter						0.41***	
						(4.47)	
log reach							0.004
							(0.01)
log rating							0.51***
							(3.00)
%black	-181.23	-43.88	97.95	99.34	70.35	-0.14	-0.36
	(-0.72)	(-0.18)	(0.38)	(0.39)	(0.29)	(-0.20)	(-0.46)
%Hispanic	607.27	1168.93	663.89	664.46	1163.38	7.61**	7.49**
	(0.48)	(0.98)	(0.56)	(0.56)	(1.01)	(2.14)	(2.10)
%male	-763.59**	-680.13**	-594.25**	-594.62**	-585.51**	-1.72*	-1.75*
	(-2.52)	(-2.39)	(-2.04)	(-2.04)	(-2.10)	(-1.97)	(-2.00)
income	1.60	4.08	5.37	5.38	6.00	-0.01	-0.01
	(0.23)	(0.63)	(0.82)	(0.82)	(0.95)	(-0.41)	(-0.48)

%age18-34	1539.96***	1010.07**	740.87	737.35	641.59	0.44	0.94
	(3.09)	(2.04)	(1.37)	(1.37)	(1.22)	(0.31)	(0.58)
male-hhi	327.37	145.04	-48.64	-49.57	305.30	2.15	2.38
	(0.40)	(0.19)	(-0.06)	(-0.06)	(0.40)	(0.94)	(1.02)
race-hhi	456.95	440.77	385.86	385.10	305.66	2.51**	2.47**
	(1.19)	(1.23)	(1.07)	(1.07)	(0.87)	(2.31)	(2.26)
Documentaries	-54.57	-72.63	-64.85	-64.67	-86.72	-0.16	-0.18
	(-0.47)	(-0.66)	(-0.59)	(-0.59)	(-0.82)	(-0.49)	(-0.53)
Kids and Family	-291.63**	-313.7**	-325.96**	-325.83**	-328.47***	-1.26***	-1.24***
	(-2.21)	(-2.54)	(-2.61)	(-2.61)	(-2.75)	(-3.37)	(-3.31)
Lifestyle & Culture	-46.68	-12.41	-40.61	-41.19	-43.05	-0.29	-0.26
	(-0.39)	(-0.11)	(-0.36)	(-0.37)	(-0.39)	(-0.86)	(-0.74)
Movies	-47.09	-76.99	-48.7	-48.5	-90.71	-0.65*	-0.67*
	(-0.35)	(-0.60)	(-0.38)	(-0.38)	(-0.73)	(-1.69)	(-1.73)
Music	43.7	137.76	71.58	70.98	129.26	0.58	0.62
	(0.35)	(1.15)	(0.61)	(0.6)	(1.1)	(1.57)	(1.67)
News and information	73.33	18.12	-142.17	-143.12	-129.22	0.09	0.23
	(0.55)	(0.14)	(-0.98)	(-0.99)	(-0.89)	(0.22)	(0.53)
Religion	-337.06	-250.93	-249.08	-250.12	-294.48	-0.9	-0.91
	(-1.21)	(-0.96)	(-0.95)	(-0.95)	(-1.15)	(-1.14)	(-1.14)
Sports	375.54**	426.77**	350.5**	350.29**	366.34**	0.97*	1.00*
	(2.09)	(2.53)	(2.07)	(2.07)	(2.22)	(1.9)	(1.95)
Constant	30.3	-89.57	-347.25	-344.62	511.8	4.93***	4.81***
	(0.05)	(-0.16)	(-0.61)	(-0.6)	(0.74)	(2.98)	(2.87)
Observations	78	78	78	78	78	78	78
R^2	0.53	0.60	0.59	0.59	0.64	0.55	0.55
Adj. R^2	0.41	0.49	0.48	0.48	0.52	0.43	0.42

^ p < .15; * p<.1; ** p<.05; *** p<.01

Table 3: *CPM-broad* IV models that passed the weak instrument test

Variables	(1) *CPM-broad (2 inst.*[a] *)*	(2) *CPM-broad (2 inst.)*	(3) *CPM-broad (2 inst.)*	(4) *CPM-broad (3 inst.*[b]*)*	(5) *log CPM-broad (3 inst.)*	(6) *log CPM-broad (3 inst.)*
inter	1004.07***		653.79***			
	(5.26)		(5.06)			
inter^2						
reach				640.81**		
				(2.05)		
reach^2						
rating				159.15		
				(1.23)		
rating^2						
log inter		0.63***			0.26***	
		(4.91)			(4.31)	
log reach						0.41
						(0.82)
log rating						0.20
						(1.56)
%black	-24.34	0.09	-94.29	16.69	-0.15	-0.09
	(-0.10)	(0.13)	(-0.45)	(0.08)	(-0.42)	(-0.20)
%Hispanic	-353.53	6.64**	-416.98	-234.50	2.38	2.29
	(-0.29)	(1.98)	(-0.32)	(-0.19)	(1.06)	(1.01)
%male	-418.38	-1.13	-367.05	-328.47	-0.82*	-0.80*
	(-1.37)	(-1.32)	(-1.34)	(-1.26)	(-1.75)	(-1.67)
income	0.99	-0.005	1.93	3.74	0.002	0.002
	(0.15)	(-0.26)	(0.31)	(0.64)	(0.19)	(0.19)
%age18-34	1619.14***	0.25	1810.66***	1409.42***	1.79**	1.67*
	(3.21)	(0.17)	(4.11)	(2.80)	(2.27)	(1.78)

male-hhi	893.93	2.29	576.61	144.09	1.31	1.23
	(1.11)	(1.06)	(0.81)	(0.21)	(1.09)	(1.01)
race-hhi	220.92	2.24**	134.98	158.57	0.92	0.92
	(0.59)	(2.17)	(0.36)	(0.45)	(1.43)	(1.43)
Documentaries	-20.54	-0.18	-40.07	-65.46	-0.14	-0.14
	(-0.18)	(-0.58)	(-0.39)	(-0.69)	(-0.83)	(-0.77)
Kids and Family	-266.95**	-1.27***	-222.28*	-215.79*	-0.71***	-0.70***
	(-2.04)	(-3.53)	(-1.68)	(-1.76)	(-3.14)	(-3.09)
Lifestyle & Culture	87.78	-0.08	83.13	50.78	0.01	0
	(0.71)	(-0.22)	(0.75)	(0.5)	(0.04)	(0.01)
Movies	-19.39	-0.63*	95.82	112.26	0.08	0.12
	(-0.15)	(-1.76)	(0.7)	(0.88)	(0.36)	(0.47)
Music	198.84	0.85**	84.19	37.57	0.28	0.25
	(1.53)	(2.29)	(0.8)	(0.39)	(1.47)	(1.3)
News and information	88.04	0.05	37.15	-92.52	0.05	0.01
	(0.64)	(0.13)	(0.31)	(-0.7)	(0.25)	(0.02)
Religion	-158.94	-0.49	-228.98	-211.49	-1.10***	-1.12***
	(-0.59)	(-0.65)	(-1)	(-0.98)	(-2.78)	(-2.81)
Sports	317.99*	0.93*	273.74*	251.44*	0.49*	0.46*
	(1.82)	(1.94)	(1.75)	(1.72)	(1.83)	(1.7)
Constant	-457.76	5.03***	-200.83	-315.42	5.34***	5.39***
	(-0.76)	(3.2)	(-0.35)	(-0.57)	(5.63)	(5.61)
Observations	73	73	64	64	64	64
R^2	0.47	0.53	0.57	0.63	0.64	0.63
Adj. R^2	0.32	0.40	0.43	0.50	0.51	0.50
Cragg-Donald Wald F	17.178^	23.496*	27.044**	42.038**	51.750**	14.664**

^ p < .15; * p<.1; ** p<.05; *** p<.01

[a] *progexp* and *log netage* are used as instruments.

[b] *progexp*, *log netage* and *tier* are used as instruments.

Table 4: *CPM-narrow* OLS models

Variables	(1) *CPM-narrow*	(2) *CPM-narrow*	(3) *CPM-narrow*	(4) *CPM-narrow*	(5) *CPM-narrow*	(6) *log CPM-narrow*	(7) *log CPM-narrow*
inter	0.75	1.59		1.18			
	(1.29)	(1.01)		(1.45)			
inter^2		-0.74					
		(-0.57)					
reach			-1.11	-1.19	-28.35***		
			(-0.72)	(-0.75)	(-3.22)		
reach^2					21.29***		
					(3.01)		
rating			1.05		1.73		
			(1.47)		(0.86)		
rating^2					-0.91		
					(-0.81)		
log inter						0.06	
						(1.43)	
log reach							-0.48**
							(-1.77)
log rating							0.20**
							(2.50)
%black	1.46	1.62	1.01	1.05	0.98	0.37	0.07
	(1.19)	(1.28)	(0.74)	(0.78)	(0.77)	(1.08)	(0.20)
%Hispanic	-2.86	-2.40	-2.98	-2.94	-1.08	-0.61	-0.77
	(-0.45)	(-0.38)	(-0.47)	(-0.47)	(-0.18)	(-0.36)	(-0.47)
%male	1.23	1.32	1.04	1.01	1.18	0.07	0.02
	(0.82)	(0.88)	(0.68)	(0.66)	(0.82)	(0.16)	(0.05)
income	0.05	0.05	0.04	0.05	0.05	0.02**	0.02*
	(1.44)	(1.50)	(1.27)	(1.28)	(1.59)	(2.03)	(1.83)

%age18-34	3.54	3.00	4.72	4.59	3.67	0.97	1.63**
	(1.41)	(1.12)	(1.63)	(1.59)	(1.34)	(1.39)	(2.17)
male-hhi	-0.27	-0.39	0.17	0.17	3.06	-0.66	-0.36
	(-0.07)	(-0.09)	(0.04)	(0.04)	(0.77)	(-0.60)	(-0.33)
race-hhi	0.44	0.41	0.57	0.54	-0.17	0.36	0.31
	(0.22)	(0.21)	(0.29)	(0.28)	(-0.09)	(0.70)	(0.62)
Documentaries	-0.24	-0.25	-0.25	-0.24	-0.33	-0.07	-0.08
	(-0.41)	(-0.42)	(-0.43)	(-0.41)	(-0.6)	(-0.43)	(-0.54)
Kids and Family	-0.46	-0.48	-0.43	-0.42	-0.43	-0.18	-0.16
	(-0.69)	(-0.72)	(-0.64)	(-0.64)	(-0.69)	(-1)	(-0.9)
Lifestyle & Culture	0.6	0.63	0.61	0.58	0.43	0.18	0.23
	(1.01)	(1.06)	(1.02)	(0.98)	(0.75)	(1.12)	(1.43)
Movies	1.32*	1.29*	1.30*	1.32*	1.06	0.36*	0.34*
	(1.92)	(1.86)	(1.89)	(1.91)	(1.62)	(1.98)	(1.88)
Music	0.47	0.56	0.45	0.43	0.6	0.05	0.11
	(0.77)	(0.88)	(0.72)	(0.7)	(1)	(0.28)	(0.65)
News and information	-0.51	-0.57	-0.21	-0.23	-0.4	-0.2	0
	(-0.77)	(-0.84)	(-0.27)	(-0.31)	(-0.53)	(-1.1)	(-0.02)
Religion	0.27	0.34	0.2	0.15	-0.38	0.17	0.16
	(0.19)	(0.24)	(0.14)	(0.1)	(-0.28)	(0.45)	(0.44)
Sports	0.8	0.85	0.82	0.82	0.67	0.22	0.27
	(0.9)	(0.94)	(0.92)	(0.91)	(0.78)	(0.92)	(1.14)
Constant	-0.54	-0.69	-0.13	0.01	6.45*	0.32	0.15
	(-0.18)	(-0.23)	(-0.04)	(0)	(1.78)	(0.41)	(0.19)
Observations	83	83	83	83	83	78	78
R^2	0.34	0.34	0.35	0.35	0.44	0.35	0.40
Adj. R^2	0.18	0.17	0.18	0.18	0.28	0.18	0.22

^ p < .15; * p<.1; ** p<.05; *** p<.01

Table 5: *CPM-narrow* IV models that passed weak instrument test

Variables	(1) *CPM-narrow (2 inst.*[a]*)*	(2) *log CPM-narrow (2 inst.)*	(3) *CPM-narrow (2 inst.)*	(4) *CPM-narrow (3 inst.*[b]*)*	(5) *log CPM-narrow (3 inst.)*	(6) *log CPM-narrow (3 inst.)*
inter	2.61***		2.19***			
	(2.92)		(3.38)			
inter^2						
reach				0.23		
				(0.14)		
reach^2						
rating				1.36**		
				(1.98)		
rating^2						
log inter		0.16***			0.15***	
		(2.79)			(3.47)	
log reach						0.07
						(0.19)
log rating						0.15
						(1.59)
%black	2.22**	0.55*	1.81*	1.60	0.51*	0.45
	(1.97)	(1.82)	(1.71)	(1.37)	(1.89)	(1.42)
%Hispanic	-4.32	-0.75	4.48	4.98	1.54	1.54
	(-0.76)	(-0.5)	(0.68)	(0.76)	(0.92)	(0.93)
%male	1.52	0.14	0.83	0.67	0.01	-0.03
	(1.1)	(0.38)	(0.61)	(0.49)	(0.03)	(-0.08)
income	0.07**	0.03***	0.04	0.04	0.02**	0.02**
	(2.16)	(2.98)	(1.33)	(1.28)	(2.34)	(2.28)
%age18-34	4.2*	0.98	5.13**	5.52**	0.92	1.07

	(1.8)	(1.52)	(2.33)	(2.06)	(1.58)	(1.57)
male-hhi	1.75	-0.6	2.54	1.95	-0.21	-0.19
	(0.47)	(-0.62)	(0.71)	(0.55)	(-0.23)	(-0.22)
race-hhi	0.82	0.47	2.74	2.86	1.04**	1.03**
	(0.47)	(1.03)	(1.44)	(1.53)	(2.17)	(2.18)
Documentaries	0.05	-0.01	0.35	0.29	0.04	0.04
	(0.11)	(-0.11)	(0.7)	(0.59)	(0.3)	(0.31)
Kids and Family	-0.11	-0.09	-0.73	-0.68	-0.28*	-0.27*
	(-0.18)	(-0.58)	(-1.11)	(-1.05)	(-1.69)	(-1.65)
Lifestyle & Culture	1.12**	0.34**	0.93*	0.85	0.22	0.21
	(1.99)	(2.2)	(1.68)	(1.57)	(1.59)	(1.54)
Movies	1.72***	0.46***	1.60**	1.54**	0.43**	0.42**
	(2.79)	(2.86)	(2.34)	(2.25)	(2.52)	(2.27)
Music	1.07*	0.23	1.13**	0.96*	0.20	0.18
	(1.82)	(1.41)	(2.15)	(1.87)	(1.42)	(1.27)
News and information	-0.31	-0.19	-0.1	-0.1	-0.18	-0.15
	(-0.49)	(-1.11)	(-0.17)	(-0.15)	(-1.16)	(-0.79)
Religion	1.12	0.45	1.33	1.26	0.47	0.44
	(0.88)	(1.34)	(1.16)	(1.1)	(1.6)	(1.51)
Sports	0.81	0.28	1.29*	1.30*	0.33*	0.34*
	(1.01)	(1.29)	(1.66)	(1.69)	(1.68)	(1.69)
Constant	-3.85	-0.03	-4.53	-4.25	-0.36	-0.38
	(-1.37)	(-0.05)	(-1.58)	(-1.45)	(-0.52)	(-0.54)
Observations	78	73	65	65	64	64
R^2	0.36	0.39	0.48	0.49	0.5	0.51
Adj. R^2	0.19	0.22	0.31	0.31	0.33	0.33
Cragg-Donald Wald F	18.738^	23.496*	27.296**	43.853**	51.750**	14.664**

^ p < .15; * p<.1; ** p<.05; *** p<.01

[a] *progexp* and *log netage* are used as instruments.

[b] *progexp*, *log netage* and *tier* are used as instruments.

Table 6: Black audience distribution models

Variables	(1) *aa black*	(2) *aa black*	(3) *aa black*	(4) *aa black*	(5) *aa black*	(6) *% black*	(7) *% black*	(8) *% black*	(9) *% black*	(10) *% black*
log netage	38.09***	38.33***	38.20***	14.24	13.37	-0.02	-0.02	-0.03*	-0.03	-0.04*
	(3.96)	(4.19)	(4.21)	(1.52)	(1.65)	(-0.95)	(-1.38)	(-1.94)	(-1.09)	(-1.93)
black/African-American		127.92***	111.72**		140.39***		0.68***	0.66***		0.66***
		(2.92)	(2.63)		(4.14)		(8.49)	(8.38)		(8.33)
Hispanic/Spanish		-64.77	-62.54		-9.21		-0.15*	-0.20**		-0.19**
		(-1.48)	(-1.48)		(-0.27)		(-1.81)	(-2.51)		(-2.32)
Documentaries			-41.18*		-10.86			-0.10**		-0.10**
			(-1.93)		(-0.62)			(-2.63)		(-2.4)
Kids and Family			37.14*		45.35***			-0.01		-0.01
			(1.74)		(2.68)			(-0.27)		(-0.24)
Lifestyle & Culture			-32.36		-5.3			-0.10**		-0.1
			(-1.31)		(-0.27)			(-2.25)		(-2.1)
Movies			-12.84		14.32			-0.02		-0.01
			(-0.45)		(0.62)			(-0.34)		(-0.25)
Music			-36.83		-2.03			0.06		0.06
			(-1.59)		(-0.11)			(1.31)		(1.38)
News and information			-50.26*		-47.64***			-0.04		-0.04
			(-1.88)		(-2.25)			(-0.83)		(-0.81)
Religion			-39.8		62.33			0.03		0.04
			(-0.67)		(1.26)			(0.25)		(0.38)
Sports			-32.2		-49.55***			0.01		0
			(-1.38)		(-2.66)			(0.17)		(0.11)
log progexp				31.95***	37.84***				0.01	0.01
				(5.44)	(6.63)				(0.54)	(0.47)
Constant	-45.04	-47.19	-30.63	-127.64***	-152.54***	0.25	0.24	0.29***	0.23***	0.27***
	(-1.69)	(-1.86)	(-1.04)	(-4.63)	(-5.13)	(3.91)	(5.18)	(5.33)	(2.95)	(3.88)
Observations	84	84	84	84	84	84	84	84	84	84
R^2	0.16	0.26	0.42	0.39	0.64	0.01	0.49	0.6	0.01	0.6
Adj. R^2	0.15	0.23	0.33	0.37	0.58	-0.001	0.47	0.53	-0.01	0.53

* p<.1; ** p<.05; *** p<.01,   t-statistics in parenthesis

Table 7: Hispanic audience distribution models

Variables	(1) *aa Hispanic*	(2) *aa Hispanic*	(3) *aa Hispanic*	(4) *aa Hispanic*	(5) *aa Hispanic*	(6) *% Hispanic*	(7) *% Hispanic*	(8) *% Hispanic*	(9) *% Hispanic*	(10) *% Hispanic*
log netage	20.39***	20.31***	23.37***	10.19	11.34*	0.01	0.0003	0.002	0.03	-0.003
	(3.31)	(3.26)	(3.99)	(1.55)	(1.92)	(0.5)	(0.04)	(0.42)	(1.13)	(-0.45)
black/African-American		-20.08	-17.67		-3.79		-0.04	-0.03		-0.03
		(-0.67)	(-0.64)		(-0.15)		(-1.34)	(-1.33)		(-1.11)
Hispanic/Spanish		13.88	21.15		46.98*		0.86***	0.85***		0.87***
		(0.47)	(0.78)		(1.88)		(29.01)	(32.67)		(32.66)
Documentaries			-3.4		11.28			-0.004		0.003
			(-0.25)		(0.88)			(-0.28)		(0.19)
Kids and Family			53.95***		57.93***			0.05***		0.06***
			(3.91)		(4.69)			(4.1)		(4.28)
Lifestyle & Culture			-4.91		8.19			-0.02		-0.01
			(-0.31)		(0.56)			(-1.26)		(-0.88)
Movies			-2.13		11.03			0.0004		0.01
			(-0.11)		(0.66)			(0.02)		(0.34)
Music			-10.8		6.05			0.02		0.03*
			(-0.72)		(0.43)			(1.29)		(1.75)
News and information			-21.98		-20.71			-0.03*		-0.03*
			(-1.27)		(-1.34)			(-1.69)		(-1.68)
Religion			-10.47		38.99			-0.05		-0.02
			(-0.27)		(1.09)			(-1.23)		(-0.63)
Sports			-12.28		-20.68			0.0001		-0.004
			(-0.82)		(-1.53)			(0.01)		(-0.25)
log progexp				13.68***	18.33***				-0.02	0.01*
				(3.32)	(4.41)				(-1.47)	(1.79)
Constant	-26.61	-26.24	-37.12*	-61.98***	-96.16***	0.07	0.08***	0.07***	0.13*	0.04*
	(-1.56)	(-1.52)	(-1.94)	(-3.2)	(-4.44)	(1.23)	(4.57)	(3.71)	(1.84)	(1.86)
Observations	84	84	84	84	84	84	84	84	84	84
R^2	0.12	0.13	0.38	0.22	0.51	0.003	0.91	0.94	0.03	0.95
Adj. R^2	0.11	0.09	0.28	0.20	0.43	-0.01	0.91	0.93	0.01	0.94

* p<.1; ** p<.05; *** p<.01, t-statistics in parenthesis

Table 8: White audience distribution models

Variables	(1) *aa white*	(2) *aa white*	(3) *aa white*	(4) *aa white*	(5) *aa white*	(6) *% white*	(7) *% white*	(8) *% white*	(9) *% white*	(10) *% white*
log netage	143.41***	147.35***	147.31***	48.16*	47.24*	0.02	0.03	0.04**	0.02	0.04**
	(4.55)	(4.75)	(4.65)	(1.73)	(1.88)	(0.9)	(1.55)	(2)	(0.77)	(2.11)
black/African-American		-220.51	-250.35*		-134.81		-0.63***	-0.61		-0.61***
		(-1.49)	(-1.69)		(-1.28)		(-7.21)	(-7.28)		(-7.29)
Hispanic/Spanish		-250.74*	-200.65		14.28		-0.33***	-0.28***		-0.29***
		(-1.69)	(-1.36)		(0.13)		(-3.81)	(-3.37)		(-3.44)
Documentaries			-36.61		85.59			0.1		0.1
			(-0.49)		(1.57)			(2.48)		(2.2)
Kids and Family			123.68		156.76***			-0.03		-0.03
			(1.66)		(2.97)			(-0.69)		(-0.74)
Lifestyle & Culture			-48.98		60.07			0.11**		0.10**
			(-0.57)		(0.97)			(2.24)		(2.03)
Movies			-60.92		48.52			0.03		0.02
			(-0.61)		(0.68)			(0.51)		(0.37)
Music			-159.84*		-19.6			-0.07		-0.08
			(-1.97)		(-0.33)			(-1.48)		(-1.63)
News and information			-31.17		-20.64			0.06		0.06
			(-0.33)		(-0.31)			(1.15)		(1.14)
Religion			-146.74		264.86*			0.04		0.01
			(-0.71)		(1.73)			(0.3)		(0.05)
Sports			-124.79		-194.7***			-0.02		-0.01
			(-1.54)		(-3.37)			(-0.41)		(-0.3)
log progexp				127.63***	152.50***				0.001	-0.01
				(7.33)	(8.59)				(0.04)	(-0.75)
Constant	-164.20*	-163.51*	-133.59	-494.24***	-624.88***	0.65***	0.65***	0.61***	0.65***	0.65***
	(-1.88)	(-1.9)	(-1.29)	(-6.05)	(-6.75)	(9.69)	(12.99)	(10.6)	(8.02)	(8.77)
Observations	84	84	84	84	84	84	84	84	84	84
R^2	0.2	0.25	0.37	0.52	0.69	0.01	0.45	0.58	0.01	0.58
Adj. R^2	0.19	0.22	0.27	0.51	0.64	-0.002	0.43	0.51	-0.01	0.51

* p<.1; ** p<.05; *** p<.01,   t-statistics in parenthesis

Figure 1: ***CPM-narrow* × *reach***

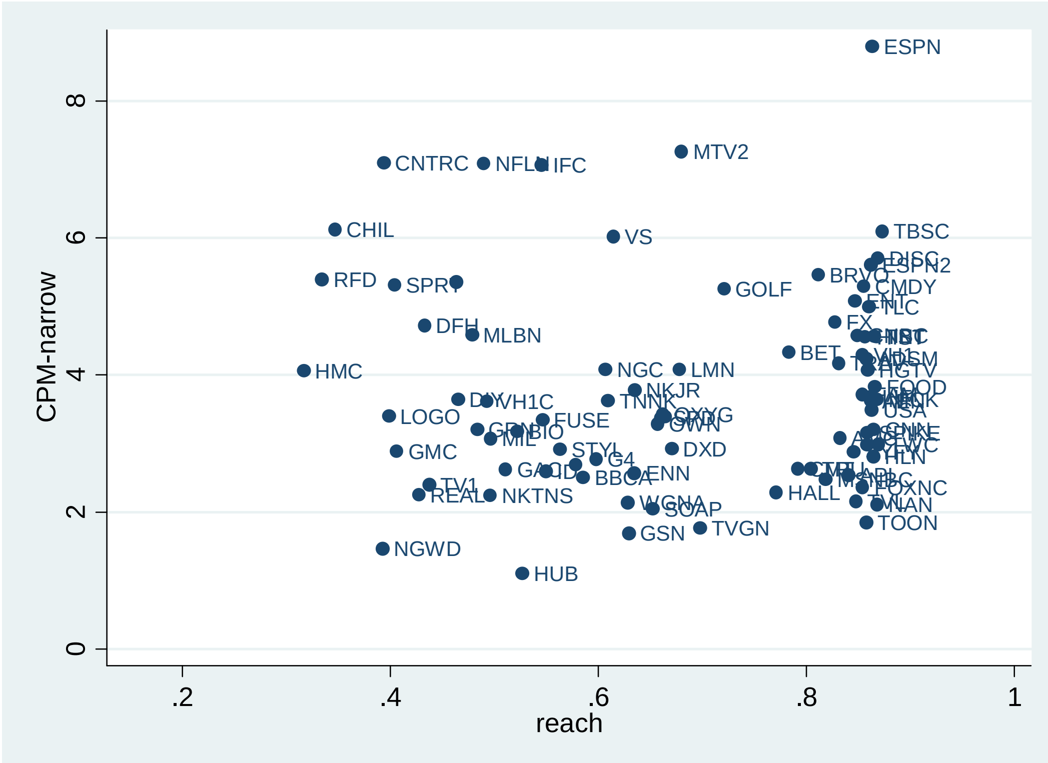

Figure 2: ***CPM-broad* × *reach***

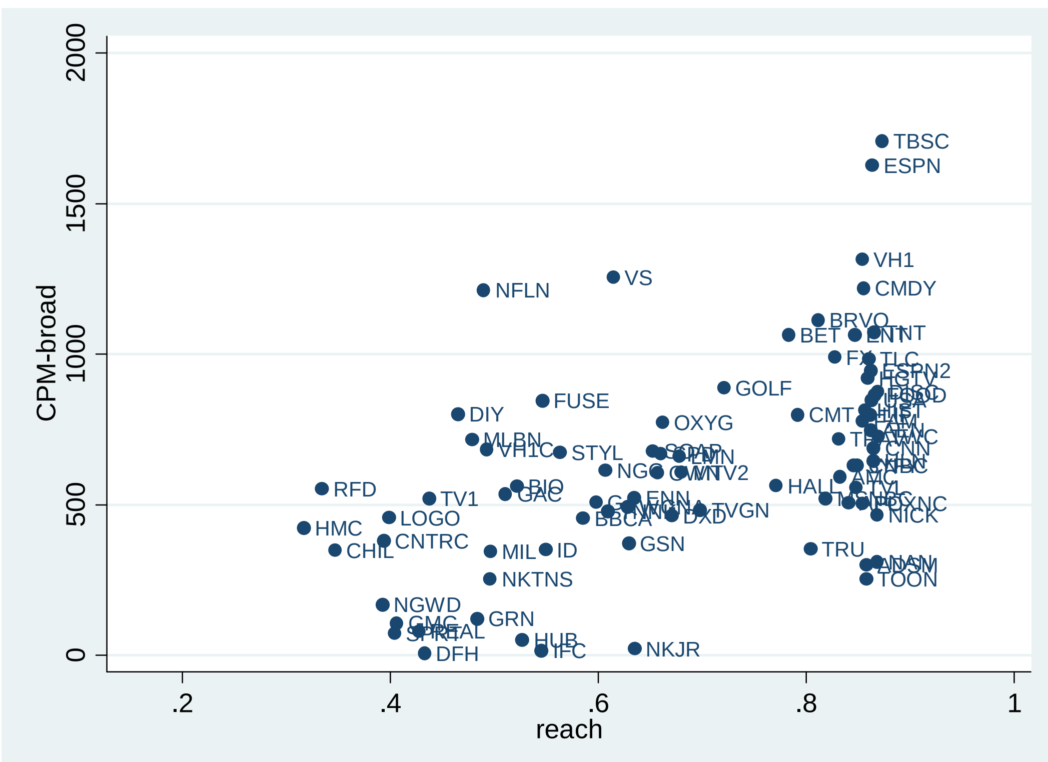

Figure 3: ***CPM-narrow*** **×** ***rating***

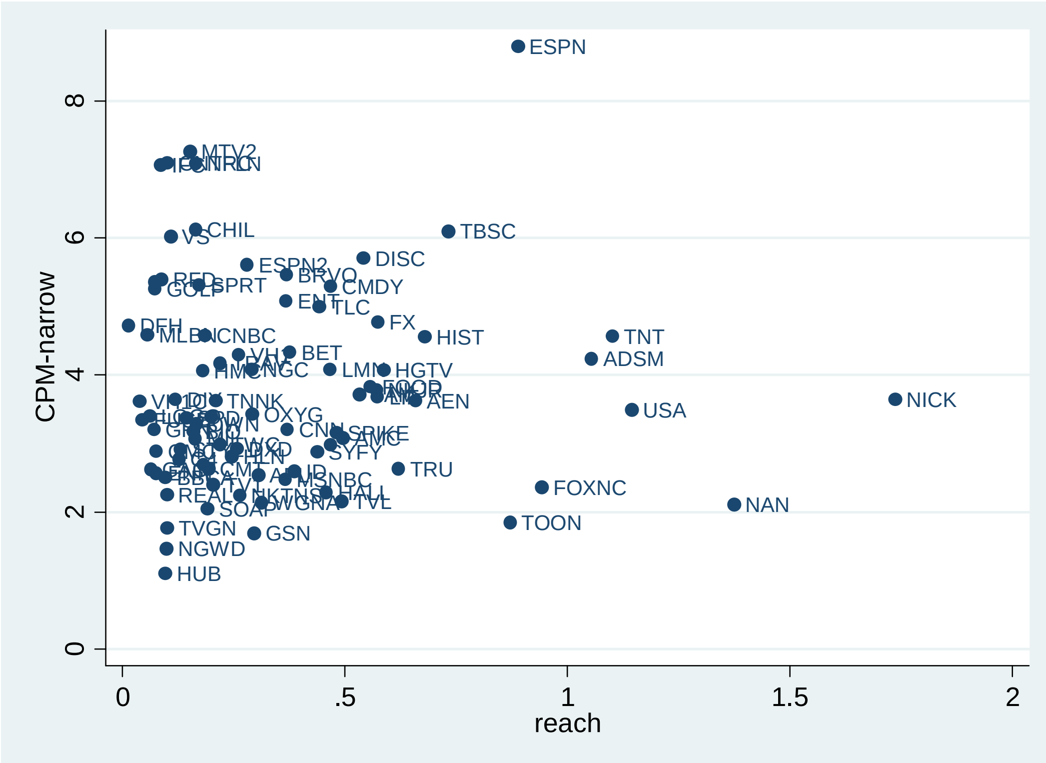

Figure 4: ***CPM-broad*** **×** ***rating***

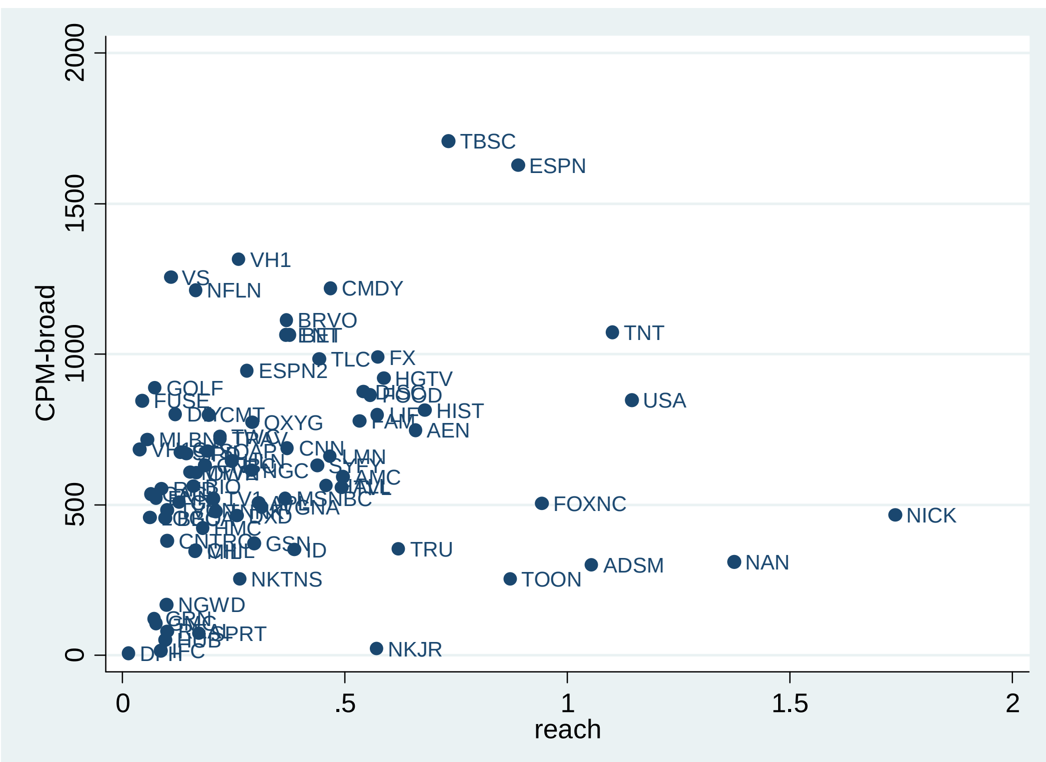

Figure 5: % Black audience composition ordered from low to high *%black*

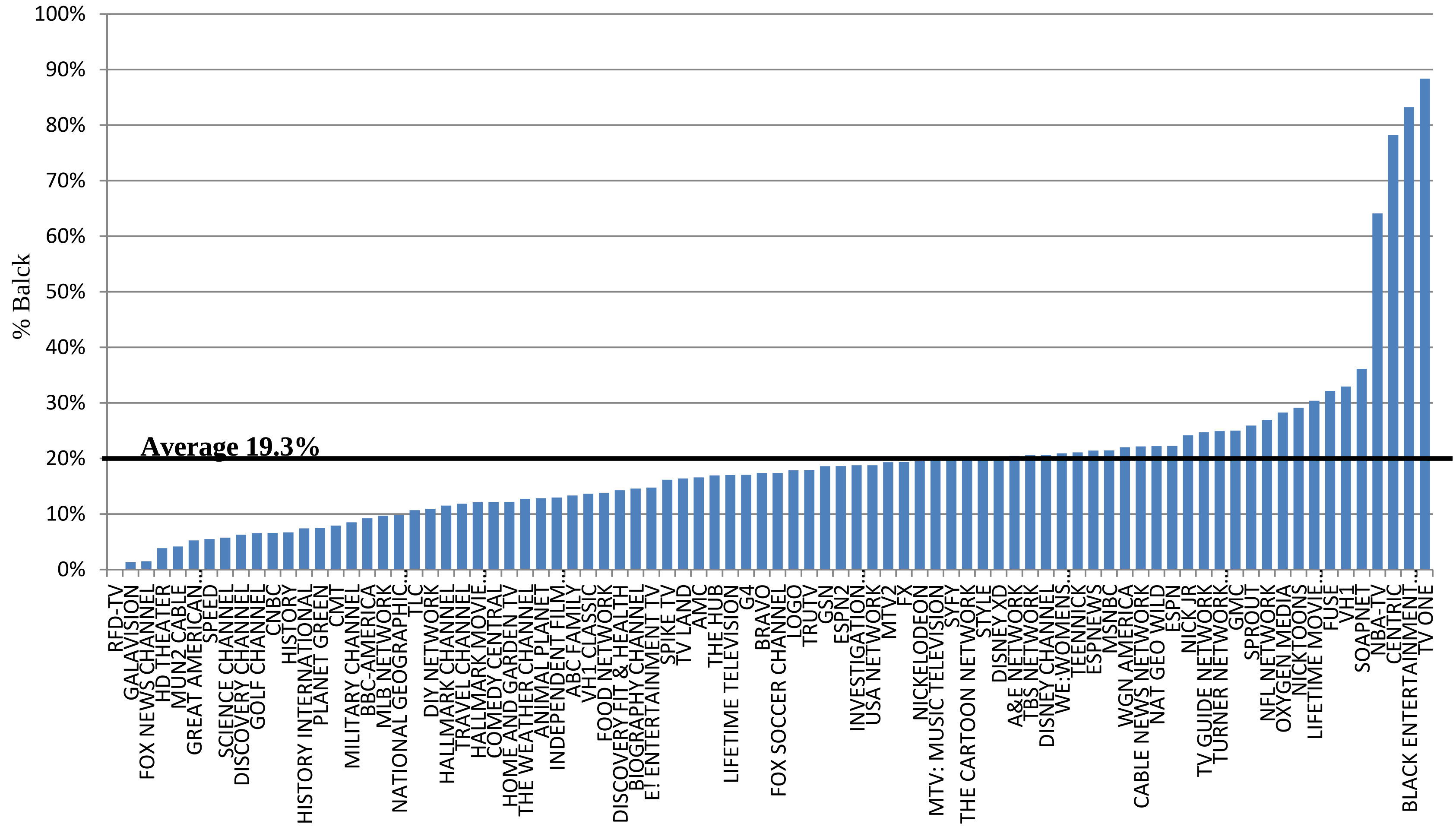

Figure 6: % Black audience composition ordered by average black audience delivered (*aablack*)

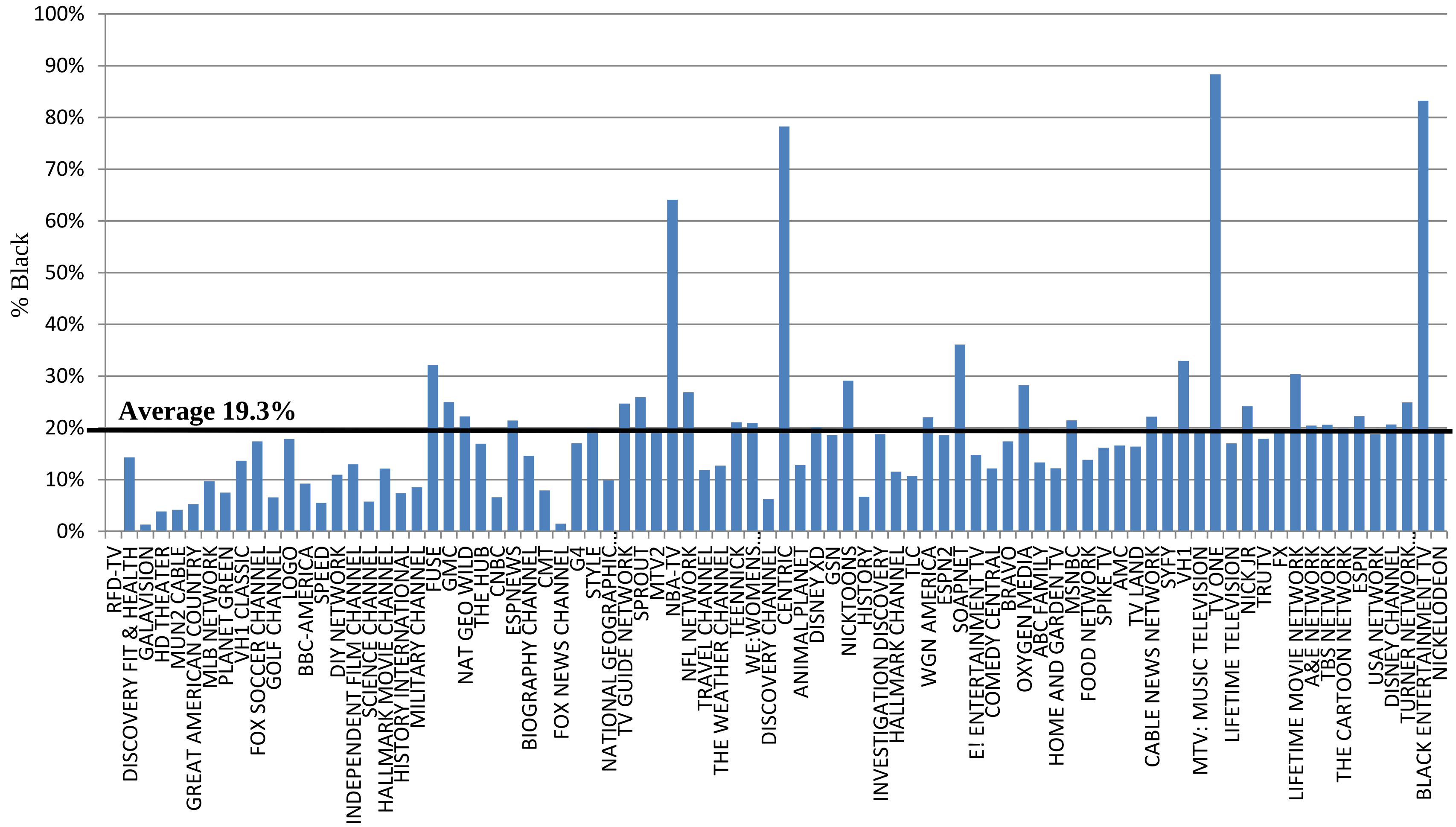

Figure 7: % Hispanic audience composition ordered from low to high *%Histpanic*

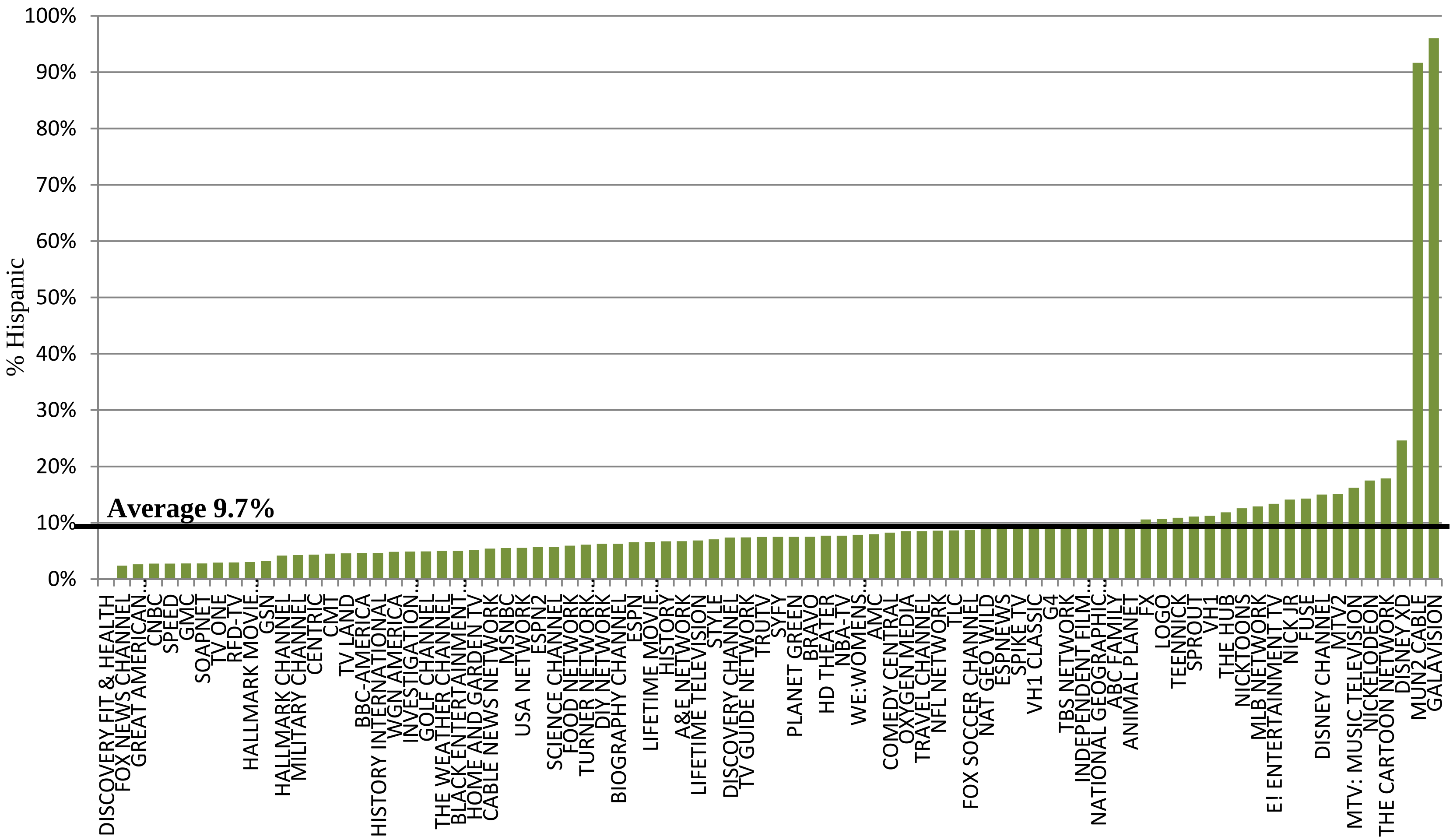

Figure 8: % Hispanic audience composition ordered by average Hispanic audience delivered (*aaHispanic*)

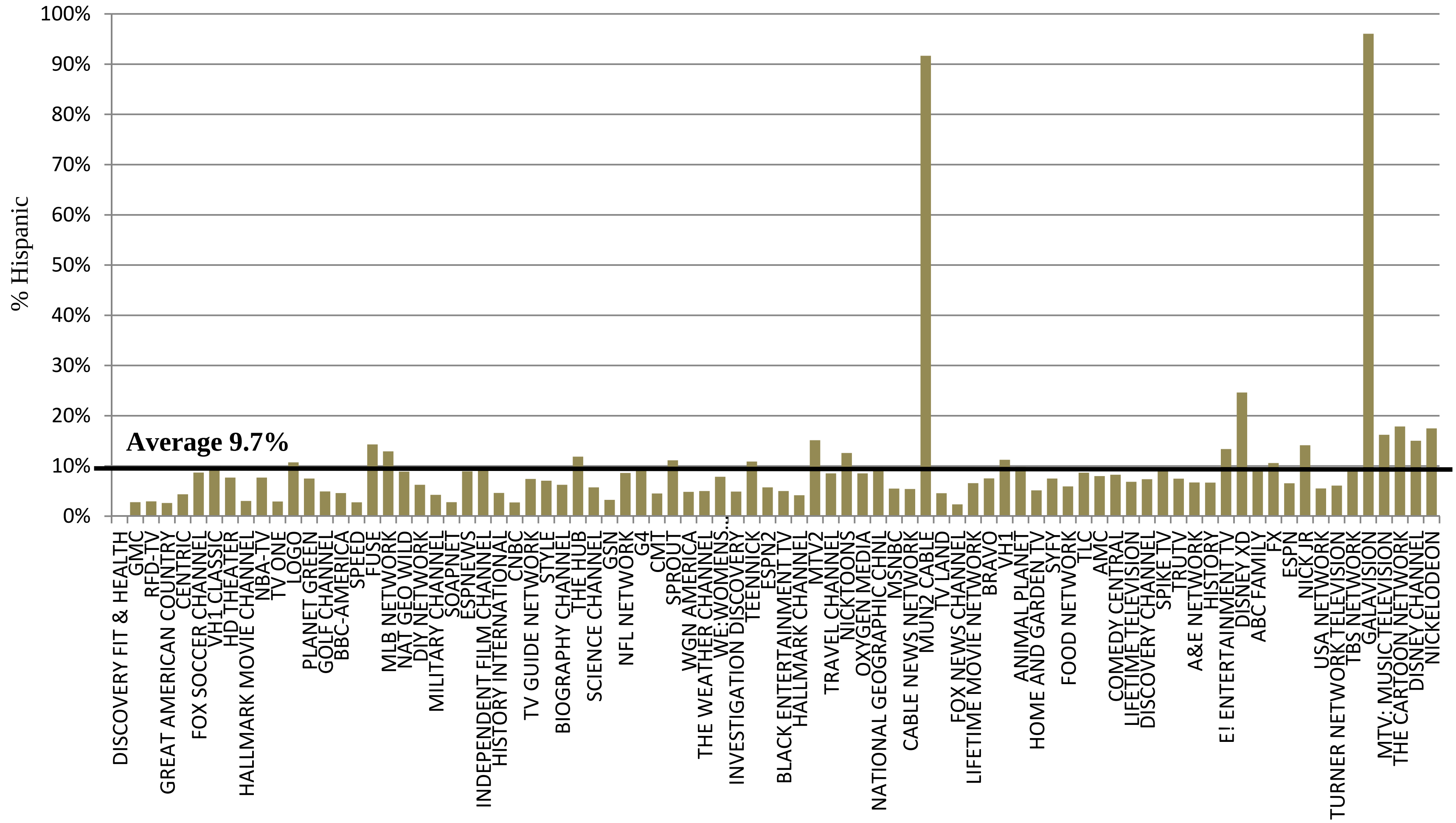

Figure 9: Racial/ethnic audience composition models: % variance explained

	Black/Hispanic content dummies	**Black/Hispanic content + genre dummies**	**Production cost (*log progexp*)**	**Combined variables**
%black	47.4	53.3	0.1	52.8
aablack	23.4	32.7	37.0	57.9
%Hispanic	91.1	93.4	0.5	93.6
aaHispanic	9.2	28.1	20.4	42.7
% white	43.3	51.5	-1.4	51.1
aawhite	22	27.3	50.8	63.8

Appendix Table 1: *CPM-broad* Models (IV), not passed weak instrument test

Variables	*CPM-borad (2 inst.[a])*	*CPM-broad (2 inst.)*	*CPM-broad (2 inst.)*	*CPM-broad (2 inst.)*	*log CPM-broad (2 inst.)*	*CPM-broad (3 inst.[b])*	*CPM-broad (3 inst.)*	*CPM-broad (3 inst.)*
inter	9131.58		622.60			-858.23	1179.18***	
	(0.49)		(1.47)			(-0.74)	(2.75)	
inter^2	-8283.49					1597.77		
	(-0.43)					(1.33)		
reach		1924.88***	813.70	-2.1e+04*			-992.99	-8490.05**
		(2.72)	(0.99)	(-1.75)			(-1.32)	(-1.97)
reach^2				18540.39*				6617.73**
				(1.80)				(2.05)
rating		-223.96		-1782.43				645.70
		(-0.87)		(-1.06)				(1.63)
rating^2				557.95				-365.22*
				(0.81)				(-1.68)
log inter								
log reach					4.25*			
					(1.73)			
log rating					-0.39			
					(-0.70)			
%black	1152.31	452.62	217.25	469.62	2.06	-321.18	-345.38	-190.72
	(0.40)	(1.33)	(0.65)	(0.83)	(1.23)	(-0.84)	(-1.07)	(-0.79)
%Hispanic	7719.67	539.46	-80.02	1272.12	9.18**	-2147.96	-557.54	174.81
	(0.40)	(0.46)	(-0.07)	(0.65)	(2.00)	(-0.86)	(-0.34)	(0.14)
%male	75.94	-324.65	-332.89	-222.77	-1.42	-331.34	-493.86	-475.24*
	(0.05)	(-1.09)	(-1.12)	(-0.45)	(-1.30)	(-0.74)	(-1.40)	(-1.74)
Income	30.16	9.14	5.04	10.46	0.01	-4.36	-1.44	3.40
	(0.42)	(1.21)	(0.67)	(0.85)	(0.51)	(-0.40)	(-0.18)	(0.57)

%age18-34	-3860.55	56.55	892.50	-963.16	-3.90	2910.75***	2598.75***	1477.90***
	(-0.30)	(0.07)	(1.03)	(-0.58)	(-1.07)	(2.66)	(3.22)	(2.87)
male-hhi	-2101.41	-282.16	500.01	1791.19	0.46	1366.15	1066.35	679.51
	(-0.28)	(-0.35)	(0.59)	(1.16)	(0.15)	(1.05)	(1.11)	(0.92)
race-hhi	609.27	284.42	229.99	-604.18	3.23**	31.88	128.36	-286.45
	(0.37)	(0.80)	(0.65)	(-0.79)	(2.24)	(0.05)	(0.27)	(-0.66)
Documentaries	-341.74	-63.08	-29.28	-161.89	0.03	28.24	-15.25	-72.17
	(-0.4)	(-0.59)	(-0.27)	(-0.9)	(0.06)	(0.16)	(-0.12)	(-0.74)
Kids and Family	-627.49	-322.77**	-300.04**	-398.00*	-1.33***	-200.01	-211.39	-206.51
	(-0.65)	(-2.53)	(-2.36)	(-1.87)	(-2.81)	(-0.93)	(-1.29)	(-1.63)
Lifestyle & Culture	149.31	7.87	80.15	-338.04	-0.42	115.78	103.93	-44.62
	(0.31)	(0.07)	(0.7)	(-1.23)	(-0.93)	(0.64)	(0.76)	(-0.39)
Movies	-416.18	-28.08	-14.76	-232.71	-0.32	194.13	52.7	-118.3
	(-0.4)	(-0.22)	(-0.12)	(-1.03)	(-0.62)	(0.83)	(0.31)	(-0.73)
Music	851.43	109.51	208.58*	37.97	0.38	-27.64	91.52	63.39
	(0.53)	(0.93)	(1.71)	(0.19)	(0.81)	(-0.14)	(0.7)	(0.61)
News and information	-576.28	-361.8	-100.8	-682.47	-1.08	136.32	246.28	5.04
	(-0.36)	(-1.66)	(-0.44)	(-1.41)	(-1.15)	(0.65)	(1.13)	(0.04)
Religion	506.42	-89.26	-90.52	-849.41	-0.44	-333.26	-297	-517.15*
	(0.28)	(-0.34)	(-0.34)	(-1.51)	(-0.45)	(-0.88)	(-1.03)	(-1.89)
Sports	838.45	287.58*	307.35*	67.24	0.72	131.82	314.23	323.36**
	(0.62)	(1.74)	(1.87)	(0.22)	(1.14)	(0.48)	(1.61)	(2.09)
Constant	-1168.87	-969.57	-808.43	5470.18	5.28**	-207.9	140.82	2624.42*
	(-0.42)	(-1.49)	(-1.22)	(1.61)	(2.55)	(-0.22)	(0.19)	(1.73)
Observations	73	73	73	73	73	64	64	64
R^2	-6.11	0.53	0.54	-0.23	0.20	-0.12	0.35	0.61
Adj. R^2	-8.31	0.38	0.39	-0.68	-0.05	-0.53	0.11	0.44
Cragg-Donald Wald F	0.04	5.384	3.857	0.835	2.825	0.974	3.218	1.950

^ p < .15; * p<.1; ** p<.05; *** p<.01

[a] *progexp* and *log netage* are used as instruments.

[b] *progexp*, *log netage* and *tier* are used as instruments.

Appendix Table 2: *CPM-narrow* Models (IV), not passed weak insturment test

Variables	*CPM-narrow (2 inst.*[a]*)*	*CPM-narrow (2 inst.)*	*CPM-narrow (2 inst.)*	*CPM-narrow (2 inst.)*	*CPM-narrow (2 inst.)*	*CPM-narrow (3 inst.*[b]*)*	*CPM-narrow (3 inst.)*	*CPM-narrow (3 inst.)*
inter	23.08		6.05**			1.73	5.76***	
	(0.66)		(2.26)			(0.47)	(2.8)	
$inter^2$	-21.17					0.53		
	(-0.59)					(0.14)		
reach		-0.93	-7.13	-8.82			-6.69*	-59.69***
		(-0.27)	(-1.39)	(-0.24)			(-1.87)	(-2.64)
$reach^2$				4.3				43.57***
				(0.8)				(2.58)
rating		1.45		4.21				3.67*
		(1.13)		(0.13)				(1.80)
$rating^2$				-1.61				-1.80
				(-0.74)				(-1.60)
log inter								
log reach					-0.2			
					(-0.25)			
log rating					0.16			
					(0.86)			
%black	5.79	1.30	-0.08	0.61	0.28	1.74	0.08	0.23
	(0.88)	(0.76)	(-0.04)	(0.36)	(0.52)	(1.44)	(0.05)	(0.18)
%Hispanic	14.45	-3.63	-6.82	-2.62	-0.75	3.88	3.49	6.85
	(0.42)	(-0.66)	(-1.01)	(-0.48)	(-0.5)	(0.49)	(0.44)	(1.03)
%male	3.07	1.01	0.80	0.96	0.01	0.86	0.09	-0.35
	(0.76)	(0.73)	(0.48)	(0.71)	(0.02)	(0.62)	(0.05)	(-0.25)
Income	0.14	0.06	0.04	0.05	0.02**	0.04	0.02	0.04
	(0.98)	(1.55)	(0.82)	(1.34)	(2.19)	(1.11)	(0.44)	(1.16)

%age18-34	-10.14	6.23	10.29**	7.23	1.66	5.48	10.49***	6.26**
	(-0.41)	(1.52)	(2.01)	(1.42)	(1.38)	(1.58)	(2.71)	(2.36)
rale-hhi	-4.69	0.97	4.90	1.99	-0.43	2.83	5.89	5.64
	(-0.34)	(0.26)	(1.02)	(0.44)	(-0.43)	(0.69)	(1.28)	(1.47)
race-hhi	1.55	1.06	0.77	0.95	0.48	2.7	2.67	-0.12
	(0.38)	(0.63)	(0.38)	(0.43)	(1.01)	(1.39)	(1.19)	(-0.05)
Documentaries	-0.6	-0.07	0.06	-0.19	-0.03	0.37	0.48	0.31
	(-0.37)	(-0.14)	(0.1)	(-0.38)	(-0.21)	(0.7)	(0.8)	(0.62)
Kids and Family	-0.89	0.02	0.11	0.01	-0.05	-0.73	-0.69	-0.58
	(-0.47)	(0.04)	(0.16)	(0.02)	(-0.35)	(-1.09)	(-0.88)	(-0.89)
Lifestyle & Culture	1.3	0.93*	1.12*	0.92	0.29**	0.94*	1.05	0.23
	(1.00)	(1.75)	(1.73)	(1.10)	(1.97)	(1.67)	(1.6)	(0.39)
Movies	0.72	1.61***	1.64**	1.39**	0.43**	1.63**	1.28	0.1
	(0.33)	(2.7)	(2.31)	(2.17)	(2.55)	(2.24)	(1.56)	(0.13)
Music	2.49	0.63	0.95	0.75	0.14	1.10*	1.15*	1.06**
	(0.9)	(1.15)	(1.41)	(1.36)	(0.94)	(1.82)	(1.85)	(1.99)
News and information	-1.99	-0.01	1.25	0.43	-0.05	-0.07	1.28	0.54
	(-0.62)	(0)	(0.93)	(0.3)	(-0.17)	(-0.11)	(1.24)	(0.74)
Religion	2.63	0.77	0.5	0.6	0.32	1.3	0.86	-0.82
	(0.69)	(0.62)	(0.33)	(0.36)	(0.98)	(1.09)	(0.63)	(-0.58)
Sports	2.19	0.82	0.78	0.91	0.27	1.23	1.5	1.73**
	(0.74)	(1.07)	(0.85)	(1)	(1.32)	(1.42)	(1.62)	(2.19)
Constant	-6.21	-2.18	-0.64	0.09	-0.12	-4.56	-2.23	15.18*
	(-0.83)	(-0.68)	(-0.16)	(0.01)	(-0.18)	(-1.57)	(-0.62)	(1.91)
Observations	78	78	78	78	73	65	65	65
R^2	-2.19	0.41	0.16	0.43	0.44	0.47	0.28	0.50
Adj. R^2	-3.09	0.25	-0.08	0.24	0.27	0.28	0.01	0.29
Cragg-Donald Wald F	0.096	5.285	3.342	0.770	2.825	0.966	3.296	1.924

^ p < .15; * p<.1; ** p<.05; *** p<.01

[a] *progexp* and *log netage* are used as instruments.

[b] *progexp*, *log netage* and *tier* are used as instruments.

Appendix Table 3: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) *CPM-broad*	1									
(2) *CPM-narrow*	0.49**	1								
(3) *inter*	0.23**	0.02	1							
(4) *inter*^{2}	0.08	0.05	0.93**	1						
(5) *reach*	0.51**	0.004	0.66**	0.45**	1					
(6) *reach*^{2}	0.51**	0.03	0.71**	0.49**	0.99**	1				
(7) *rating*	0.2	0.01	0.97**	0.9**	0.52**	0.58**	1			
(8) *rating*^{2}	0.07	-0.003	0.92**	0.99**	0.39**	0.44**	0.93**	1		
(9) *log inter*	0.38**	-0.02	0.85**	0.64**	0.79**	0.83**	0.84**	0.65**	1	
(10) *log reach*	0.50**	-0.02	0.58**	0.39**	0.98**	0.93**	0.41**	0.32**	0.70**	1
(11) *log rating*	0.31**	-0.01	0.82**	0.64**	0.58**	0.64**	0.88**	0.68**	0.95**	0.45**
(12) *male*	0.04	0.30**	-0.17	-0.1	-0.21**	-0.21**	-0.16	-0.1	-0.27**	-0.21**
(13) *income*	0.16	0.25**	-0.08	-0.05	-0.1	-0.09	-0.05	-0.03	-0.11	-0.12
(14) *age18-34*	0.49**	0.38**	-0.02	-0.06	0.036	0.06	-0.01	-0.05	-0.0001	-0.012
(15) *male-hhi*	0.26**	0.21	-0.14	-0.15	0.04	0.004	-0.18	-0.17	-0.09	0.08
(16) *race-hhi*	0.04	-0.01	-0.18	-0.18	-0.05	-0.07	-0.23**	-0.21**	-0.17	-0.02
(17) *tier*	0.53**	0.16	0.69**	0.46**	0.92**	0.95**	0.65**	0.45**	0.82**	0.88**
(18) *log netage*	0.49**	0.07	0.44**	0.32**	0.47**	0.52**	0.45**	0.34**	0.55**	0.39**
(19) *progexp*	0.47**	0.42**	0.40**	0.32**	0.30**	0.32**	0.39**	0.31**	0.35**	0.28**
(20) *log progexp*	0.64**	0.26**	0.69**	0.51**	0.79**	0.79**	0.66**	0.50**	0.75**	0.77**
(21) *aablack*	0.21	0.04	0.88**	0.85**	0.52**	0.56**	0.86**	0.84**	0.73**	0.46**
(22) *%black*	0.09	0.09	-0.01	0.01	-0.10	-0.10	0.02	0.02	0.01	-0.09
(23) *aaHispanic*	0.06	-0.01	0.86**	0.91**	0.45**	0.49**	0.84**	0.90**	0.64**	0.39**
(24) *%Hispanic*	-0.03	0.02	-0.03	0.02	-0.15	-0.14	-0.02	0.02	-0.10	-0.15
(25) *aawhite*	0.24**	0.02	0.98**	0.89**	0.68**	0.73**	0.95**	0.88**	0.84**	0.60**
(26) *%white*	0.01	-0.01	0.03	-0.02	0.17	0.17	0.00	-0.03	0.07	0.16

** p < .05

Appendix Table 3 continued

Variables	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) *CPM-broad*										
(2) *CPM-narrow*										
(3) *inter*										
(4) *inter*^{2}										
(5) *reach*										
(6) *reach*^{2}										
(7) *rating*										
(8) *rating*^{2}										
(9) *log inter*										
(10) *log reach*										
(11) *log rating*	1									
(12) *male*	-0.25**	1								
(13) *income*	-0.09	0.43**	1							
(14) *age18-34*	0.01	0.24**	0.11	1						
(15) *male-hhi*	-0.14	0.08	0.34**	0.08	1					
(16) *race-hhi*	-0.2**	0.13	-0.23**	-0.16	-0.01	1				
(17) *tier*	0.73**	-0.06	0.1	0.23	-0.03	-0.06	1			
(18) *log netage*	0.54**	-0.04	-0.03	0.25**	-0.03	0.03**	0.67**	1		
(19) *progexp*	0.34**	0.16	0.13	0.18	0.14	-0.11	0.31**	0.24**	1	
(20) *log progexp*	0.69**	0.05	0.1626	0.26**	0.08	-0.24**	0.76**	0.45**	0.59**	1
(21) *aablack*	0.71**	-0.21**	-0.20**	0.07	-0.14	-0.30**	0.53**	0.39**	0.40**	0.60**
(22) *%black*	0.05	-0.21**	-0.28**	0.19	0.013	-0.34**	-0.12	-0.06	0.012	-0.004
(23) *aaHispanic*	0.64**	-0.10	-0.10	0.05	-0.17	-0.22**	0.44**	0.35**	0.21	0.44**
(24) *%Hispanic*	-0.07	0.10	-0.32**	0.35**	-0.14	0.32**	-0.14	0.08	-0.05	-0.11
(25) *aawhite*	0.82**	-0.15	-0.04	-0.05	-0.13	-0.12	0.71**	0.43**	0.40**	0.70**
(26) *%white*	0.02	0.12	0.35**	-0.37**	0.05	0.23**	0.18	0.05	0.02	0.06

** $p < .05$

Appendix Table 3 continued

Variables	(21)	(22)	(24)	(23)	(25)	(26)
(1) *CPM-broad*						
(2) *CPM-narrow*						
(3) *inter*						
(4) *inter*^{2}						
(5) *reach*						
(6) *reach*^{2}						
(7) *rating*						
(8) *rating*^{2}						
(9) *log inter*						
(10) *log reach*						
(11) *log rating*						
(12) *male*						
(13) *income*						
(14) *age18-34*						
(15) *male-hhi*						
(16) *race-hhi*						
(17) *tier*						
(18) *log netage*						
(19) *progexp*						
(20) *log progexp*						
(21) *aablack*	1					
(22) *%black*	0.32**	1				
(23) *aaHispanic*	0.79**	-0.01	1			
(24) *%Hispanic*	-0.03	-0.15	0.22**	1		
(25) *aawhite*	0.78**	-0.11	0.79**	-0.06	1	
(26) *%white*	-0.28**	-0.87**	-0.11	-0.35**	0.14	1

** p < .05