Bias in Cable News: Persuasion and Polarization

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Abstract

We measure the persuasive effects of slanted news and tastes for like-minded news, exploiting cable channel positions as exogenous shifters of cable news viewership. Channel positions do not correlate with demographics that predict viewership and voting, nor with local satellite viewership. We estimate that Fox News increases Republican vote shares by 0.3 points among viewers induced into watching 2.5 additional minutes per week by variation in position. We then estimate a model of voters who select into watching slanted news, and whose ideologies evolve as a result. We use the model to assess the growth over time of Fox News influence, to quantitatively assess media-driven polarization, and to simulate alternative ideological slanting of news channels.

1 Introduction

The 24-hour cable news channels - CNN, the Fox News Channel, and MSNBC - are frequent targets of allegations of media bias. In this paper, we address several questions about cable

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news. First, how much does consuming slanted news, like the Fox News Channel, change individuals' partisan voting preferences in presidential elections, if at all? Second, how intense are consumer preferences for cable news that is slanted towards their own ideology? After measuring these forces, we ask: how much could slanted news contribute to increases in ideological polarization? And, what do these forces imply for the optimal editorial policy of channels that wish to maximize viewership, or alternatively to maximize electoral influence?

The answers to these questions are key inputs for designing optimal public policy - such as merger policy - for the media sector, which has attracted blame for the rise in polarization in the US (Gentzkow, 2016). If consumers simply prefer news that resonates with their pre-existing ideology, and the consumption of such news does not have any associated social or political externalities, then the news media sector should be treated like any other consumer product. However, if consuming news with a slant alters the consumer's political behavior, as in DellaVigna and Kaplan (2007), then the existence of slanted news could lead to a polarizing feedback loop: an "echo chamber" where partisans can reinforce and strengthen their initial biases.[1] Furthermore, an interested party could influence the political process by controlling media outlets, as in Prat (2014).[2] Such concerns led the Federal Communications Commission (FCC) to condition approval of the merger of Comcast Corporation and NBC Universal in 2010 on the requirement that Comcast take steps to promote independent news services.[3]

The central new results in this paper are that the Fox News effect in presidential elections grew from 2000 to 2008 because of a combination of increasing viewership and increasingly conservative slant on Fox News; and that the cable news channels can explain an increase in political polarization of similar size to that observed in the US population over this period. We also find that the dispersion in partisan slant across cable channels increased from 2000 to 2012; that Fox News's viewership-maximizing slant is much more centrist than its observed slant; that the cable-news-driven increase in polarization relies on consumers' taste for like-minded news; and that we can confirm the approximate magnitude of the finding in DellaVigna and Kaplan (2007) for the effect of Fox News on the 2000 election using a new data set.

[1] Gentzkow and Shapiro (2008) detail the complexities in designing optimal regulatory policy for media markets. Gentzkow and Shapiro (2011) indicate that media consumption tends to be balanced across slanted sources.

[2] Existing evidence from Gentzkow and Shapiro (2010) shows that owner partisanship is not an important determinant of newspaper slant. The sample size is too small to test this hypothesis in the case of cable news.

[3] The condition required that Comcast move "independent" news channels such as Bloomberg Television into "news neighborhoods." This effectively required Comcast to move Bloomberg next to channels such as MSNBC and CNN in their channel lineups. The FCC justified the condition "in accordance with the special importance of news programming to the public interest," and did not place any such conditions on non-news programming. See `https://apps.fcc.gov/edocs_public/attachmatch/FCC-11-4A1.pdf`, paragraph 122.

To generate these results, we first propose a new instrument for exposure to media bias to complement estimates based on news channel availability: the channel positions of news channels in cable television lineups. The channel position is the ordinal position of news channels in the cable lineup. The assertion is thus that FNC will be watched more when it is channel position 25 instead of channel position 65. We demonstrate that a one-standard-deviation decrease in Fox News' channel position is associated with an increase of approximately 2.5 minutes per week in time spent watching Fox News. We estimate that watching the Fox News Channel for this additional 2.5 minutes per week increases the vote share of the Republican presidential candidate by 0.3 percentage points among voters induced into watching by variation in channel position. The corresponding effect of watching MSNBC for 2.5 additional minutes per week is an imprecise zero.

As with any instrumental variables design, it is critical that the channel positions for Fox News and MSNBC are not chosen to accord with local political tastes. Empirically, we show that Fox News channel position does not predict pre-Fox News political outcomes, including 1996 county level Republican voting and 1996 political contributions to Republican candidates. Additionally, Fox News cable positions are not negatively correlated with the predictable-from-demographics component of either Republican voting or Fox News viewership. In other words, in areas where demographics would predict the Republican vote share to be high, Fox News is not systematically located in lower channel positions. And in areas where demographics would predict Fox News viewership to be high, Fox News is not systematically located in lower channel positions. Furthermore, Fox News' local cable channel position does not predict local viewership of Fox News by satellite subscribers, who see a different, nationwide channel lineup.

We then quantify the preference for like-minded news by adapting the method of Gentzkow and Shapiro (2010), who estimate this quantity in the context of newspapers. We measure the relationship between changes in a text-based slant measure over time and the characteristics of viewers of these channels. A key source of variation in this exercise is MSNBC's change in business strategy towards offering more liberal content. Our ideology estimates pick up this format switch - MSNBC closely tracks CNN in the early 2000s, but then moves left following the format switch in 2006. We estimate that Fox News' ideology has been moving further to the right in the most recent years.

We combine the analysis of the influence of slanted news with the demand for slanted news in a structural model that allows the quantification of polarization dynamics and media power. The model features consumer-voters who choose how much time to spend watching the cable news channels; whether to subscribe to cable, satellite or no pay television service; and for

whom to vote in presidential elections. Consumers' allocation of time to television channels is governed by their preferences for the channels (which are a function of their ideology, the channels' ideologies, and their demographics), and the availability of the channels (whether the cable operator carries them and, if so, the positions they occupy on the channel lineup). Consumers' ideologies evolve from their initial position depending on how much time they allocate to watching channels of different ideologies. This process culminates in a presidential election in which consumers choose for whom to vote.

We estimate the parameters of the model by simulated indirect inference. The criterion function is the distance between two-stage least squares estimates of voting on demographics and minutes watched of each channel, using channel positions as instrumental variables, in the actual data and in data simulated from the model. In addition to matching the second stage regression coefficients, we also match the first stage (viewership equation) regression coefficients and the OLS regression coefficients.

We use the estimated model to quantitatively assess the degree of ideological polarization induced by cable news; the effect of the entry of Fox News prior to the 2000 presidential election; and the degree of "media power" (Prat, 2014) possessed by each of the news channels individually as well as a hypothetical conglomerate under unified ownership. We find that cable news does increase ideological polarization among the viewing public. The increase in polarization predicted by our model is comparable in magnitude to the estimated decade-long increase in polarization derived from the General Social Survey. In absolute terms, however, this increase is fairly small, consistent with existing research in political science (Ansolabehere et al., 2006; Fiorina et al., 2008; Bafumi and Herron, 2010) showing that ideological polarization among the public is much lower than among their elected representatives, in both levels and recent growth rates.

In other results, we estimate that removing Fox News from cable television during the 2000 election cycle would have reduced the overall Republican presidential vote share by 0.46 percentage points. The predicted effect increases in 2004 and 2008 to 3.59 and 6.34 percentage points, respectively. This increase is driven by increasing viewership on Fox News as well as increasingly conservative slant. Finally, we find that the cable news channels' potential for influence on election outcomes would be substantially larger were ownership to become more concentrated.

This paper contributes to the empirical literature on the relationship of news media to political outcomes.[4] The closest papers to this study are by DellaVigna and Kaplan (2007)

[4]A number of papers have demonstrated that media usage or availability affects behavior. Amongst others,

and Gentzkow and Shapiro (2010).

DellaVigna and Kaplan (2007) study the effects of Fox News by comparing vote shares in locations with and without cable access to Fox News by November 2000. Our contributions to this strand of the literature are to introduce a new identification strategy based on channel positions, and to update their availability-based estimates using more accurate data from Nielsen on Fox News availability.[5] Channel position variation allows a researcher to examine the effects of cable news in later years where there is negligible variation in availability of these channels, and could be useful for studying the effects of media consumption in other contexts. We confirm, using Nielsen viewership data, that the availability of Fox News has a large and statistically powerful relationship with viewership of Fox News. In terms of results, we estimate a Fox News effect that is statistically positive and quantitatively large as in the DellaVigna and Kaplan (2007) analysis. Indeed, our estimated counterfactual effect of removing Fox News on the change in year 2000 election Republican vote share is 0.46 percentage points, which resonates well with the DellaVigna and Kaplan (2007), updated with more accurate availability data, estimated range of 0.26 to 0.36 percentage points.

Our approach follows Gentzkow and Shapiro (2010) in several dimensions, including the use of text analysis to measure media outlets' slant. Like Gentzkow and Shapiro (2010), we treat ideological slant as a characteristic over which consumers have heterogeneous tastes when choosing media consumption levels. Our contribution is to model media consumption together with voting, to separately measure tastes for like-minded news and the influence of slanted media consumption on consumer ideology. The influence effect also interacts with the existence of tastes for like-minded news. Consumers for whom both effects are present can be induced into a feedback loop in which they consume slanted media, their ideologies then evolve in the direction of the slant, their taste for that slanted media increases, and so on. In this sense, this paper combines the literature on the persuasive effects of the media with the literature on self-selection into consumption of slanted media to explore media-driven polarization and to counterfactually simulate alternative ideological slant strategies by the cable news outlets.

Chiang and Knight (2011) find positive effects of unexpected newspaper endorsements on vote shares for the endorsed candidate, Gentzkow (2006) finds decreased voter turnout from television access, Gerber et al. (2009) find positive effects of newspaper exposure, regardless of slant, on Democratic vote shares in the 2005 Virginia gubern,atorial elections. Enikolopov et al. (2011) find that viewing an independent news channel in Russia increased vote shares for the opposition parties and decreased overall turnout in 1999. Lim et al. (2014) find that media coverage can affect criminal sentencing decisions for judges.

[5]In Appendix D, we document that Fox News availability in DellaVigna and Kaplan (2007) is measured with error. Nearly 40% of the "control group," the locations that they consider as not having cable access to Fox News in 2000, did in fact have cable access to Fox News. 25% of the control group had Fox News availability since 1998.

2 Institutional Overview

During our study period of 1998-2008, most American households had three options for television service: a wire-based cable package, a satellite package, or over-the-air broadcast signals.[6] In 2000, most pay television subscribers were cable subscribers, but by 2008, satellite providers had a market share of about 30%. The set of channels on cable varies both across providers and within providers across locations. Each of the two nationwide satellite providers, DirecTV and the Dish Network, have their own packages and lineups that are common to *all* locations nationwide. Cable content is produced by media conglomerates such as Viacom, News Corporation, ABC-Disney, or NBC Universal. The cable and satellite providers contract with these firms to offer their content to subscribers.

The foci of this study are the cable news channels. CNN began broadcasting in 1980 as one of the earliest cable channels of any genre. The Fox News Channel (FNC) and MSNBC both entered the market in the mid 1990's. FNC quickly gained a reputation for being slanted to the right (Rutenberg, 2000). FNC is now one of the most highly rated cable channels across all genres. MSNBC began as a joint venture between NBC and Microsoft. For its first ten years, MSNBC did not have any obvious slant and featured show hosts from across the political spectrum. MSNBC changed its business strategy in the starting around 2006 to provide news with a more liberal slant, as detailed in Sanneh (2013), culminating in adopting the slogan "Lean Forward" in 2010.

The channel lineup, or the numerical ordering of channels, that cable subscribers encounter varies by local cable system. The first channel positions are generally allocated to over-the-air broadcast affiliates: for example, NBC4 occupies position four in the Washington D.C. area. After the over-the-air channels, the cable channels begin. We assert in this paper that the ordering of a channel in the lineup can have significant effects on the viewership of news channels (though the significant relationship between channel position and viewership holds for all genres, not just news).

Figure 1 plots the relationship between the residual component of ratings - the portion that is not explained by viewer demographics and channel-specific state-year fixed effects - and channel position for a set of 34 channels, including both the news channels and other

[6]Some households, for example households in remote rural areas, did not have a cable option. Some households which did not have a direct line of sight due to physical obstructions like tall buildings, trees, or steep slopes, did not have a satellite option. And some households, mostly in urban areas, had two wire-based cable operators. In 2004 about 85% of US zip codes, accounting for about 67% of the total population, were served by a single monopolist wire-based cable operator.

channels that tend to occupy similar positions in cable lineups. There is a clear negative, and very nearly linear, relationship between position and ratings over the range of positions which the news channels typically occupy. Table A32 in Appendix G documents the own-position coefficients on ratings for each of these channels; all are negative and almost all are statistically significant.

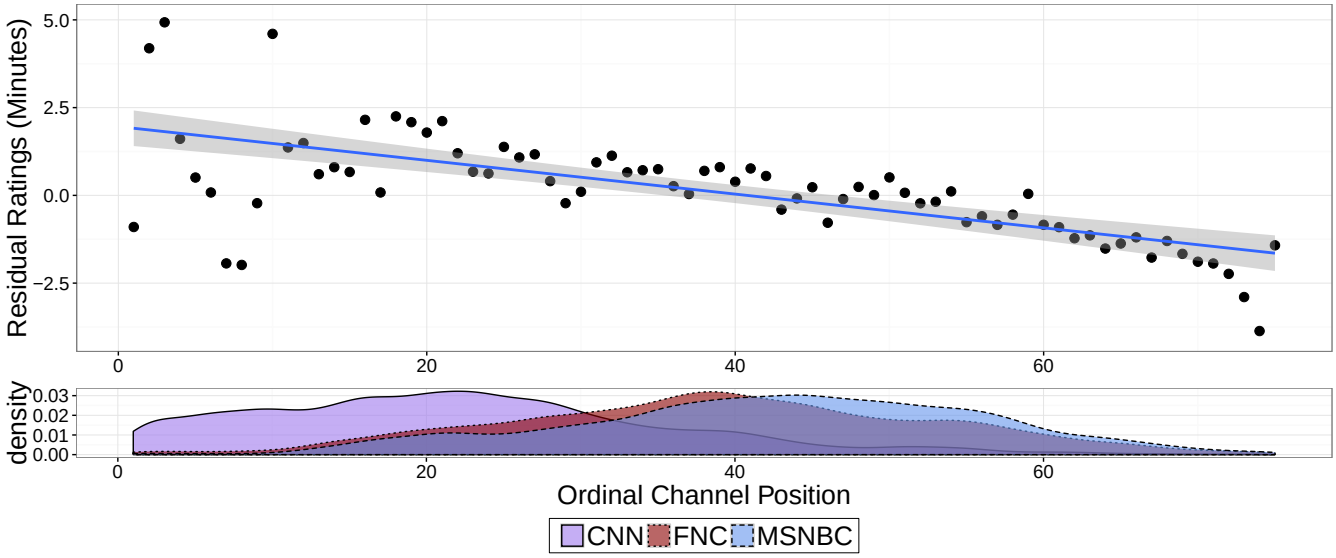


Figure 1: The top panel shows the relationship between the residual component of minutes watched and channel position, in a set of 34 comparable cable channels whose median positions across cable system-years are between 30 and 60 and thus typically occupy similar positions to FNC and MSNBC. Residuals are constructed by regressing minutes watched per week (in the MediaMark individual-level dataset) on the full set of individual demographics plus state-year fixed effects. The predicting regressions are estimated separately for each channel, such that demographic effects and state-specific time trends are allowed to vary by channel. The points in the figure are averages of these residual minutes across all channels located at a given ordinal position. The blue line is the least-squares fit. The bottom panel shows the density of the three news channels' ordinal positions across system-years for comparison.

The obvious empirical concern is that a channel might be placed in lower positions in localities with high tastes for the channel. We later examine and reject that concern empirically in a variety of ways. Describing the process by which channel positions were determined historically provides additional support for the claim that channel positions are valid instruments.

The mid-1990's, during which FNC and MSNBC were rolling out, was a tumultuous time for the cable industry. This period saw many systems upgrade from analog to digital equipment, expanding the number of channels cable operators were able to offer. Coincident with this technical advance, a wave of new channels entered cable lineups alongside first-generation channels like CNN, ESPN, and HBO. New channels were often allocated positions sequentially,

in the order in which they joined a system.[7] As a result, the channel positioning of FNC or MSNBC on a given local system depended on the timing of that system's bilateral negotiations with multiple new channels as well as its decision of when to upgrade. On capacity constrained systems owned by the multiple-system operator TCI in 1996, FNC was reported to have replaced one of as many as twelve different channels (Dempsey (1996)). Combined with the desire to limit changes in positions so as to not confuse customers, these chaotic factors generated persistent cross-system variation in the positioning of FNC and MSNBC.[8]

3 Data

We use nine categories of data sets: (1) Nielsen FOCUS data on cable channel lineups by zip code by year, (2) precinct-level voting data from the 2008 Presidential election, (3) individual survey data on intent to vote Republican in 2000, 2004, and 2008 U.S. Presidential elections, (4) Nielsen viewership data at the zip code level for the cable news channels from 2005 to 2008, (5) individual survey data on cable news viewership for 2000 to 2008, (6) County level presidential election vote share data, (7) U.S. Census demographics by zip code, 1996 political donation data by zip code from the Federal Elections Commissions, and the 2010 religious adherence data by county from the Religious Congregations and Membership Study (RCMS), (8) Broadcast transcripts of cable news from Lexis-Nexis, and (9) the Congressional Record. In Appendix A, we provide details on how we cleaned and joined the data sets. Appendix B provides summary statistics.

Cable Lineups: Nielsen FOCUS The Nielsen FOCUS database consists of yearly observations of cable systems. The key variables in this data set are, for each system and year, the availability of CNN, FNC, and MSNBC, the channel positions of CNN, FNC, and MSNBC, when available, and the zip codes served by the system. In Figure 2, we document the availability of each of these news channels by year. CNN was already near-universal by 1998; FNC and MSNBC expanded over the early part of the sample period, reaching the vast majority of cable subscribers by 2002.

[7] In Appendix G, we show that channel positions correlate with the best available position in the year before a channel was added.

[8] Some systems have shuffled positions over time as channels went out of business, as channel capacity expanded and as new channels came online. Some local managers pursued a strategy of moving channels with similar content or in the same genre together into "neighborhoods," when possible. In general, however, the ordering of cable channels is highly persistent from year to year: the autoregressive coefficient in a regression of channel position in year t on

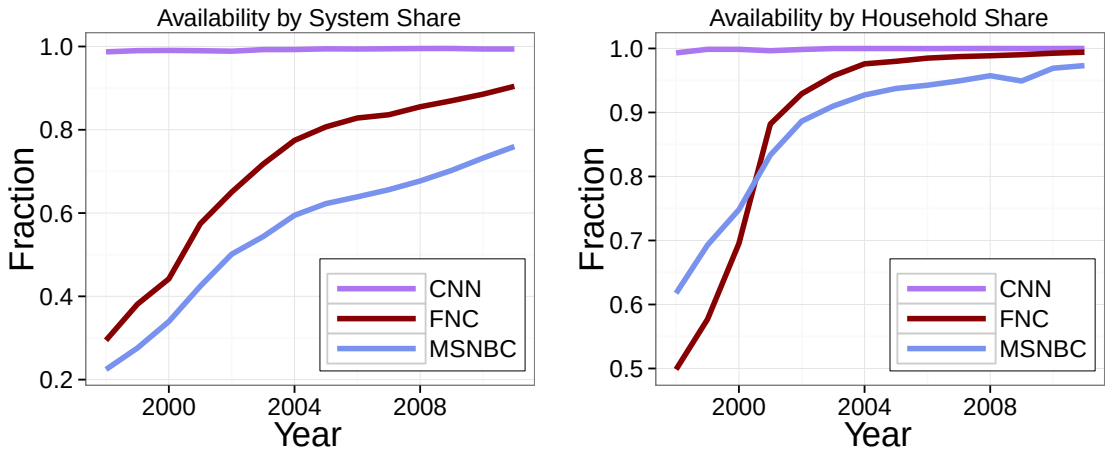


Figure 2: Availability of cable news channels by year. The left panel lines represent the fraction of cable systems which carry the news channels. The right panel represent the fraction of cable subscribers for whom the news channel was carried on their system.

Zip Code Level Voting Data and Demographics We use the "Precinct-Level Election Data" from Ansolabehere et al. (2014) which provides votes cast in the 2008 Presidential election for each party, by voting precinct. We aggregate these precinct-level totals up to the zip code level, and compute the two party vote share for each zip code. We combine these with demographic data from the US Census for 2010. These data are summarized in Appendix B, Table A1.

Individual Voting Data: NAES and CCES The National Annenberg Election Study (NAES) is a large-scale phone survey conducted each presidential election cycle. We use data from the 2000, 2004, and 2008 election cycles, including the confidential zip code field. The key variables are demographic variables such as race, age, and income; zip code; and actual or intent to vote in the current presidential election. These data are summarized in Appendix B, Table A2. For 2008, we add data from the Cooperative Congressional Election Study (CCES) on the same variables that we use from the NAES. In all years, NAES / CCES individuals were matched to their corresponding news channel availability and positioning using their zip code of residence to identify their local cable provider in the Nielsen FOCUS data.

channel position on the same system in year $t-1$ ranges from 0.94 (MSNBC) to 0.97 (CNN).

Zip Level Viewership Data: Nielsen Nielsen measures television viewership from a rotating panel of households. We acquired zip code level ratings for CNN, FNC, and MSNBC from the Nielsen Local TV (NLTV) database for the years 2005 through 2008. The Nielsen data also report viewership conditional on being a cable subscriber and conditional on being a satellite subscriber. The measurements come in the units of rating points which indicate what fraction of persons were tuned in to each channel in a given time period. We convert to average hours per week by multiplying this fractional rating by 168, the total number of hours in a week. These data are summarized in Appendix B, Table A3.

Individual Viewership Data: Mediamark and Simmons Mediamark and Simmons are two commercial data vendors who survey individuals on their usage of different brands, including media usage. We use Mediamark for 2000 to 2007, and Simmons for 2008. The key variables for our study are year, zip code, individual demographics, whether the respondent subscribes to cable, satellite, or neither, and the reported number of hours watched per week of CNN, FNC, and MSNBC. These data are summarized in Appendix B, Table A4.

County Level Vote Shares and Demographics We use county level presidential vote shares for the Presidential election in 1996 from the Voting and Elections Collection Database maintained by *Congressional Quarterly*. We also use zip code level demographic statistics from the 2010 US Census. We construct county-level distributions of household income, age, race, education, and initial ideology, for use in the model in section 5. We also use this data to condition on the pre-Fox News county level Republican vote share in some of our regression specifications.

Broadcast Transcripts and Congressional Record To quantify the slant of each news channel in each year, we follow Groseclose and Milyo (2005) and Gentzkow and Shapiro (2010) in comparing the language that the channels use to language that Congresspeople use. This procedure is designed to capture the connotations that a politician or media outlet can imply by using differences in language to describe the same program or policy, e.g., "personal accounts" versus "private accounts" or "war in Iraq" versus "global war on terror." It cannot, however, pick up all forms of slant present in television news - for instance, the use of quotations or clips from an opponent's speech in order to satirize or mock the opponent's views - and thus likely underestimates the dispersion in slant among the slanted outlets. We obtained broadcast transcripts for CNN, FNC, and MSNBC from the Lexis-Nexis database for the sample period

1998-2012 by downloading all transcripts in each year for each identifiable cable news program from each of the three channels. Appendix C details the procedure we employ.[9]

Each Congressperson has a measure of their ideology, derived from roll-call votes: the DW-NOMINATE score of McCarty et al. (1997), which places each Congressperson on the interval $[-1, 1]$. More positive scores correspond to more conservative legislators. Our approach first measures the relationship of phrase usage to DW-NOMINATE ideology among members of Congress. There are many more two word phrases than Congresspeople, however, and an ordinary least squares criterion is therefore useless. For each year, we run an Elastic Net (Zou and Hastie, 2005) regularized regression of DW-NOMINATE score of frequency of phrase usage where an observation is a Congressperson. Table 1 shows the most partisan phrases selected by the Elastic Net regression.

We use the estimated coefficients to predict the DW-NOMINATE score for each cable news channel in each year. We then apply a three period moving average smoothing filter. The results are shown in Figure 3. FNC is consistently more conservative than the other two channels. However, these differences are small compared to differences between Congresspeople during the early years. One contributing factor to the channels being clustered near the center is that some major news events are not as amenable to partisan slant as political news. For example, stories about the disappearance of high school student Natalee Holloway in Aruba receive cable news coverage, but are not obviously political. MSNBC closely tracks CNN initially, and then becomes consistently more liberal - though by much less than the gap between CNN and FNC - in the mid-2000's. The estimates reveal an increasing polarization of cable news over time. In Appendix C, we assess the robustness of our estimated channel ideologies to alternative statistical models, and to using a fixed set of phrases over the time period. We also construct a measure of slant that does not rely on phrase counts at all, using the share of time allocated to guests who are elected officials from each party. All of these variants display a similar pattern over time.

The text based measures produce estimated ideologies for the channels that are more moderate than the median members of each party. In the modeling to come, we allow for consumers to perceive these news channels as more or less ideologically differentiated, in proportion to these estimates. Indeed, our estimates for this scale factor put FNC very close to the median

[9]The broadcast transcripts do not include political advertisements aired on these channels. However, the amount of political advertising on cable news is small. In the 2004 presidential election, according to the Wisconsin Advertising Project, only 1,211 out of 812,091 thirty second spots (across 210 DMAs) aired on FNC. FNC airs a total of 245,280 thirty second ad spots per year, so political advertisements were a small fraction of these in 2004.

Republican member of Congress.[10]

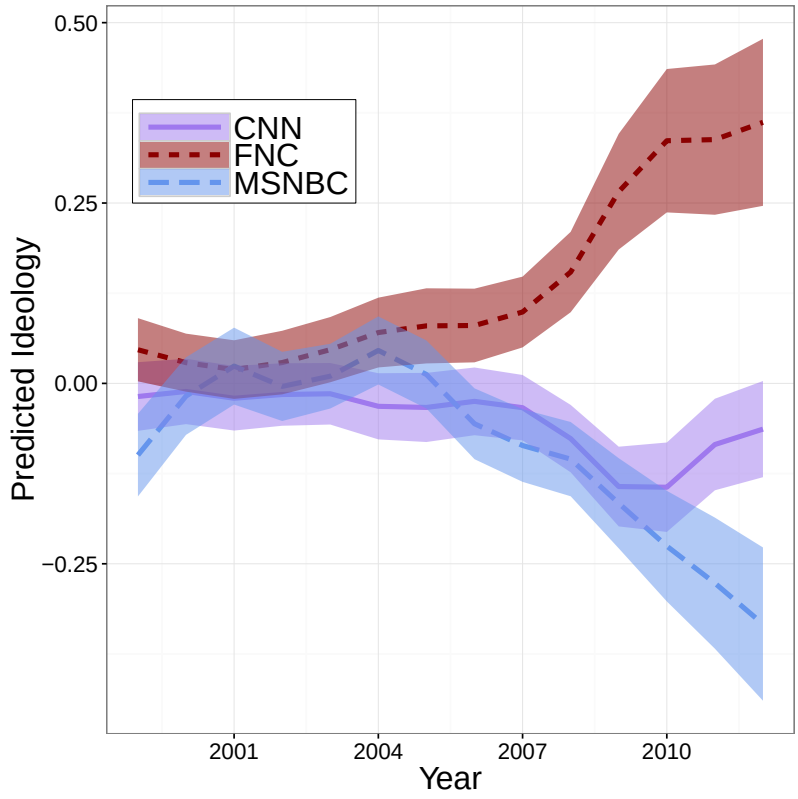


Figure 3: Estimated Ideology by Channel-Year: Each point corresponds to the estimated ideology of the news channels based on phrase usage as described in the text, with 95% confidence bounds shaded.

4 Regression Analysis

This section presents the relationship between cable channel positions, watching FNC, and voting for Republican presidential candidates. These results underlie the model estimation and simulation in later sections. However, the results here do not depend on that model, and can be read as a stand-alone two-sample instrumental variables regression analysis.

[10]In Appendix C, we explore using alternative prediction models such as the random forest, as well as running the prediction model on the pooled sample of Congress-years, rather than year-by-year. The general pattern of estimated slant by channel is similar in these cases.

2000	Party	2004	Party	2008	Party
republican leadership	D	mai 5	R	bush administr	D
clinton gore	R	ronald reagan	R	strong support	D
feder govern	R	social justic	D	african american	D
african american	D	war iraq	D	cost energi	R
civil right	D	african american	D	pass bill	D
gore administr	R	reagan said	R	will us	R
death tax	R	fail provid	D	new refineri	R
pass bill	R	illeg alien	R	civil right	D
support democrat	D	marriag licens	R	work famili	D
peopl color	D	limit govern	R	full time	D

Table 1: Top 10 Partisan Phrases for Years 2000, 2004, and 2008. These are the ten phrases which have the largest absolute magnitude coefficient among those selected by the Elastic Net for the corresponding year. Word variants are stemmed to their roots.

First Stage: Viewership and Channel Position The first stage describes how cable news viewers' time watched vary with channel position. The idea is that lower channel positions induce more viewership for channels such as FNC because the more popular channels tend to be in lower positions, for historical reasons.[11] Consider a viewer who just finished watching a television program, and begins to search for a new program. Their search will begin from the channel they were watching, which is likely to be in a low position. They are more likely to stop nearer to the original channel than further away.[12]

Table 2 presents first stage estimates of Nielsen-measured FNC viewership on the position of FNC. This set of viewership data spans all states and the years 2005 to 2008. The estimating equations for a news channel c take the form:

$$h_{zt}^{c} = \delta_{ct} + a_{zct} + \alpha_c x_{zt} + \zeta_{c,FNC} p_{zt}^{FNC} + \zeta_{c,MSNBC} p_{zt}^{MSNBC} + \epsilon_{zct}^{H} \quad (1)$$

where h_{zt}^{c} is the average minutes watched per week of all Nielsen households[13] in zip code z in year t; δ_{ct} are channel fixed effects, which are allowed to vary by year, state-year, or county-year depending on the specification; p_{zt}^{j} is the cable channel position of channel j in zip code z in year t; x_{zt} are average demographic characteristics of zip code z; and a_{zct} are dummy

[11] In addition to the broadcast networks ABC, CBS, Fox, and NBC, the lower channel positions are generally occupied by the earliest cable entrants (eg ESPN, MTV, TNT, and USA), which also have high viewership.

[12] Bias to the top of a list or default option in search is documented in eye tracking studies for yellow pages (Lohse (1997)) and survey response (Galesic et al. (2008)). There is a theoretical literature in economics modelling such behavior (see Rubinstein and Salant (2006), Horan (2010), Masatlioglu and Nakajima (2013), and the literature on status-quo bias more generally.)

[13] We use time among *all* households, and not only wired cable subscribers, even though the instrument can only affect cable subscribers. The reason for this is that the second stage dataset - vote totals - does not allow us to discriminate between cable and satellite subscribers. The first stage is substantially stronger when estimated on cable subscribers alone, which can be seen in table 6.

variables for cable availability of the cable news channels in zip code z in year t. We weight the observations by the number of Nielsen respondents in the zip code-year. This weighting improves efficiency as the variance of the left hand side ratings estimate is decreasing in the zip code-year sample size. In particular, a handful of zip codes have sample sizes of one and ratings measurements that are six or more standard deviations from the mean. The relative importance of these zip codes is reduced when weighting by sample size. In Table A19 in the appendix, we drop zip codes with fewer than ten Nielsen respondents, and find similar results as with weighting.

Table 2 reports specifications with year fixed effects, state-year fixed effects, and county-year fixed effects and different sets of conditioning variables. The primary covariate of interest in these regressions - FNC channel position - varies at the level of the cable system, which may span multiple zip codes. We therefore present cluster-robust standard errors in all specifications, using cable system as the cluster variable. Our preferred specification is column (3), which includes state-year fixed effects and an extensive set of demographic covariates that correlate with Republican voting and residential sorting, including measures of Republican voting and donations from 1996, effectively before FNC.

In Column (3), cable positions of both FNC and MSNBC significantly predict viewership of FNC, in the expected directions. A one standard deviation increase in FNC channel position predicts a decrease in average viewership of about two and one-half minutes per week. In Column (5), we use county-year fixed effects and the extensive demographic set. Here, the coefficient falls in magnitude by about 40%, however it remains significantly different from zero. The more limited variation induced by the instrument within a county-year is one limitation of this specifcation. The cluster-robust F statistic for the ordinal FNC position is 39.02 in the specification with state-year fixed effects and extensive demographics. The effect of cable access to FNC, as used in DellaVigna and Kaplan (2007), is a large and statistically precise predictor of FNC viewership. In particular, the availability of FNC is associated with increased viewership on average of 22 minutes (with state fixed effects) and 15 minutes (with county fixed effects) with associated test statistics exceeding 10 in some specifications.

Columns (4) and (6) of the table add the minutes per week of FNC viewership among *satellite* subscribers in the same zip code. To the extent that satellite and cable subscribers in the same zip code have similar tastes for the news channels, conditioning on satellite viewership controls for unobserved variation in taste for FNC which, if it were correlated with channel position, would bias the estimates of the position effects. Comparing columns (3) with (4) and (5) with (6) reveals that the position coefficients are essentially unchanged with the addition

of conditioning on same-zip code satellite minutes.

Table 2: First Stage Regressions: Nielsen Data

	FNC Minutes Per Week					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Position	−0.146	−0.075	−0.174	−0.167	−0.097	−0.111
	(0.043)	(0.039)	(0.028)	(0.025)	(0.033)	(0.030)
MSNBC Position	0.078	0.073	0.064	0.070	0.019	0.020
	(0.036)	(0.032)	(0.025)	(0.022)	(0.034)	(0.035)
Has MSNBC Only	1.904	1.137	−3.954	−2.804	−1.220	−1.562
	(3.697)	(3.713)	(4.255)	(3.416)	(6.180)	(5.397)
Has FNC Only	31.423	26.526	23.460	22.011	15.141	15.069
	(2.677)	(2.546)	(2.278)	(1.864)	(2.697)	(2.314)
Has Both	24.859	23.118	18.338	16.168	15.159	14.486
	(2.919)	(2.687)	(2.361)	(1.991)	(3.216)	(2.842)
Sat. FNC Minutes				0.197		0.173
				(0.013)		(0.015)
Fixed Effects:	Year	State-Year	State-Year	State-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Extended	Extended	Extended	Extended
Robust F-Stat	11.39	3.72	39.02	44.7	8.86	13.43
Number of Clusters	5789	5789	4830	4761	4839	4770
N	71,150	71,150	59,541	52,053	59,684	52,165
R^2	0.030	0.074	0.213	0.377	0.428	0.544

Notes: Cluster-robust standard errors in parentheses (clustered by cable system). Instrument is the ordinal position of FNC on the local system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. In Columns (4) and (6), the specification conditions on the average FNC ratings among satellite subscribers in the same zip code. Cable system controls include the total number of channels on the system and the number of broadcast channels on the system, as well as an indicator for Nielsen collection mode (diary vs. set-top). "Basic" demographics include the racial, gender, age, income, educational, and urban/rural makeup of the zip code. "Extended" demographics includes the Basic set plus information on the percentage of homeowners; median housing values, sizes, ages, and property tax rates; the fraction of the population receiving food stamps; median social security income; the fraction of veterans; the fractions of married, unmarried, and same-sex couples; the share of federal campaign contributions that went to Republican candidates in 1996; the Republican presidential share of the county in 1996; and the religious composition of the county. Observations are weighted by the number of survey individuals in the zipcode according to Nielsen.

First stage results with MSNBC viewership on the left-hand side of equation (1) are very similar, though the direction of coefficients on FNC and MSNBC positions are reversed. The power of channel positions for predicting MSNBC viewership is also similar. For brevity, we relegate these results to Appendix F, Table A20. Appendix E, Tables A12 and A21 document that the same first-stage relationships are also evident in the independently sampled individual-

level viewership dataset.

Second Stage: Voting and Viewership We begin in Table 3 with the reduced form for the zip level data. The regressions take the form:

$$y_z = \gamma_g + a_z + \beta x_z + \zeta_{FNC} p_z^{FNC} + \zeta_{MSNBC} p_z^{MSNBC} + \epsilon_z^R \quad (2)$$

Where y_z is Republican vote share in zip code z, γ_g are either state or county fixed effects, a_z are indicators for availability of the channels, β are coefficients on zip code demographics and cable system characteristics x_z, and p_z^C are the ordinal cable channel positions of channel C in zip code z.

FNC position is significantly negatively correlated with zip code 2008 Republican vote share in all specifications which include demographic covariates, although the relationship is significant only at the 90% level in the specification with both county-year fixed effects and the extensive demographics.[14]

The MSNBC position coefficient in the reduced form tables is generally positive but, unsurprisingly given MSNBC's substantially lower viewership, statistically indistinguishable from zero and less robust across specifications compared to the FNC reduced form. In addition, the ideological estimates in Figure 3 put MSNBC, even in 2008, at a relatively centrist position compared to FNC. Prior to 2006, MSNBC is generally to the right of CNN.

Next, we present zip code-level second stage regression results in Table 4. The regressions take the form:

$$y_z = \gamma_g + a_z + \beta x_z + \zeta_{MSNBC} p_z^{MSNBC} + \rho_f h_z^f + \epsilon_z^V \quad (3)$$

Where y_z is Republican vote share in zip code z, γ_g are either state or county fixed effects, a_z are indicators for availability of the channels, and β are coefficients on zip code demographics and cable system characteristics x_z. We are interested in the coefficient ρ_f on the zip code's predicted average hours watched per week of FNC, h_z^f, produced by the first stage from Table 2.

We compute standard errors by a bootstrap, as deemed appropriate in two-sample IV settings by Inoue and Solon (2010). We use a cluster-robust block bootstrap at the level of

[14] We report the reduced form for 2004 and 2012 in Appendix F, Tables A16 and A17. While the results are similar to 2008, the samples for 2004 and 2012 are smaller because of data availability issues.

Table 3: Reduced Form Regressions: Zip Code Voting Data

	2008 McCain Vote Percentage			
	(1)	(2)	(3)	(4)
FNC Cable Position	−0.011	0.004	−0.027	−0.015
	(0.023)	(0.020)	(0.008)	(0.008)
MSNBC Cable Position	0.054	0.041	0.008	0.003
	(0.019)	(0.016)	(0.005)	(0.006)
Has MSNBC Only	−2.118	−0.465	0.749	1.374
	(1.585)	(1.306)	(1.002)	(1.219)
Has FNC Only	7.557	5.500	2.262	1.061
	(1.175)	(0.975)	(0.547)	(0.504)
Has Both	4.223	4.351	1.358	0.814
	(1.521)	(1.269)	(0.661)	(0.609)
Fixed Effects:	None	State	State	County
Cable System Controls:	Y	Y	Y	Y
Demographics:	None	None	Extended	Extended
Number of Clusters	6035	6035	4814	4814
N	22,584	22,584	17,400	17,400
R^2	0.148	0.294	0.833	0.907

Cluster-robust standard errors in parentheses (clustered by cable system). See first stage tables for description of control variables.

cable systems to allow for correlation across zip codes and over time within cable systems.[15] Our estimates imply that being induced to watch an additional hour per week of FNC by the channel position instrument would lead to an approximately 7.2 point increase in the probability of voting Republican in presidential elections for those induced into watching by the instrument. However, the magnitude of the variation induced by the instrument is typically much less than one hour: a one standard deviation increase in channel position induces a roughly 2.5-minute-per-week increase in FNC viewing. The implied change in probability of voting for the Republican candidate from a one standard deviation increase in FNC channel position is thus -0.3 points. With county fixed effects, the precision of the estimates goes down as the confidence intervals widen; however, the point estimates are of a similar magnitude as when using state fixed effects. Appendix E, Table A13 reports the second-stage results for the individual-level data, which are also very comparable in magnitude though somewhat less precise than the zip-level version.

Within Table 4, the second-stage coefficient is essentially unaffected by the inclusion of the

[15] We resample with replacement from the set of cable systems in the data, with independent resamples drawn for the viewership and the voting data.

Table 4: Second Stage Regressions: Zip Code Voting Data

	2008 McCain Vote Percentage			
	(1)	(2)	(3)	(4)
Pred. FNC Mins.	0.152	0.120	0.157	0.098
	(0.056, 0.277)	(0.005, 0.248)	(−0.126, 0.938)	(−0.121, 0.429)
Satellite FNC Mins.		−0.021		−0.015
		(−0.047, 0.001)		(−0.073, 0.022)
Fixed Effects:	State	State	County	County
Cable System Controls:	Y	Y	Y	Y
Demographics:	Extended	Extended	Extended	Extended
Number of Clusters	4814	3993	4729	4001
N	17,400	12,417	17,283	12,443
R^2	0.833	0.841	0.907	0.919

The first stage is estimated using viewership data for all Nielsen TV households. See first stage tables for description of instruments and control variables. Observations in the first stage are weighted by the number of survey individuals in the zipcode according to Nielsen. Confidence intervals are generated from 1000 independent STID-block-bootstraps of the first and second stage datasets. Reported lower and upper bounds give the central 95 percent interval of the relevant bootstrapped statistic.

extensive demographic set. It declines slightly, but remains positive and significantly different from zero, when FNC hours among satellite subscribers in the same zip code are included as a covariate. Both of these facts lend some credence to the idea that channel position is not simply picking up local variation in unobserved political tastes.[16][17]

The OLS coefficient on FNC hours, shown in Table A18 of Appendix F is significant and positive, as expected, but it is much smaller in magnitude than the corresponding IV coefficients. This is due to at least two factors: first, the zip code level viewership levels are estimates based on samples leading to attenuated OLS coefficients. Second, as the behavioral model makes clear, we are estimating a single coefficient in a world of heterogeneous treatment effects. The IV coefficient measures the local average treatment effect on zip codes whose viewership levels are affected by channel position. The OLS estimate averages across all zip codes in the sample, weighting most heavily those with unusually high or low Republican vote share. It is reasonable to suspect that the complier zip codes are more centrist relative to the outlier zip codes, and thus subject to larger persuasion effects: those whose choice among ideological news channels is most susceptible to influence by channel position are also likely to be those whose pre-existing ideological attachments are relatively weak.

[16] In the specification with satellite hours, the coefficient on satellite hours is negative, a result that may seem counter-intuitive. The reason for this is that predicted hours are predicted *total* hours, across both cable and satellite subscribers. The negative coefficient on satellite hours implies that, *holding total FNC hours watched constant*, the effect on vote shares is smaller, the more of those hours that come from satellite.

[17] In Tables A28, A29, and A30 in the appendix, we report results that split the sample up by year, and separately interact the demographics with dummy variables for year.

In Appendix F, we include an analogous specification to Table 4 where MSNBC viewership is the endogenous variable, as well as a dual-instrument version where FNC and MSNBC viewership are both instrumented by FNC and MSNBC positions. The point estimate of the second-stage MSNBC hours coefficient is negative, though smaller in magnitude than the analogous FNC coefficient, in the single-instrument specification. However, the confidence intervals do not allow us to reject a zero effect of MSNBC in the analogue to our preferred FNC specification. We conclude that while there is some suggestive evidence of a MSNBC persuasive effect, it is weaker and less robust than the evidence for FNC. Accordingly, we fit the behavioral model in section 5 using only the information from the single-instrument second stage results for FNC.

Instrument Validity Support In this section, we provide evidence on the quasi-experimental nature of the channel position. We ask: (1) In zip codes whose demographics predict that the Republican vote share should be high, is FNC systematically in lower channel positions? (2) In zip codes whose demographics predict that the viewership of FNC should be high, is FNC systematically in lower channel positions? (3) Is FNC in lower positions in zip codes which had higher measures of Republican-ness in 1996, before FNC? (4) Does the FNC position in the cable lineup predict viewership for satellite subscribers in the same zip code, who do not interface with the cable lineup? The answers to questions (1)-(4) are all negative. In Appendix G.4, we show additionally that FNC viewership does not correlate with FNC channel positions on nearby systems, nor future FNC channel positions on the same system. Furthermore, the 2008 McCain vote share does not correlate with FNC channel position on nearby systems.

Table 5: FNC cable position coefficients on predicted viewing / voting, and 1996 Republican voting and contributions.

	Predicted Viewing		Predicted Voting		1996 Contributions		1996 Vote
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FNC Position	0.100	0.033	0.027	−0.0004	0.0002	0.001	−0.006
	(0.034)	(0.026)	(0.022)	(0.017)	(0.0002)	(0.0003)	(0.012)
Fixed Effects:	State-Year	County-State-Year	State-Year	County-State-Year	State-Year	County-State-Year	State-Year
Demographics:	Extended	Extended	Extended	Extended	Extended	Extended	Extended
Number of Clusters	4830	4839	4814	4827	4830	4839	4830
N	59,551	59,694	17,400	17,451	59,551	59,694	59,551
R^2	0.380	0.827	0.339	0.729	0.176	0.436	0.571

Cluster-robust standard errors in parentheses (clustered by cable system). Columns 1-4 regress predicted hours of FNC and predicted Republican vote share, respectively, on FNC cable position. The predicting regressions exclude FNC position but include the indicated set of demographic controls. Columns 5-7 regress indicators of pre-treatment political attitudes (1996 county-level Republican presidential vote share and 1996 zipcode-level Republican campaign contribution share) on FNC cable position. 1996 vote data is defined at the county level, and thus there is no specification with county-state-year fixed effects for this dependent variable.

The first two columns of Table 5 show the relationship of FNC cable position with *observable* variation in local taste for FNC. The left hand side here is predicted minutes watched of

FNC per week, using only demographic information as covariates; predicted minutes per week are then regressed on FNC cable position. The relationship is positive and significant. For assessing the identifying assumption, positive estimates are re-assuring as they indicate that FNC positions are *higher* in locations with observable demographics which would predict more FNC viewing.

The next two columns of Table 5 regress the predicted voting outcome from a regression of vote preference that excludes position, on the FNC cable position. This predictable component of variation in political preference has a correlation with FNC position that is again positive, though not always significantly different from zero. I.e., FNC's position in cable territories that are expected to be more Republican given observables is, if anything, slightly worse than average. Similarly, we show in Table A34 of Appendix G that the coefficients on FNC position in both the first stage viewership regression and the reduced form do not change substantially as we add or remove subsets of variables that are highly predictive of both voting Republican and watching FNC. These results together say that areas which are predicted, based on demographics, to be highly Republican or to have high FNC viewership do not have lower FNC channel positions.

Columns (5) through (7) check whether FNC position is correlated with political variables that predate FNC's arrival: the share of federal campaign contributions from the zip code that went to Republican candidates in 1996, and the (county-level) Republican presidential vote share in 1996. The idea is to test the conjecture that cable position proxies for pre-treatment variation in political tastes. Again, the majority of the correlations are positive (the opposite direction from the reduced form), and none differs significantly from zero.

We next introduce a placebo test using satellite viewership in the same zip code. Satellite subscribers in the same zip code provide a useful placebo group because they do not interface with the local cable lineup; they see a different lineup which is set by the satellite provider at the national level, yet they look similar on observable demographic dimensions.[18] To carry out the satellite placebo test in the zip code level data, we create a data set which has two observations for each zip code and year: the mean viewership amongst cable subscribers and the mean viewership amongst satellite subscribers. We then run the first stage regression, but interacting the channel positions on their local cable system with an indicator for whether the observation represents viewership for cable or for satellite. If the channel positions on the local cable system are chosen in response to unobservable local characteristics, then these positions

[18]Table A33 in the appendix regresses satellite demographics on cable demographics at the zip code level to show that satellite subscribers and cable subscribers demographics are highly correlated.

should also predict satellite subscribers' viewership.

Table 6 presents the results of the satellite placebo test. The Chow test p-value tests for equality between the FNC cable position coefficients. In all columns, we cannot reject that the FNC cable position interacted with satellite subscription is zero, while we reject zero strongly for FNC position interacted with cable subscription. Furthermore, we can always reject the hypothesis that these two coefficients are equal to each other.

Table 6: First Stage Regressions: Nielsen Data, Satellite and Cable Subscribers

	FNC Minutes Per Week			
	(1)	(2)	(3)	(4)
FNC Position × cable	−0.155	−0.264	−0.151	−0.219
	(0.043)	(0.035)	(0.048)	(0.051)
FNC Position × sat	0.031	−0.050	0.037	0.045
	(0.049)	(0.041)	(0.063)	(0.067)
MSNBC Position × cable	0.102	0.092	0.035	0.046
	(0.036)	(0.032)	(0.049)	(0.048)
MSNBC Position × sat	−0.004	−0.029	−0.029	−0.033
	(0.040)	(0.033)	(0.072)	(0.074)
Fixed Effects:	State-Year	State-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y
Demographics:	None	Extensive	None	Extensive
Chow Test p-value	0	0	0.011	0.001
Number of Clusters	5786	4830	5786	4830
N	127,072	107,829	127,072	107,829
R^2	0.032	0.077	0.232	0.278

Cluster-robust standard errors in parentheses (clustered by cable system). Positions are the ordinal position of FNC/MSNBC on the local cable system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. Cable system controls include the total number of channels on the system and the number of broadcast channels on the system. All controls (including fixed effects) are interacted with a dummy for the observation corresponding to satellite viewership. Observations are weighted by the number of survey individuals in the zipcode according to Nielsen.

5 Model

We now specify a behavioral model of viewership and voting. The purpose of the model is two-fold: first, we can run counterfactual predictions, such as predicting the effect of removing FNC or quantifying the role of cable news in polarization. Second, the model helps to interpret

the meaning of the IV results. Specifically, the heterogeneity in the model draws attention to the role of the IV as measuring local average treatment effects among agents who are heterogeneous in both their ideological malleability and in their viewership responsiveness to channel position. These benefits come at the cost of functional form assumptions on exactly how consumers allocate their time watching cable news and how they change their ideology after watching slanted news.

The model has two stages. In the first stage, consumer-voters choose a television package, and how much time to spend watching the cable news channels. In the second stage, consumer-voters vote in the Presidential election. Between the first and second stage, consumer-voters' ideologies evolve as a function of the ideologies of and time spent watching the news channels.

Voter Ideology and Presidential Vote Decision Consumer-voters have a latent unidimensional political ideology which determines their vote choice in presidential elections. We denote the left-right ideology of consumer-voter i in year t by r_{it}.

We specify voters' initial ideologies as a function of their county of residence and demographic attributes. Specifically, we estimate a logit model of vote choice with county dummies as explanatory variables, which matches county level vote shares from 1996. The county-level intercepts from this model then determine the simulated consumers' initial ideologies, along with demographic effects and an iid logit error term:

$$r_{ij0} = \delta_j + \beta_V' d_i + \epsilon_{ij} \tag{4}$$

Where δ_j is the estimated county intercept for county j, consumer i's county of residence, d_i is a vector of demographic characteristics associated with consumer i, and β_V is a parameter vector to be estimated. From this starting point, the consumer's ideology evolves in response to both random shocks and the influence of the news channels he watches, according to a process described in detail later in this section.

At election time, each voter votes for the party whose candidate's announced position is closest to her own. Each presidential election has a cutpoint parameter P_t, for $t \in \{2000, 2004, 2008\}$. All voters to the left of the cutpoint (with $r_{it} < P_t$) vote for the Democratic candidate, and those to the right vote for the Republican. We do not model the turnout decision.[19]

[19]In Table A31 of the Appendix, we are not able to pin down a precise effect of cable news on turnout.

Viewership and Subscription The viewership time allocation and subscription portion of the model follows Crawford and Yurukoglu (2012). Given access to the news channels C_{jt} in package j in year t, consumer-voter i allocates their time amongst watching those channels and other activities to maximize:

$$v_{ij} = \sum_{c \in C_{jt}} \gamma_{ict} \log(1 + T_{ijc}) \tag{5}$$

where γ_{ict} is consumer-voter i's preference parameter for news channel c in year t, subject to a budget constraint that the total time available to allocate is 168 hours per week. We normalize the outside option (doing anything other than watching cable news) such that $\gamma_{i0t} = 1$ for all i, t, and parameterize the remaining vector of γ_{ict} as

$$\begin{aligned} \gamma_{it} &= \chi_{it} \circ \nu_{it} \\ \chi_{ict} &\sim \mathsf{Bernoulli}(\alpha_{0ct} + \Pi_{0c} d_i + \zeta_0 pos_{ict} - \eta((a + b r_{ct}) - r_{it})^2) \qquad (6) \\ \nu_{ict} &\sim \mathsf{Exp}(\alpha_{ct} + \Pi_c d_i + \zeta pos_{ict}) \qquad (7) \end{aligned}$$

χ_{ict} determines whether consumer-voter i has a non-zero preference for channel c. It is a random function of demographics d_i according to parameters Π_0, a channel-year specific fixed effect α_{0ct}, the position of the channel in the lineup according to ζ_0, and the distance of consumer-voter i's one dimensional political ideology r_{it} from the channel's text based estimated ideology r_{ct} according to η. This last term represents taste for like-minded news as in Mullainathan and Shleifer (2005) and Gentzkow and Shapiro (2010). The parameters a and b scale the text based ideology measures to allow for consumers to perceive slant as a linear function of the text based slant measure. If η is positive, then increasing the ideological distance between consumer-voter i and channel c reduces the probability i watches c.

If the consumer-voter has a non-zero preference for a channel, the intensity of her preference is drawn from an exponential distribution whose parameter depends on α_{ct}, a channel-year specific fixed effect, demographics d_i according to parameters Π, and the channel position according to ζ. The exponential mixed with a mass at zero is inspired by the individual viewership data, which features a mass at zero and monotonically decreasing density.

The constrained maximization problem defined by (5) has an analytic solution described in Appendix H. The indirect utility from solving this problem enters into the consumer-voter's decision of whether to subscribe to cable, satellite, or no television package at all. The

conditional indirect utility from subscribing to package j is

$$u_{ij} = v^*_{ij} + \tilde{\delta}_j + \tilde{\epsilon}_{ij}$$

where $\tilde{\delta}_j$ is the mean utility of package j, $\tilde{\epsilon}_{ij}$ is an idiosyncratic logit error term and j corresponds to cable or satellite. We also allow consumers to subscribe to no package at all which yields corresponding $u_{i0} = \log(1 + B) + \tilde{\epsilon}_{i0}$.

Ideological Influence After watching cable news, consumer-voter i's one-dimensional political ideology evolves as a function of how much time i spends watching the news channels and the ideology of the news channels.[20] We assume that i is attracted towards the ideologies of the news channels she watches, the more so the more time i spends watching. Specifically

$$r_{it} = \frac{r_{i,t-1} + \rho \sum_c T_{ic,t-1}(a + br_{c,t-1})}{1 + \rho \sum_c T_{ic,t-1}} + \xi_{it} \tag{8}$$

where $r_{i,t-1}$ is i's ideology in the previous year, r_{it} is i's new ideology, and ρ is a parameter to be estimated which controls the magnitude of news channels' influence on viewers' ideology. The ξ_{it}'s are mean-zero, normally distributed random shocks.[21] This formulation implies that in the absence of watching cable news, viewers' ideologies evolve according to a random walk with zero drift.

One interpretation of ρ is as a (per-hour) rate at which viewers receive ideological signals while watching cable news. If voters treat signals from slanted outlets as true draws on the state of the world, and further, if they do not account for the correlation between repeated signals from the same source as in the model of DeMarzo et al. (2003),[22] then equation (8) arises as the inverse-variance-weighted average of signals observed by viewer i in period t.[23]

The functional form here implies that a consumer-voter's attraction is governed by the

[20] The channel's ideology measure is the same function of the text based slant measure that enters the viewership decision problem.

[21] We calibrate the variance of the ideology shocks to match the yearly rate of party switching found in the American National Election Study's (ANES) 2008-2009 Panel Study. This study tracked and repeatedly interviewed the same group of respondents over the course of a presidential campaign, allowing an estimate of the within-individual propensity to change support from the Republican to the Democratic presidential candidate over time. Specifically, we calibrated the standard deviation to 0.4654. This magnitude implies that, when such a shock is added to a standard logistic distribution, the mass which changes sign matches the observed fraction of party switchers in ANES.

[22] Gentzkow and Shapiro (2006) explore media consumption and endogenous slant with fully Bayesian consumers.

[23] For this interpretation to hold over a series of periods, we require that at the beginning of each period the consumer gets an ideology shock which returns the variance of his ideology to 1.

same parameter (ρ), whether coming from the left or the right. This rules out that a voter might watch a slanted channel, become disgusted, and move in the opposite direction of the channel as in Arceneaux et al. (2012). Furthermore, consumer-voters are naive about the influence effect when choosing viewing time.

6 Estimation and Results

We estimate the parameters of the model by indirect inference (Smith (1990); Gourieroux et al. (1993)). This implies choosing the model's parameters to generate predictions for an auxiliary model which match the auxiliary model estimated from the data. In essence, we are choosing model parameters so that they generate regression results as close as possible to those in Section 4. The auxiliary model consists of thirteen linear regressions that fall into four categories, plus a set of unconditional moments: (1) regressions of individual-level and zipcode-level viewership of each cable news channel on demographics and channel positions, (six regressions), (2) a linear probability model of watching any positive amount of each cable news channel at the individual level on demographics and channel positions (three regressions), (3) regressions of individual level intent to vote Republican and zipcode level Republican vote share on demographics and predicted time spent watching FNC from (1) (two regressions), and (4) OLS regressions of intent to vote Republican and zipcode level Republican vote share on hours of FNC, MSNBC, or CNN watched (two regressions).[24] (1) and (3) correspond to the two-stage least squares estimate of the effects of watching FNC on voting Republican, with the addition of analogous first-stage regressions for the other two channels. We introduce (2) to identify the Bernoulli and exponential components of our utility specification. (4) corresponds to the OLS regression of intent to vote Republican on viewership presented in Table A18. All regressions include state-year fixed effects. Finally, we also match (5) the actual vote shares in each presidential election, the year by year average hours watched for each channel, and the year by year fraction of non-zero viewership for each channel. We choose the model's parameters so that estimating (1)-(5) on data simulated from the model produce coefficient estimates with minimum distance to those in the data. We weight the distance metric in proportion to the inverse of the variance in the estimated relationships in the real data.

[24]The individual-level OLS regression uses, rather than hours watched, an indicator for whether FNC, MSNBC, or CNN is an individual's "most-watched" news source as the right-hand-side variable. The reason for this substitution is, as described in Section 3, that we lack an individual-level data set with information on both hours watched and voting preferences. The NAES survey asked respondents only to list which of the news channels, if any, they watched the most.

Discussion of Variation in Data and Model Parameters Here we provide an intuitive description of what in the data helps drive estimates of the model's parameters. ρ, the parameter which determines the degree of influence, is sensitive to the coefficients on projected time in the second stage regression. η, the parameter governing the degree of tastes for like-minded news, is sensitive to coefficients in OLS regression relative to the coefficients on viewership in the second stage regressions. The OLS coefficient estimates on FNC viewership conflates tastes for like-minded news with any influence effect. We isolate the influence effect by using channel positions as instrumental variables, and choose the level of tastes for like minded news to explain the OLS coefficient conditional on the influence effect.

Increasing ζ, the parameters determining the strength of channel positions in the time allocation problem, increases the first stage coefficients on channel positions. A similar straightforward relationship applies to the demographic factors influencing time watched and the coefficients on demographics in the first stage regressions.

P_t, the parameters characterizing the three presidential elections in our sample period, are related to the unconditional aggregate vote share moments. These parameters allow the model to capture national trends in party preference. β_V are sensitive to the OLS and second stage IV coefficients on demographics. They allow consumers with different demographics to have different mean preferences over party.

Separation of a and b, from ρ and η is possible because there are three channels and thus seven moments to work with- the IV coefficient and three from each of the OLS regressions. The asymmetries in the channels' estimated effects relative to their text-based ideological positioning provide variation to distinguish the scaling parameters from ρ and η. The FNC OLS coefficient is more positive than the MSNBC coefficient is negative. Increasing η intensifies the magnitude of both OLS coefficients in similar proportions. Increasing b at a fixed η increases the magnitude of the FNC coefficient at a faster rate than the MSNBC coefficient, because the text-based FNC ideology is more conservative than the text-based MSNBC ideology is liberal.

Model Estimates Table 7 shows the main parameter estimates from the model.[25] We estimate positive values for both ρ, the influence parameter, and η, the taste for like-minded news, implying a positive feedback process where voters watch slanted news, are influenced to move closer to the news' channel's ideology, and subsequently have even stronger preference for that channel, due to the decreased ideological distance.

[25]The full set of parameters additionally contains channel-year fixed effects and demographic terms, separately for the amount watched and the probability of watching any. These are omitted here for brevity. The estimated model's

Parameter	Estimate	Bootstrapped Standard Error
Slant Preference (η)	0.02473	0.0064
Ideological Influence (ρ)	0.05244	0.0147
Position Effect - Ratings	-0.00020	0.00008
Position Effect - Viewership	-0.00039	0.00094
2000 R/D Threshold	-0.31354	0.0368
2004 R/D Threshold	0.06380	0.1421
2008 R/D Threshold	0.12089	0.0398
Channel Ideology Intercept (a)	0.32259	0.0311
Channel Ideology Slope (b)	17.27089	0.0132

Table 7: Key parameter estimates with standard errors clustered by cable system and computed by block bootstrap.

The magnitude of the estimate of the taste for like minded news parameter η implies that an ideological distance of one unit between viewer and channel reduces that viewer's probability of watching by about 2.5%. For reference, at our estimated scaling parameters, the ideological distance between FNC and MSNBC in 2008 is 4.3 units. Given the quadratic-loss specification of ideological tastes, this distance implies that an average demographic voter located at the ideological position of FNC in 2008 is about 45% more likely to watch FNC than she is to watch MSNBC.

The magnitude of ρ implies that a voter watching an hour per week of a news channel for a year would be influenced to a new ideological position just over 5% of the distance to the channel's ideology. Estimates of the channel position parameters, consistent with the data, imply that increasing channel position decreases both the probability of watching any of a channel, as well as the number of hours watched conditional on watching any. The effect on the probability of watching any - row 4 in the table - implies increasing channel position by 20 positions decreases the probability of a typical voter watching a channel by about 1%. The channel position effect on the number of hours watched is harder to interpret directly, as the hours-watched model is nonlinear and hence effects of changing these quantities depend on the values of all the other covariates.

Table 8 shows the relationship of viewer preference for channels to demographics. For each demographic attribute included in the viewership model, Table 8 shows the variation in simulated average hours watched of each of the three cable channels as the indicated demographic varies.[26] Some attributes move viewership in the same direction for all channels: older viewers,

fit on regression coefficients is available in Appendix I.

[26]The figures in the table are conditional means of viewership among all simulated voters with the indicated

Demographic		CNN	FNC	MSN
Age	Under 35	54.8	46.2	21.2
	35-45	55.3	47.2	21.5
	45-65	76.1	62.4	29.4
	Over 65	106.5	94.2	38.8
Income	Under 25K	69.0	73.5	28.0
	25-45K	75.7	81.1	38.1
	45-85K	81.4	81.2	37.5
	Over 85K	85.9	29.8	14.3
Race	White	77.3	71.4	30.5
	Black	82.6	41.8	28.2
	Hispanic	62.3	36.7	17.2
	Other	84.5	45.0	22.4
Gender	Female	74.2	62.4	26.6
	Male	81.9	70.5	32.4
Education	College Grad	83.2	56.8	31.9
	Non-College Grad	76.5	69.3	28.8

Table 8: Mean simulated viewership (in minutes per week) of CNN, FNC and MSNBC by demographic group.

for instance, watch more of all three cable channels. Other attributes have differential effects: college education increases viewership of MSNBC but decreases it for FNC.

In both our raw data and in the simulations, cable news programs are consumed by agents who do not necessarily share the same ideology as the channel. This result is consistent with the analysis in Gentzkow and Shapiro (2011) who find that much of FNC's audience is composed of people who do not self-identify as conservative, and related, that self-identified conservatives watch other cable news besides FNC. The model estimates match these facts. Furthermore, such a lack of ideological segregation is a necessary precursor in this model for cable news consumption to change voter intentions.

This incomplete segregation can be seen in Figures 4(a) and 4(c), which show the partisan composition of the audiences of FNC and MSNBC in our simulated data. FNC's audience is almost always the most heavily Republican, but both audiences are quite comparable in partisan composition until 2004, when they begin to diverge. By 2008, FNC's audience is about three-quarters Republican; MSNBC's is about 60% Democrat. For comparison purposes, Figures 4(b) and 4(d) show the partisan composition of the channels' audiences according to the

demographic attribute.

biennial Pew Media Census.[27] For each channel, we plot the fraction who identify themselves as Democrats or Republicans among respondents who say they "Regularly" or "Sometimes" watch the channel. Though the divergence happens slightly earlier for MSNBC and slightly later for FNC, the same temporal pattern is evident: prior to 2004 the audiences of the two channels are very similar, when a partisan skew in audience composition (towards Republicans for FNC, and Democrats for MSNBC) begins to appear.[28]

We find that the perception of slant for the channels is a multiple of about 17 times the text based slant measure. The text based slant measures place FNC and MSNBC in 2008 closer to the center than the median Republican or median Democratic congressman, respectively. The scaled ideology estimates place FNC to the right of the median Republican voter in 2008. MSNBC's position falls to the left of the median Democratic voter in 2008, although only slightly.

Table 9 shows the change in the probability of voting Republican with respect to watching an additional 3 minutes per week of each of the cable channels, again for viewers with different initial ideological types. For initially centrist voters, watching CNN has an influence on the probability of voting Republican that ranges from slightly positive to slightly negative depending on the election. The effect of MSNBC is small but positive (meaning watching MSNBC increases the likelihood of Republican voting) in 2000 and 2004, but becomes negative (at 0.57 percentage points) in 2008 after MSNBC's format switch. The effect of Fox News on centrist viewers is consistently positive, ranging from 0.42 points in 2000 to 1.0 points in 2008.

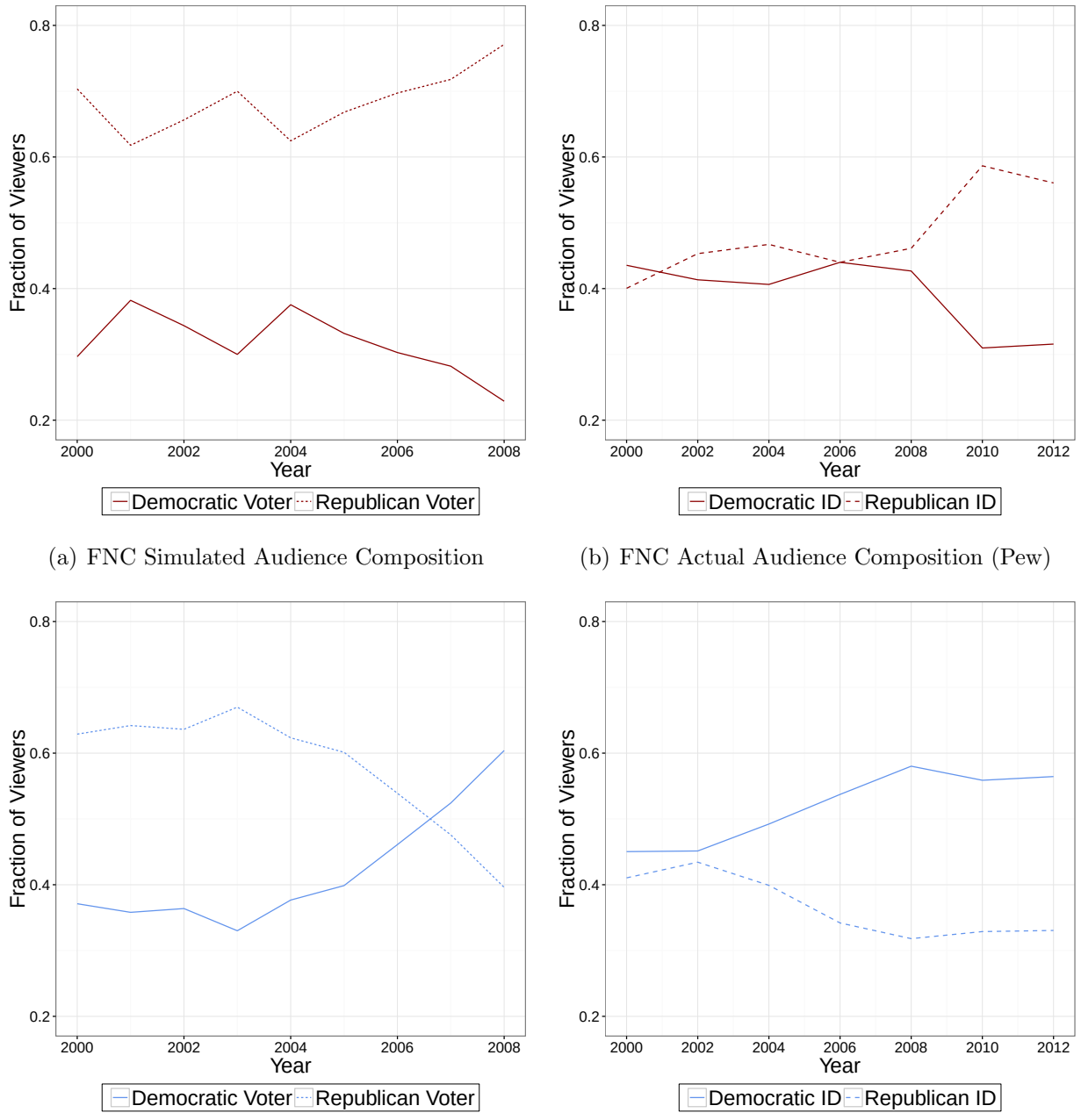
The largest elasticity magnitudes are on individuals from the opposite ideology of the channel. Were a viewer initially at the ideology of the median Democratic voter in 2008 to watch an additional 3 minutes of Fox News per week, her likelihood of voting Republican would increase by 1.03 percentage points. Another pattern that emerges from the table is that Fox is substantially better at influencing Democrats than MSNBC is at influencing Republicans. This last feature is consistent with the regression result that the IV effect of Fox is greater and more consistent than the corresponding effect for MSNBC.

Finally, we computed estimates of DellaVigna and Kaplan (2007)'s concept of *persuasion rates*: the success rate of the channels at converting votes from one party to the other.[29] The

[27]The Pew data are not used in fitting the model.

[28]Note that the levels of the two graphs do not line up because Pew asks not about vote choice but about party identification, which has three possible values: Democrat, Republican or Independent. Until 2006, Pew also asked respondents about their votes in the previous presidential election. In those years for which we have data, the fraction of Bush voters on both channels is substantially higher than the fraction of Republican party identifiers, and similar to the level of Bush voters in the simulation.

[29]DellaVigna and Kaplan (2007) use a measure of FNC cable availability in 2000 to generate variation in self-



(a) FNC Simulated Audience Composition

(b) FNC Actual Audience Composition (Pew)

(c) MSNBC Simulated Audience Composition

(d) MSNBC Actual Audience Composition (Pew)

Figure 4: The left panels show the partisan composition of the audience of FNC and MSNBC over time in our simulation. Solid (dashed) lines are the fraction of Democratic (Republican) presidential voters among simulated viewers who watch at least half an hour per week of the indicated channel. The right panels show data from the biennial Pew Media Census (not used in fitting the model) for comparison. We plot the fraction of surveyed viewers of each channel who identify with the Democratic or Republican parties in solid and dashed lines respectively. The fractions do not add to one because Pew also allowed viewers to state their affiliation as "Independent," an option chosen by 10-15% of respondents - a fraction which declines over time but in any given year is similar for all three channels. Note that the simulation models only binary presidential vote choices, not party identification.

Election	Voter Ideology	CNN	FNC	MSNBC
2000	Centrist	0.150	0.421	0.089
		(0.028)	(0.083)	(0.018)
	Median Republican	-0.202	-0.016	-0.244
		(0.046)	(0.010)	(0.055)
	Median Democrat	0.399	0.609	0.352
		(0.079)	(0.123)	(0.070)
2004	Centrist	-0.068	0.528	0.348
		(0.049)	(0.104)	(0.071)
	Median Republican	-0.347	0.086	-0.044
		(0.086)	(0.022)	(0.027)
	Median Democrat	0.243	0.687	0.552
		(0.049)	(0.136)	(0.109)
2008	Centrist	-0.405	1.000	-0.569
		(0.085)	(0.207)	(0.119)
	Median Republican	-0.595	0.449	-0.719
		(0.125)	(0.092)	(0.150)
	Median Democrat	0.009	1.027	-0.108
		(0.004)	(0.215)	(0.024)

Table 9: Effects of watching an additional 3 minutes per week of each channel on the probability of voting Republican, in percentage point terms. Standard errors, in parentheses, are computed by taking 1000 draws from the asymptotic distribution of the parameters and recomputing the persuasion effects for each draw. We report the standard deviation of the resulting distribution of statistics.

numerator in the persuasion rate here is the number of, for example, FNC viewers who are initially Democrats but by the end of an election cycle change to supporting the Republican party. The denominator is the number of FNC viewers who are initially Democrats. We find a persuasion rate of 58% in 2000, 27% in 2004, and 28% in 2008 for FNC. FNC is consistently more effective at converting viewers than is MSNBC which has corresponding estimated persuasion rates of just 16%, 0%, and 8%.

7 Polarization, Media Effects, and Media Power

In this section, we perform several exercises to quantify the effects of cable news on election outcomes. First, we simulate the evolution of ideology for a group of voters over time to ask whether cable news can contribute to polarization. Second, we estimate the effect of the entry of FNC on the 2000, 2004, and 2008 presidential elections, as well as the effects of the post-2004 MSNBC format switch on the 2008 presidential election. Finally, we measure the "media power" (Prat, 2014) of the individual channels as well as a hypothetical combination of the three under unified ownership.

We find that cable news can account for all of the increase in polarization as measured in the data as a statistic of the distribution of an index of policy views from the General Social Survey. We find that the estimated effect of removing FNC on Republican vote share increased in magnitude from -0.46 points in 2000 to an estimated -3.59 points in 2004, and -6.34 points in 2008 as a result of increased viewership. Finally, we find that Fox News' viewership maximizing slant is more centrist than its observed slant, while its media power maximizing slant is close to its observed slant.

Polarization A positive ρ and a positive η together create the potential for a polarizing feedback loop, as watching a channel attracts a viewer towards that channel's ideology, which makes watching the channel more attractive, and so on. Figure 5 shows the results of a simulation of viewing and voting behavior to assess the degree of polarization that cable news viewing can generate.

A sample of 10,000 viewers in an average cable system[30] in a county with average demo-

reported viewership. In their case, the viewership measure is an indicator for whether the respondent reports watching thirty minutes or more in a given week. Here, we use a continuous measure, condition on demographics, and account for satellite viewership.

[30]For purposes of this simulation, all viewers are given access to all three cable channels, at the channels' mean positions in 2008. We hold channel positioning, channel fixed-effects, and each channel's ideological slant constant

graphic characteristics are assigned ideologies from the initial ideology distribution, conditional on their simulated demographics. We run these simulated individuals through the model over ten years.

The resulting distribution of ideologies becomes visibly more polarized as the process continues, with new right and left modes emerging from the initially approximately unimodal distribution. In addition to plotting the distribution, we show the value of the axiomatic measure of polarization of Esteban and Ray (1994) and Duclos et al. (2004) in each year.[31] This value increases as time goes on, by a total of about 2.5% by the end of the 10-year period. The locations of the local maxima in the distribution correspond to FNC' ideological location and an intermediate location between that of MSNBC and CNN.

This increase in polarization requires a taste for like-minded news. Figure 5(b) shows the evolution of the ideology distribution when the taste for like-minded news is set to zero. Here, the distribution remains roughly unimodal throughout. Furthermore, the tails of the distribution thin out, as viewers from across the political spectrum are exposed to and persuaded by news from the other side. Additionally, the distribution shifts on the whole to the right, as FNC's relatively more extreme location allows it to out-persuade its relatively moderate competition. Normally, this greater potential for influence is counterbalanced by the fact that the more extreme location dissuades many left-leaning viewers from watching. But with the taste for slant disabled, viewers from across the political spectrum are exposed to Fox.

The evidence on the actual increase in polarization amongst American citizens during this time period is mixed. Fiorina et al. (2008) find that polarization has not increased among the public through 2008. However, more recent data suggest possible increases (for the People and the Press, 2012).[32] We follow Ansolabehere et al. (2006) to create an individual ideology score from the answers to a series of questions from the General Social Survey (GSS) for 1996 to 2014. These questions ask about positions on tax and spending levels, abortion, drug and crime policy, the environment, and attitudes towards business, labor, homosexuality, and religion.

at their 2008 values.

[31] There are four axioms which imply this measure. For example, the first axiom is "If a distribution is composed of a single basic density, then a squeeze of that density cannot increase polarization." We refer the reader to the original articles for full definitions and examples. We compute the measure with the parameter α set to 1.

[32] There is some additional disagreement in the political science literature stemming from inconsistent definitions of polarization. Some authors Iyengar et al. (2012) define polarization in "affective" terms, meaning subjective feelings of hostility towards opposing partisans. Others Levendusky (2009) focus on the correlation between ideology and party identification. The evidence is stronger that levels of these kinds of polarization have increased in recent decades, and it is possible that cable news affects these as well. As our model has no analogue to these alternative conceptualizations, however, we focus exclusively on measures of the shape of the ideology distribution among voters.

For each multiple choice question, Ansolabehere et al. (2006) assign answers to be either Republican (1) or Democrat (-1). An individual's score is the sum of their answers' ideologies across questions. Each sample in the GSS has an associated distribution of ideology scores for which we compute the polarization measure.[33] The levels of the polarization measure in the GSS data are very similar to those for our simulated voters; in 2004, for example, the measure of polarization in the GSS ideology scores was 0.274. We then regress these polarization measures on a linear time trend as the limited sample sizes in GSS can create non-trivial short term variation in the polarization metric. The benchmark for a decade's worth of polarization is thus ten times the estimated linear time trend in this measure which is 0.0042.[34] This decade-long increase in polarization is of similar magnitude to that produced by our model of self-selection into watching and the influence of slanted television news. Some further suggestive evidence consistent with a moderate effect of cable news on polarization is in Boxell et al. (2017). They find that increases in polarization measures during this time period have been more pronounced for older individuals, while as can be seen in Table 8, age is an important predictor of cable news viewership.

To benchmark the substantive size of this increase, we computed the polarization measure after an extreme "hollowing out" of the ideology distribution.[35] The polarization measure in this scenario more than doubles, to 0.591. As another point of comparison, we computed the Esteban-Ray measure on first-dimension DW-NOMINATE scores of members of the House of Representatives from 1996-2014. The levels of the polarization statistic are much higher here; the 108^{th} Congress, seated from 2003-2004 and the median House by polarization score in this period, had Esteban-Ray polarization score of 0.446. To reach the typical level of the House, then, polarization among our simulated voters would have to have increased by nearly 60%, much more than the simulated 2.5%. Furthermore, the time-series increase in the House is much stronger than that measured in GSS or in our simulation: the annual trend coefficient in DW-NOMINATE polarization is 0.005,[36] more than 10 times the analogous trend in the GSS over the same time period. We conclude that while selective exposure to cable news can plausibly explain the observed increase in ideological polarization among the US public in recent decades, this increase is nowhere near large enough to keep pace with the rate of

[33]Details of the calculation and a plot of the time series of GSS polarization scores are available in Appendix J.

[34]The trend coefficient is not precisely estimated, with t-statistic of 1.6. The 95% confidence interval for the 10-year change is $[-0.0009, 0.009]$

[35]Specifically, we transformed the initial distribution of ideology by assigning all Democratic simulated voters to the right of the median Democrat the median Democratic ideology, and assigning all Republican simulated voters to the left of the median Republican the median Republican ideology.

[36]The corresponding t-statistic is 8.42.

polarization increase among their elected representatives.

Fox Entry in 2000, and MSNBC Format Switch Next, we estimate the effect of two counterfactual scenarios aimed at measuring the aggregate influence of the cable news channels on election outcomes. First, we estimate the effect of the entry of FNC on the 2000 presidential election. We compare a base case where Fox was available to cable subscribers in the 1997-2000 period according to the observed rollout pattern to a scenario where Fox was available exclusively to satellite subscribers and not on any local cable system.

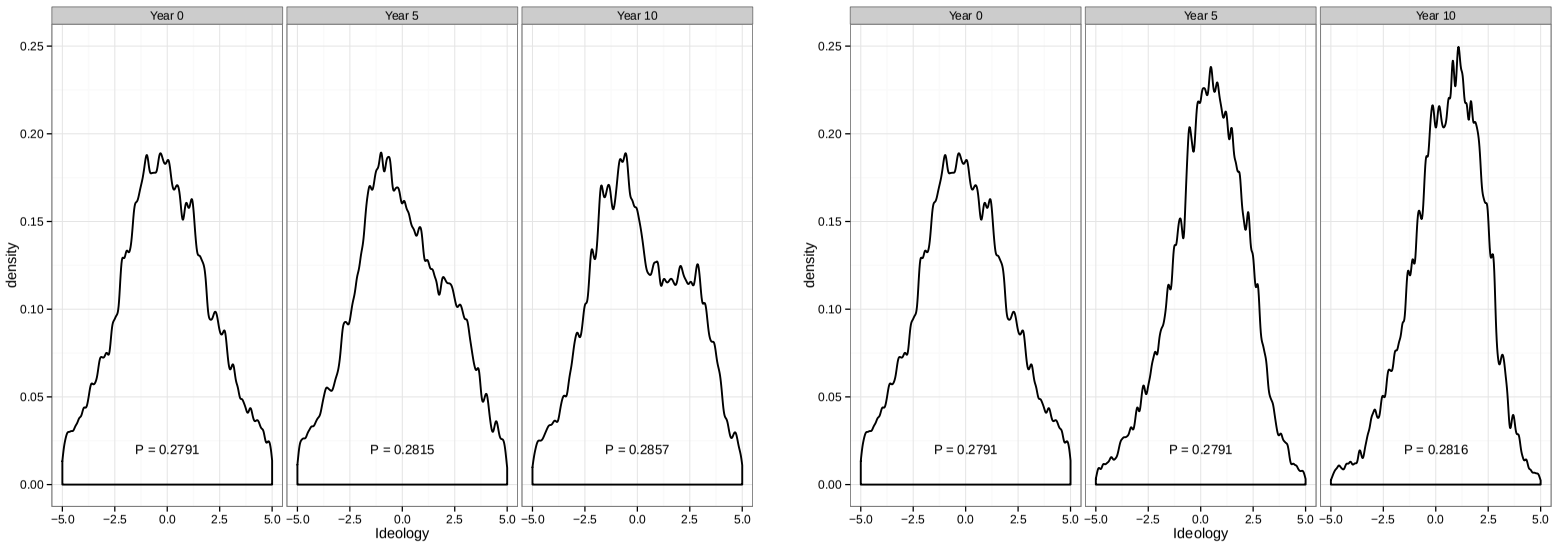
	R Vote Share Change	
Election	No Fox News	MSNBC Tracks CNN
2000	-0.0046	0.0006
2004	-0.0359	-0.0124
2008	-0.0634	-0.0009

Table 10: Effects of two counterfactual scenarios. In the first, Fox News is eliminated from cable lineups. Column 2 shows the change in the Republican vote share of the presidential popular vote in the no-Fox scenario relative to the baseline. In the second, MSNBC's ideological positioning matches that of CNN throughout the 2000-2008 period. Column 3 shows the change in the Republican vote share of the presidential popular vote in the MSNBC-matching-CNN scenario relative to the baseline.

The first column of Table 10 shows the effects of eliminating Fox from cable lineups prior to the 2000 election, as well as the effect on subsequent election cycles. The population-weighted average Republican vote share falls by .46 percentage points under the no-Fox scenario relative to the baseline. This prediction is in line with the estimate of 0.26 to 0.36 of DellaVigna and Kaplan (2007), when updated to use more accurate data.

In subsequent cycles, the implied FNC effect increases due to two forces. First and most importantly, overall FNC viewership approximately doubles during the period from 2000 to 2008, meaning nearly twice as many viewers are exposed to FNC in later cycles. Second, according to our ideological estimates, FNC moves well to the right over this period, increasing its persuasive effect enough to outweigh any loss in viewership due to the ideological drift.

The second column of Table 10 estimates the effects of MSNBC's switch to liberal slant. We simulated a condition where MSNBC's ideology matched that of CNN. The estimated effect in the 2008 election cycle is to decrease the Republican share by just 0.09 percentage points, an effect two orders of magnitude smaller than the estimated effect of eliminating FNC in 2008. This minimal effect derives from two sources. One, MSNBC's viewership is substantially smaller than that of FNC. Second, MSNBC's estimted ideological position in the



(a) $\eta = 0.025$ (b) $\eta = 0$

Figure 5: Voters are initially drawn from the unconditional ideology distribution in 2008. The remaining 10 plots show the change in the ideology distribution over years. The numbers in the center of the plots are the Esteban-Ray polarization measure of the distribution.

2008 cycle is not all that far to the left of CNN, whereas FNC is well to the right.

Media Power and Optimal Positioning Prat's (2014) notion of *media power* refers to the minimal quality candidate for whom a media owner could engineer an election victory through persuasive efforts. While our election model has no quality dimension, we can ask a similar question: how many presidential votes could the cable news channels swing from one party to the other, by changing the ideological orientation of their content? Table 11 shows the results of an exercise where we allow each channel to choose its ideological location in each year in order to maximize the vote share of the Republican candidate, and then do the same for the Democratic candidate, holding the positions of the other channels fixed. The table shows the difference in Republican aggregate vote share between these two scenarios. In the last column of the table, we show the potential influence of a combined cable news monopolist controlling all three channels.

	Potential Vote Share Swing			
Election	CNN	FNC	MSNBC	Monopolist
2000	0.0316	0.0126	0.0082	0.0465
2004	0.1456	0.0955	0.0409	0.2123
2008	0.1862	0.1568	0.0563	0.2893

Table 11: The maximum potential vote share swing that the channel could engineer, by election. The "monopolist" column is the maximum vote share swing attainable if all three channels were controlled by a single owner.

In this time period, CNN has the highest power to swing election outcomes, due to its relatively large viewership, favorable channel positioning, and broad demographic appeal. The potential to change election outcomes are large - the achievable vote share swing of a cable news monopolist exceeds 25% by 2008 - and increasing over time. The time trend is a result of the accumulation of influence over time, as the cumulative reach of the channels grow with each passing year.

The preceding is a "worst-case" scenario, in the sense that it assumes cable news operators seek only to maximize the vote share of a favored party. In reality, the cable channels are businesses whose revenue derives from advertising and affiliate fees from cable providers,[37] which are generally increasing in audience size. The profit motive presumably provides some disincentive from choosing extreme ideological locations that would reduce ratings by turning off too many moderate viewers.

[37]According to SNL, the FNC received 64% of its revenue from affiliate fees in 2015.

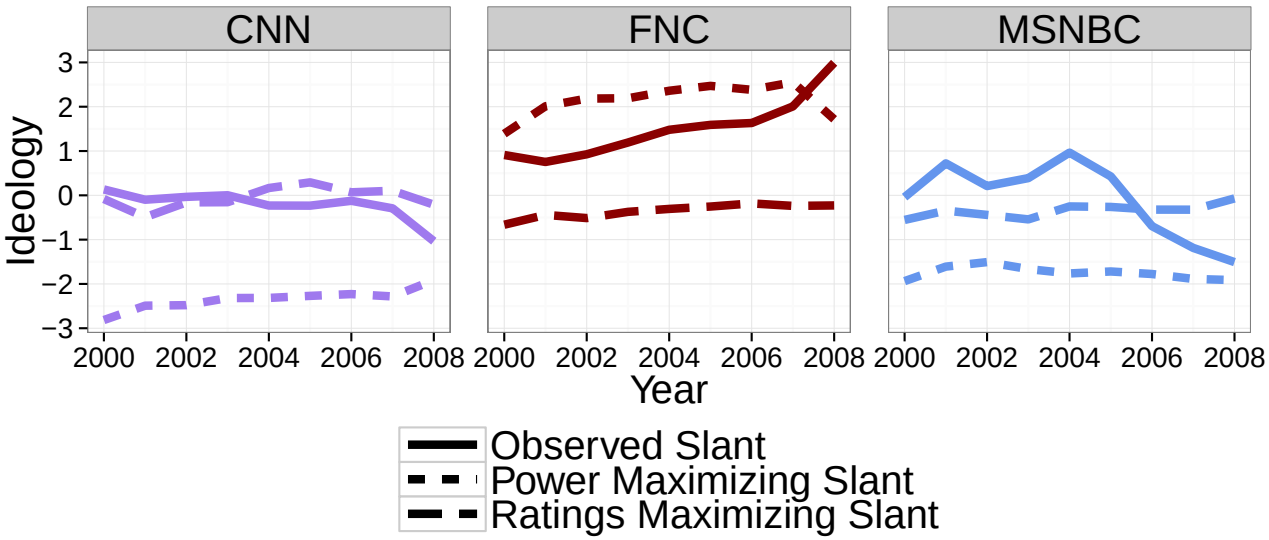


Figure 6: Channels' ideological positioning from 2000-2008. The three lines are the observed position from the text-based measure, the position that would maximize the channel's ratings, and the position that maximizes the vote share for a favored party. For FNC, we show the position that maximizes Republican vote share; for the other two channels we show the position that maximizes Democratic vote share.

We examined the extent to which this tradeoff constrains the channels' persuasive power, by comparing the power-maximizing ideological position to the ratings-maximizing ideological position. Figure 7 compares each of the three channels' actual, ratings-maximizing, and influence-maximizing[38] ideological positioning in the 2000-2008 period.

The optimal ideological location from a ratings perspective is quite centrist, and similar for all three of the channels. Comparison of the channel's actual location with the vote-share maximizing choice, however, reveals an asymmetry: the two relatively liberal channels, and CNN in particular, are far from the location that would maximize the vote share of Democratic candidates. FNC, on the other hand, is close to, and by 2008 actually exceeds, the position that maximizes Republican vote share. Were Fox to move even further to the right, the loss of liberal viewers turned off by Fox's extreme location would outweigh the gain in persuasive potential among liberal viewers who continued to watch, reducing FNC's overall influence on election outcomes.

Relatedly, the power figures presented in Table 11 do not represent symmetric swings around the actual vote share totals: FNC is already close to achieving the maximal Republican

[38]For MSNBC and CNN, we plot the choice that maximizes Democratic vote share; for FNC we plot the choice that maximizes Republican vote share.

vote share it can attain on its own, and its power consists almost entirely of the damage it could do to Republican candidates by moving to the left. We estimate that a leftward move would be beneficial for FNC in ratings terms: the increase in average FNC viewership in the viewership-maximizing counterfactual relative to the base case ranges from 5 minutes per week in 2000 to 35 minutes per week in 2008, compared to base levels of approximately 60 minutes per week. Most of this viewership increase comes from the extensive margin, with FNC increasing its reach[39] in the viewership-maximizing counterfactual by an additional 1% of viewers in 2000 and more than 6% in 2008, relative to baseline.

Several caveats to this exercise are in order. First, these are partial-equilibrium results holding the locations of the other channels fixed at their actual locations. Although an interesting question in its own right, modeling the strategic interaction between channels in this complex dynamic game is beyond the scope of this paper. Second, although ratings are related to profitability, they are not the same thing. Advertising rates vary with the demographics of the audience, and it is possible that a smaller audience is more valuable than a larger one if its composition is skewed in ways - towards higher income households, for example - that are attractive to advertisers. And cable providers' willingness to pay affiliate fees is likely to be higher for differentiated news channels than for homogeneous ones. Hence, though FNC's strategy appears to cost it some viewers relative to a more centrist editorial policy, we cannot conclude from this observation that the FNC ownership must therefore be willing to sacrifice profits for Republican votes.

8 Conclusion

This paper provides estimates of both the influence of slanted news on voting behavior and the taste for like-minded news in the context of cable television news in the U.S. The key ingredient in the analysis is the use of channel positions as instrumental variables to estimate a model of viewership, voting, and ideology evolution. We show instrumental variables estimates that watching FNC increases the probability of voting Republican in presidential elections. We probe the instrumental variables assumption by correlating channel positions with observables: demographics which predict FNC viewership, demographics which predict partisan vote shares, pre-FNC partisan vote shares, pre-FNC partisan donations, and local satellite viewership of FNC.

We estimate a model of consumer-viewer-voters who choose cable subscriptions, allocate

[39]The fraction of viewers who watch any positive amount of the channel.

time to watching news channels, and vote in elections. The tastes for news channels are partly determined by the closeness of the news channels' estimated ideology to the individuals. Individual ideology evolves towards the estimated ideologies of the news channels that a consumer watches. We use the estimated model to characterize the degree of polarization that one can attribute to slanted cable news consumption, to measure effects of cable news on elections, and to assess the positioning strategies of the cable news channels. Our estimates imply increasing effects of FNC on the Republican vote share in presidential elections over time, from 0.46 points in 2000 to 6.34 points in 2008. Furthermore, we estimate that cable news can increase polarization and explain about two-thirds of the increase among the public in the US, and that this increase depends on both a persuasive effect of cable news and the existence of tastes for like-minded news. Finally, we find that an influence-maximizing owner of the cable news channels could have large effects on vote shares, but would have to sacrifice some levels of viewership to maximize influence.

Future research could go in a number of directions. The use of channel positions as instrumental variable could be useful in other studies of how media consumption affects behavior. One could also use channel position variation to study the cable news channels in more detail by examining specific programs, e.g. "The O'Reilly Factor," and specific issues like abortion, gay marriage, or government spending. In a different direction, studying the causes and consequences of the divergence in estimated ideologies seems fruitful.[40] It would also be useful to test, refine, or expand the specific model we employ for belief updating after media consumption. For example, one could allow for a joint distribution of influence parameters and tastes for like-minded news in the population.

[40]This includes improving these text based procedures to allow for sentiment analysis or other partisan indicators.

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A Data Construction

A.1 Nielsen FOCUS Lineups

The Nielsen FOCUS data set were provided in two formats. For the largest 55 DMA's, we were given yearly spreadsheets for each DMA. For the DMA's ranked 56 to 210, we were given a CSV file with all systems and years. We stacked all the 1-55 DMA spreadsheets with the 56-210 CSV file. An observation in the main combined file is a cable system-year-channel. A separate file links cable system-years to zip codes. We dropped any cable system labeled "-ADS" or "APTS". These system correspond to alternative delivery systems for single apartment buildings. We synchronized cable channel names across years and system by manual inspection.

The three main challenges with these data are that some zip codes have more than one cable system which serve it, and some cable systems have multiple "devices" whose lineups sometimes, but not always, differ, and some cable system devices have multiple channels listed in a channel position. To deal with the first issue, we first kept the cable system which reports the highest number of total subscribers (across all zip codes). To break ties, we then considered which cable system had the highest number of county subscribers, the most homes passed, and the highest number of channels, and at random, in that order. 124252 ties are broken by total subscribers, and a total of 222 further ties broken by the other criteria. In the case where a device listed two channels in the same position, we kept the channel if it was a news channel, and at random if no news channel was involved. If a channel showed up in two different positions, we used the minimum channel position.

We first dropped any device labeled "COMMUNITY SPECIFIC" or "UNIQUE SITUATION." These were always in systems which had other devices that were labelled "DIGITAL" or "REGULAR." In cases where two devices did not have any overlapping channel numbers, we combined the two devices into one. For systems with multiple devices, we kept the device with the most number of channels. This is often innocuous as the devices would be nested and have the same channel positions for most of the basic channels. If multiple devices had the same number of channels, we kept the device that was labelled "DIGITAL," if possible. If not, we kept the device labelled "REGULAR." These conditions broke all ties.

We dropped any system which did not report carrying any of the top 60 cable channels by Mediamark viewership after the cleaning. These are likely due to error in the cleaning process and correspond to 587 zip code-years out of 522,139 zip code-years (0.11%).

The number of channels variable corresponds to the total number of non-empty channel

positions in the cleaned cable lineup. We dropped any pay-per-view channels, channels labeled "BLACKOUT," program guide channels, split-channels (e.g. "Nick at Nite" which is the evening version of Nickelodeon), and HD channels. The number of broadcast channels variable corresponds to the total number of channels that have an associated over-the-air channel number.

A.2 Nielsen Viewership Data

We use zip code-level viewership data from Nielsen Local Television View (NLTV) for the years 2005 through 2008.

Sample selection We downloaded reports from the NLTV interface for zip code level ratings aggregated for each year separately in any zip code where the estimated sample size in the report interface was positive. We used the 5am-5am daypart, and all persons 18 and over. Each zip code year had 9 observations: three for each of CNN, Fox News Channel, and MSNBC. Within each channel, we had a rating for all television households, a rating for households who subscribed to cable television, and a rating for households who subcribed to Alternative Delivery Systems (ADS) which are defined as "Satellite (C-band), DBS (KU-band), SMATV (master antenna), MDS (includes multi-channel, multi-point and multi-point distribution service) and Broadband Only." (http://en-us.nielsen.com/sitelets/cls/documents/nltv/NLTV-CharacteristicDefinitions-Diary.pdf). DirecTV and Dish Network are DBS providers.

Matching to lineup and availability data We match this data set to the Nielsen FOCUS lineups by the zip code and year.

A.3 MRI-Simmons Viewership Data

We use individual-level viewership data from two sources: Mediamark Research's Survey of the American Consumer and Experian Simmons' National Consumer Study. We use Mediamark data from 2000 to 2007, and Experian Simmons data for 2008. In this section, we detail the steps we took in cleaning and combining these data sets.

Sample selection We included in our sample any respondent who responded to all relevant demographic characteristics: race, income, education, age, and gender. We also required the respondent to have a valid zip code.

Demographics We make some simplifications to the demographic questions, as follows. First, racial categories are simplified to three dummy variables, for white, black, and hispanic respectively. The excluded category is all other racial categories. Education variables are reduced to a single dummy variable for having completed at least a bachelor's degree.

Household income comes in binned indicator form in the raw data. For example, there is an indicator for household income of "$15,000 to less than $25,000." We convert these indicators to a continuous variable by computing the expected value of a log-normally-distributed random variable, conditional on the variable falling within the bin boundaries.[41] The parameters of this distribution are calibrated to match the shares of the national population falling into each of the income bins collected by the US Census Bureau. All respondents in the same income bin are, therefore, assigned the same level of income.

Viewership of Cable Channels Both surveys ask about the number of hours viewed in a given week for a variety of television channels. This study uses responses to CNN, the Fox News Channel, and MSNBC. Mediamark asks whether the respondent watched any amount, as well as a multiple choice question for each channel with the following options: 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6-9 hours, 10 hours, 11-15 hours, 16-20 hours, and 21+ hours. Experian Simmons also asks whether the respondent watched any amount, and a multiple choice question for each channel with the following options: Less than 1 hour, 1 hour to less than 3, 3 hours to less than 5, 5 hours to less than 7, 7 hours to less than 10, and 10 hours or more. We assigned the midpoint of each interval as the hours watched for that respondent when possible.[42]

Cable or Satellite Subscription We also use whether the respondent subscribes to Cable, DirecTV, Dish Network, or none of the above. For the 5,386 respondents (2.5%) who indicate that they subscribe to both cable and one of the satellite providers, we assume they only subscribe to the satellite provider.

Matching to lineup and availability data We match both data sets to the Nielsen FOCUS lineups by the respondent's zip code and year.

[41] For the top-coded categories, we compute the expected value conditional on being above the top-coding threshold.
[42] For the highest bin, we used 25 hours for Mediamark and 12.84 hours for Simmons.

A.4 Construction of 2008 zip-level vote

Precinct-level voting data for the 2008 presidential election come from the Harvard Election Data Archive (HEDA, Ansolabehere and Rodden, 2011). We matched each precinct to a ZIP code (the level at which our cable position data is defined) using a spatial matching procedure. For each precinct in the HEDA shapefile, we computed the coordinates of the precinct's centroid. We then overlaid the precinct centroids onto the polygon files defining zip code tabulation area boundaries provided by the US Census Bureau's TIGER/Line series, generating a corresponding ZIP code for each precinct.

There are a minority of cases for which the precinct centroid does not fall within the boundaries of any ZIP code. This can happen, for instance, if the precinct centroid falls in a lake or other body of water, which are excluded from the ZIP polygon boundaries. In these cases, we match to ZIPs by computing the centroids for each ZIP, and finding the nearest neighbor ZIP centroid (by geographic distance) for each precinct centroid.

Once a ZIP code match for every precinct has been constructed in this fashion, we aggregate voting totals across precincts up to the ZIP level. This ZIP level dataset is then used in our reduced-form regression of 2008 Republican presidential vote share on position.

A.5 Construction of CCES and NAES datasets

For the 2000, 2004 and 2008 election cycles, we use individual-level political preference data from the National Annenberg Election Survey (NAES). The NAES is a nationally representative telephone survey, conducted as a rolling cross-section between the December of the preceding year and the January following the election year. Survey waves were timed roughly to correspond with major campaign events such as the televised debates. Those interviewed after the election date were asked for whom they actually had cast a ballot; those interviewed before were asked for whom they intended to cast a ballot. The bulk of the interviews occur in the three months prior to the election; 10-15% occur after the election.

Sample selection We included in our sample any respondent in the rolling cross-section who indicated a preference for one of the two major-party presidential candidates, either in the form of intention to vote or of actual vote, pooling together all survey waves. NAES also asked pre-election voters to state how certain they were of their choice, on a scale ranging from "Definitely will vote for candidate" to "Good chance will change mind." We pool all of these responses together as votes for the stated candidate. Voters who did not answer the

presidential preference question, or said they "Don't know" or are "Uncertain" of their choice are excluded from the sample.

Demographics We make some simplifications to the demographic questions in NAES, as follows. First, racial categories are simplified to three dummy variables, for white, black, and hispanic respectively. The excluded category is all other racial categories. Education variables are reduced to a single dummy variable for having completed at least a bachelor's degree, which includes the NAES' "Four-year college degree" and "Graduate or professional degree" categories.

Household income comes in binned indicator form in the raw NAES data. For example, there is an indicator for household income of "$15,000 to less than $25,000." We convert these indicators to a continuous variable by computing the expected value of a lognormally-distributed random variable, conditional on the variable falling within the bin boundaries.[43] The parameters of this distribution are calibrated to match the shares of the national population falling into each of the income bins collected by the US Census Bureau. All respondents in the same income bin are, therefore, assigned the same level of income.

Most-watched cable channel The 2004 and 2008 editions of the NAES ask respondents to state the TV news source which they watch most. In 2004 this question is phrased in terms of channels (i.e. respondents can select CNN, MSNBC, FNC, or one of the networks) whereas in 2008 it is phrased in terms of programs (i.e, respondents can select *The O'Reilly Factor*, *Anderson Cooper 360*, and so forth.) We convert the 2008 response to channel level by aggregating across all responses that indicate a show affiliated with a particular channel, as well as responses that state the channel name but not a specific program. We then create three mutually exclusive dummy variables for selecting each of the three channels. It is possible (and, in fact, likely) that a respondent may have a 0 for all three of these variables, indicating either that the respondent does not consume any TV news or that she prefers a non-cable source.

Matching to lineup and availability data NAES data is matched to the Nielsen FOCUS lineups by the respondent's zip code and year. Because Nielsen's lineups data are released at the end of December each year, we apply the following rule for temporal matching: any respondent interviewed in the first six months of a year is matched to his zip code's lineup

[43] For the top-coded categories, we compute the expected value conditional on being above the top-coding threshold.

from the previous December 31. Any respondent interviewed in the last six months is matched to his zip code's lineup from the following December 31.

CCES For 2008, we supplement the NAES data with additional respondents from the Cooperative Congressional Election Study (CCES), an online cross-section survey which began operation in 2006. Our construction of the CCES data exactly parallels the discussion of NAES data above. The only differences are that the CCES does not include the most-watched news source question, and that the income bins differ from those used by NAES. The conversion of income to a continuous variable discussed above allows the CCES data to be appended cleanly to the NAES sample.

B Summary Statistics for Voting and Viewership Datasets

Tables A1 through A4 present summary statistics for the primary datasets employed in the 2SLS analysis and behavioral model: voting and viewership data, at the zip code and individual levels.

Table A1: Summary Statistics for 2008 Zip Code Level Voting

Statistic	N	Mean	St.Dev.	Min	Max
Year	22984.00	2008.00	0.00	2008.00	2008.00
Republican Two Party Vote Share	22984.00	52.24	17.49	0.35	94.05
Has FNC	22584.00	0.94	0.24	0.00	1.00
Has MSNBC	22584.00	0.85	0.36	0.00	1.00
FNC Position	22584.00	39.08	16.93	0.00	140.00
CNN Position	22584.00	30.28	13.69	0.00	123.00
MSNBC Position	22584.00	38.99	24.57	0.00	164.00
Number Channels	22584.00	161.58	51.48	8.00	249.00
Number Broadcast Channels	22584.00	13.55	8.40	2.00	45.00
Nielsen Diary Market	22984.00	0.48	0.50	0.00	1.00
FNC Minutes	17742.00	49.39	97.04	0.00	4233.60
CNN Minutes	17374.00	31.60	62.55	0.00	2046.24
MSNBC Minutes	17374.00	16.30	46.13	0.00	1673.28
FNC Minutes (Cable)	15616.00	58.94	137.80	0.00	4233.60
CNN Minutes (Cable)	15277.00	41.86	103.93	0.00	3487.68
MSNBC Minutes (Cable)	15277.00	22.20	72.49	0.00	3276.00
FNC Minutes (Satellite)	14947.00	56.03	143.19	0.00	4163.04
CNN Minutes (Satellite)	14598.00	34.22	96.40	0.00	4082.40
MSNBC Minutes (Satellite)	14598.00	14.00	59.80	0.00	1703.52
Population	22984.00	12828.07	14841.96	0.00	113916.00
Pct Black	22979.00	0.09	0.16	0.00	0.98
Pct Asian	22979.00	0.02	0.05	0.00	0.72
Pct Other	22979.00	0.07	0.09	0.00	1.00
Pct Hispanic	22979.00	0.09	0.15	0.00	1.00
Pct Male	22979.00	0.50	0.03	0.10	1.00
Pct Age 10-20	22979.00	0.15	0.04	0.00	0.88
Pct Age 20-30	22979.00	0.12	0.06	0.00	0.89
Pct Age 30-40	22979.00	0.12	0.03	0.00	0.42
Pct Age 40-50	22979.00	0.14	0.02	0.00	0.33
Pct Age 50-60	22979.00	0.15	0.03	0.00	0.50
Pct Age 60-70	22979.00	0.11	0.03	0.00	0.50
Pct Age 70-80	22979.00	0.06	0.03	0.00	0.34
Pct Age 80+	22979.00	0.04	0.02	0.00	0.61
Median HH Income	22909.00	53204.33	22090.18	2499.00	250001.00
Pct HS Graduate	22964.00	0.34	0.11	0.00	1.00
Pct Some College	22964.00	0.29	0.07	0.00	1.00
Pct Bachelors Degree	22964.00	0.15	0.09	0.00	1.00
Pct Post Graduate Degree	22964.00	0.08	0.08	0.00	1.00
Pct Own Home	22953.00	0.73	0.16	0.00	1.00
Median Home Value	22815.00	187870.02	155380.38	9999.00	1000001.00
Aggregate Tax Rate	22590.00	0.01	0.01	0.00	0.04
Median Number of Rooms	22911.00	5.70	0.80	1.30	9.00
Pct Homes Built After 2005	22937.00	0.03	0.05	0.00	1.00
Pct Food Stamps	22931.00	0.11	0.08	0.00	1.00
Median Social Security Income	22843.00	16085.78	2479.94	275.00	46761.00
Pct Veteran	22931.00	0.69	0.11	0.00	1.00
Pct Married	22971.00	0.55	0.11	0.00	1.00
Pct Same Sex HH	22953.00	0.00	0.00	0.00	0.12
Pct Unmarried HH	22953.00	0.06	0.02	0.00	0.50
Pct Family HH	22966.00	0.11	0.05	0.00	1.00
Fraction of 1996 Contributions to Republican	17944.00	0.70	0.30	0.00	1.00
Pct Evangelical (County)	22979.00	169.76	146.91	0.00	1113.76
Pct Catholic (County)	22979.00	189.47	154.32	0.00	946.82
Pct Jewish (County)	22979.00	11.81	26.76	0.00	313.86
Pct Mormon (County)	22979.00	13.66	65.55	0.00	915.70
Pct Southern Baptist Convention (County)	22979.00	84.30	126.84	0.00	961.39
Pct Suburban	22955.00	0.10	0.24	0.00	1.00
Pct Urban	22955.00	0.38	0.46	0.00	1.00
1996 County Republican Vote Share	22924.00	0.47	0.11	0.11	0.88

Table A2: Summary Statistics for NAES/CCES Voting Survey

Statistic	N	Mean	St. Dev.	Min	Max
Year	135574	2003.79	3.20	2000	2008
Has FNC	135574	0.88	0.32	0	1
Has MSNBC	135574	0.87	0.34	0	1
FNC Position	135574	37.84	18.99	0	125
CNN Position	135574	29.75	12.95	0	123
MSNBC Position	135574	39.54	21.61	0	164
Number Channels	135574	141.02	51.55	1	249
Number Broadcast Channels	135574	14.03	7.48	2	45
Intent to vote Republican	135574	0.50	0.50	0	1
Age	134608	48.21	16.42	18	99
White	135574	0.84	0.37	0	1
Black	135574	0.08	0.27	0	1
Hispanic	135574	0.07	0.25	0	1
Bachelors	135574	0.36	0.48	0	1
HH Income	123679	0.66	0.52	0.07	2.17
Male	135574	0.45	0.50	0	1
Most Watched FNC	48695	0.30	0.46	0	1
Most Watched CNN	48695	0.38	0.49	0	1
Most Watched MSNBC	48695	0.10	0.30	0	1
Population	135386	28864.83	18292.89	1	113916
Pct Black	135386	0.11	0.17	0.00	1.00
Pct Asian	135386	0.04	0.06	0.00	0.72
Pct Other	135386	0.09	0.09	0.00	0.98
Pct Hispanic	135386	0.13	0.17	0.00	0.99
Pct Male	135386	0.49	0.02	0.28	1.00
Pct Age 10-20	135386	0.14	0.03	0.00	0.95
Pct Age 20-30	135386	0.14	0.06	0.00	0.93
Pct Age 30-40	135386	0.13	0.03	0.00	0.35
Pct Age 40-50	135386	0.14	0.02	0.00	0.30
Pct Age 50-60	135386	0.14	0.02	0.00	0.29
Pct Age 60-70	135386	0.10	0.03	0.00	1.00
Pct Age 70-80	135386	0.06	0.02	0.00	0.34
Pct Age 80+	135386	0.04	0.02	0.00	0.33
Median HH Income	135359	56307.44	21572.15	2499	240441
Pct HS Graduate	135382	0.29	0.10	0.00	1.00
Pct Some College	135382	0.29	0.06	0.00	1.00
Pct Bachelors Degree	135382	0.18	0.09	0.00	1.00
Pct Post Graduate Degree	135382	0.11	0.08	0.00	1.00
Pct Own Home	135377	0.67	0.16	0.00	1.00
Median Home Value	135273	230027.60	166599.70	9999	1000001
Aggregate Tax Rate	135159	0.01	0.01	0.0001	0.04
Median Number of Rooms	135357	5.60	0.82	1.40	9.00
Pct Homes Built After 2005	135363	0.01	0.01	0.001	0.88
Pct Food Stamps	135363	0.11	0.07	0.00	0.72
Median Social Security Income	135324	16279.69	2071.40	610	31735
Pct Veteran	135363	0.66	0.11	0.00	1.00
Pct Married	135383	0.52	0.10	0.00	1.00
Pct Same Sex HH	135377	0.005	0.004	0.00	0.12
Pct Unmarried HH	135377	0.07	0.02	0.00	0.20
Pct Family HH	135383	0.10	0.04	0.00	1.00
Fraction of 1996 Contributions to Republican	128791	0.69	0.23	0.00	1.00
Pct Evangelical (County)	135341	147.62	127.82	0.00	1113.76
Pct Catholic (County)	135341	207.80	148.39	0.00	946.82
Pct Jewish (County)	135341	18.76	32.10	0.00	313.86
Pct Mormon (County)	135341	15.56	66.89	0.00	915.70
Pct Southern Baptist Convention (County)	135341	72.79	108.71	0.00	961.39
Pct Suburban	135377	0.11	0.25	0.00	1.00
Pct Urban	135377	0.68	0.43	0.00	1.00
1996 County Republican Vote Share	135001	0.46	0.11	0.11	0.88

An observation is an individual. Zip Code demographic data comes from the US Census Bureau. Religious adherence data is from 2010 U.S. Religion Census: Religious Congregations and Membership Study (RCMS).

Table A3: Summary Statistics for Nielsen Viewership Sample

Statistic	N	Mean	St. Dev.	Min	Max
Year	71177	2006.50	1.12	2005	2008
Has FNC	71177	0.94	0.23	0	1
Has MSNBC	71177	0.86	0.35	0	1
FNC Position	71177	39.89	16.69	0	140
CNN Position	71177	29.94	13.23	0	123
MSNBC Position	71177	38.84	21.65	0	164
Number Channels	71177	157.03	46.62	7	249
Number Broadcast Channels	71177	12.50	7.76	2	45
Nielsen Sample Size	71177	57.05	73.58	0.50	1028.00
Nielsen Cable Sample Size	71071	34.69	53.75	0.00	948.00
Nielsen Satellite Sample Size	71072	15.30	19.11	0.00	371.00
Nielsen Diary Market	71177	0.51	0.50	0	1
FNC Minutes	71150	43.27	84.14	0.00	4233.60
CNN Minutes	69731	24.23	50.92	0.00	2388.96
MSNBC Minutes	69731	10.06	34.51	0.00	2076.48
FNC Minutes (Cable)	64894	51.03	124.35	0.00	7388.64
CNN Minutes (Cable)	63602	32.48	85.81	0.00	4122.72
MSNBC Minutes (Cable)	63602	13.01	48.14	0.00	3276.00
FNC Minutes (Satellite)	62178	48.81	133.41	0.00	7953.12
CNN Minutes (Satellite)	60840	24.13	72.40	0.00	4082.40
MSNBC Minutes (Satellite)	60840	8.66	43.94	0.00	3185.28
Population	71137	15485.43	15591.85	6	113916
Pct Black	71137	0.10	0.17	0.00	0.98
Pct Asian	71137	0.03	0.06	0.00	0.72
Pct Other	71137	0.07	0.09	0.00	0.98
Pct Hispanic	71137	0.10	0.16	0.00	0.99
Pct Male	71137	0.50	0.03	0.34	0.84
Pct Age 10-20	71137	0.15	0.03	0.00	0.60
Pct Age 20-30	71137	0.12	0.05	0.00	0.66
Pct Age 30-40	71137	0.12	0.03	0.004	0.30
Pct Age 40-50	71137	0.14	0.02	0.00	0.29
Pct Age 50-60	71137	0.15	0.03	0.001	0.32
Pct Age 60-70	71137	0.11	0.03	0.00	0.50
Pct Age 70-80	71137	0.06	0.02	0.00	0.34
Pct Age 80+	71137	0.04	0.02	0.00	0.31
Median HH Income	71129	52689.98	20622.01	2499	228726
Pct HS Graduate	71136	0.33	0.10	0.00	1.00
Pct Some College	71136	0.29	0.07	0.00	1.00
Pct Bachelors Degree	71136	0.15	0.09	0.00	0.61
Pct Post Graduate Degree	71136	0.09	0.07	0.00	0.92
Pct Own Home	71136	0.72	0.15	0.003	1.00
Median Home Value	71002	187049.60	145519.30	9999	1000001
Aggregate Tax Rate	70780	0.01	0.01	0.0001	0.04
Median Number of Rooms	71132	5.66	0.77	1.50	9.00
Pct Homes Built After 2005	71135	0.02	0.02	0.001	0.62
Pct Food Stamps	71135	0.11	0.08	0.00	0.78
Median Social Security Income	71057	16050.84	2249.87	610	30336
Pct Veteran	71135	0.68	0.10	0.00	1.00
Pct Married	71136	0.55	0.10	0.00	1.00
Pct Same Sex HH	71136	0.004	0.003	0.00	0.11
Pct Unmarried HH	71136	0.06	0.02	0.00	0.20
Pct Family HH	71136	0.11	0.04	0.00	0.55
Fraction of 1996 Contributions to Republican	59864	0.71	0.28	0.00	1.00
Pct Evangelical (County)	71167	170.35	144.60	0.00	978.98
Pct Catholic (County)	71167	185.96	150.07	0.00	946.82
Pct Jewish (County)	71167	11.50	24.97	0.00	313.86
Pct Mormon (County)	71167	13.40	60.77	0.00	915.70
Pct Southern Baptist Convention (County)	71167	85.79	126.23	0.00	852.45
Pct Suburban	71136	0.12	0.25	0.00	1.00
Pct Urban	71136	0.43	0.47	0.00	1.00
1996 County Republican Vote Share	71019	0.47	0.11	0.11	0.85

An observation is a zip code-year. Demographic data comes from the US Census Bureau. Religious adherence data is from 2010 U.S. Religion Census: Religious Congregations and Membership Study (RCMS).

Table A4: Summary Statistics for Mediamark/Simmons Viewership Survey

Statistic	N	Mean	St. Dev.	Min	Max
Year	207950	2003.72	2.47	2000	2008
Has FNC	207950	0.94	0.24	0	1
Has MSNBC	207950	0.93	0.25	0	1
FNC Position	207950	40.79	17.29	0	140
CNN Position	207950	31.34	13.32	0	109
MSNBC Position	207950	42.48	18.56	0	164
Number Channels	207950	153.14	42.38	14	249
Number Broadcast Channels	207950	16.61	7.32	2	45
Age	207950	46.31	15.75	21	70
White	207950	0.81	0.39	0	1
Black	207950	0.10	0.31	0	1
Hispanic	207950	0.11	0.31	0	1
Bachelors	207950	0.32	0.47	0	1
HH Income	207860	0.74	0.63	0.04	6.33
Male	207950	0.51	0.50	0	1
FNC Minutes	207950	61.52	162.22	0.00	1500.00
CNN Minutes	207950	71.21	163.34	0.00	1500.00
MSNBC Minutes	207950	30.59	97.87	0.00	1500.00
Cable Subscriber	207950	0.65	0.48	0	1
Satellite Subscriber	207950	0.18	0.38	0	1
Population	207630	31101.55	18279.02	0	113916
Pct Black	207628	0.12	0.18	0.00	1.00
Pct Asian	207628	0.06	0.08	0.00	0.72
Pct Other	207628	0.09	0.09	0.00	1.00
Pct Hispanic	207628	0.15	0.18	0.00	0.98
Pct Male	207628	0.49	0.02	0.37	1.00
Pct Age 10-20	207628	0.15	0.03	0.00	0.47
Pct Age 20-30	207628	0.13	0.05	0.00	0.66
Pct Age 30-40	207628	0.13	0.03	0.00	0.35
Pct Age 40-50	207628	0.15	0.02	0.00	0.24
Pct Age 50-60	207628	0.14	0.02	0.00	0.26
Pct Age 60-70	207628	0.10	0.03	0.001	1.00
Pct Age 70-80	207628	0.05	0.02	0.00	0.34
Pct Age 80+	207628	0.04	0.02	0.00	0.35
Median HH Income	207614	65344.72	25327.25	9100	228726
Pct HS Graduate	207614	0.26	0.10	0.00	0.90
Pct Some College	207614	0.28	0.06	0.00	0.60
Pct Bachelors Degree	207614	0.21	0.09	0.00	0.54
Pct Post Graduate Degree	207614	0.13	0.09	0.00	0.63
Pct Own Home	207627	0.69	0.17	0.00	0.99
Median Home Value	207562	288273.00	193230.30	9999	1000001
Aggregate Tax Rate	207426	0.01	0.01	0.0002	0.03
Median Number of Rooms	207612	5.75	0.97	1.50	9.00
Pct Homes Built After 2005	207620	0.01	0.01	0.001	0.75
Pct Food Stamps	207614	0.09	0.07	0.00	0.78
Median Social Security Income	207552	16695.29	2219.52	7122	37418
Pct Veteran	207614	0.68	0.11	0.00	1.00
Pct Married	207614	0.53	0.10	0.00	0.88
Pct Same Sex HH	207627	0.01	0.004	0.00	0.11
Pct Unmarried HH	207627	0.06	0.02	0.00	0.20
Pct Family HH	207614	0.09	0.04	0.00	0.33
Fraction of 1996 Contributions to Republican	198700	0.68	0.23	0.00	1.00
Pct Evangelical (County)	207745	118.08	108.77	0.00	809.59
Pct Catholic (County)	207745	249.19	146.38	0.00	946.82
Pct Jewish (County)	207745	28.12	37.96	0.00	313.86
Pct Mormon (County)	207745	13.06	57.96	0.00	915.70
Pct Southern Baptist Convention (County)	207745	54.61	90.84	0.00	736.46
Pct Suburban	207627	0.05	0.18	0.00	1.00
Pct Urban	207627	0.82	0.34	0.00	1.00
1996 County Republican Vote Share	207053	0.45	0.12	0.11	0.82

An observation is an individual. Zip Code demographic data comes from the US Census Bureau. Religious adherence data is from 2010 U.S. Religion Census: Religious Congregations and Membership Study (RCMS).

C Channel Ideology Estimates

C.1 Construction of Estimates

Our estimates of each channel's political ideology are generated by an adaptation of the method employed in Gentzkow and Shapiro (2010) to measure ideology of print newspapers. The method compares the use frequency of phrases in transcripts of the cable channel's shows to the use frequency of the same phrases in floor speeches by members of Congress recorded in the Congressional Record.

Text sources and transcript selection We downloaded all transcripts from any show appearing on CNN, Fox News, and MSNBC during 2000-2013 that were available in the Lexis-Nexis database. Most of the highest-rated prime-time shows on all of the channels were available in Lexis, with one exception: Glenn Beck's Fox News show, which aired from 2009-2011.[44] We supplemented the Lexis transcripts by downloading transcripts of Glenn Beck's Fox News show from historical versions of the Fox News website archived by the Internet Archive (archive.org). Table A5 lists the shows for which we were able to collect transcripts, by channel. For each show, we downloaded all available transcripts of episodes of that show.

We also downloaded the 1998-2012 Congressional Record (CR) in its entirety from the US Government Publishing Office's website (`http://gpo.gov`). From the raw HTML files we extracted every speech that could be attributed to an individual member of Congress.

Pre-processing of text Both transcript and Congressional record text was pre-processed by removing a list of 184 common "stop words" such as "we," "have," "for," and the like. The list of stop words matches that used by Gentzkow and Shapiro (2010). We then applied the Porter stemming algorithm to reduce variants of words to their common roots.[45] For example, the words "beaches" and "beach" would both be stemmed to "beach." Finally, a script counted the frequency of occurrence of every two word phrase that appears at least five times in total in the Congressional record in that year in the speech of every speaker.[46] A two-word phrase is two stemmed words appearing next to each other (excluding stop words) in the same sentence.

[44] The version of Mr. Beck's show on CNN, which aired from 2006-2008, had transcripts available in the database.

[45] We used an implementation of the Porter stemmer written in the Haskell language by Dmitry Antonyuk and Mark Wotton: `https://hackage.haskell.org/package/porter`

[46] A "speaker" in the TV transcripts is a show; in the Congressional record it is a member of Congress, either a senator or representative.

CNN	*Anderson Cooper 360*, *Campbell Brown*, *CNN Live Today*, *CNN News Room*, *CNN Tonight*, *Connie Chung Tonight*, *Crossfire*, *Erin Burnett OutFront*, *Glenn Beck*, *Greenfield at Large*, *John King, USA*, *Larry King Live*, *Moneyline / Lou Dobbs Tonight*, *News Night with Aaron Brown*, *Parker / Spitzer*, *Paula Zahn Now*, *Piers Morgan*, *The Point with Greta van Susteren*, *The Situation Room with Wolf Blitzer*, *Wolf Blitzer Reports*
Fox News	*Fox News Edge*, *Fox News Sunday*, *Glenn Beck*, *Hannity*, *The O'Reilly Factor*, *On the Record with Greta van Susteren*, *Special Report with Bret Baier*, *Special Report with Brit Hume*, *The Edge with Paula Zahn*, *The Kelly File*, *Your World with Neil Cavuto*
MSNBC	*All in with Chris Hayes*, *Ashleigh Banfield on Location*, *Buchanan & Press*, *Countdown with Keith Olbermann*, *Donahue*, *Hardball with Chris Matthews*, *Live with Dan Abrams*, *Morning Joe*, *Politics Nation*, *Rave for the White House 1600 Pennsylvania Ave.*, *Rita Cosby Live and Direct*, *Scarborough Country*, *The Ed Show*, *Last Word with Lawrence O'Donnell*, *The News with Brian Williams*, *The Rachel Maddow Show*, *The Savage Nation*, *Tucker*

Table A5: Cable shows for which transcripts were available, by channel.

Choice of phrase set There are millions of two-word phrases which result from the phrase-counting algorithm described above. Most of these are of no value for distinguishing the partisanship of a a speaker. As a result, it is necessary to reduce the set of phrases considered to a manageable size, and to limit the number of "noise" phrases. We construct, for each phrase appearing in the Congressional Record, the Gentzkow-Shapiro partisanship statistic. We use the top 1000 "most partisan" phrases in each year according to this criterion, subject to the condition that the phrase must appear at least 20 times in total in the cable news transcripts in that year. We impose this criterion to weed out the (many) purely procedural phrases that appear in the Congressional Record, many of which appear highly partisan because they are spoken primarily by committee chairs, the House Speaker, and other members of the Congressional leadership, who by definition are all members of the majority party in the chamber.[47] The result is a set of 1000 phrases for each year.

Elastic-net regression For each speaker in both the CR and the transcripts, we compute the frequency of each phrase as the count of occurrences divided by the total number of two-word phrases (among all phrases, not just the set of 1000 selected in the previous set). We standardize all frequencies by subtracting the mean frequency (across all speakers) and dividing by the cross-speaker standard deviation of frequency of the phrase in that year. This scaling prevents phrases that are more common overall from being weighted more heavily in the elastic net objective.

The standardized phrase frequencies of the set of 1000 phrases in each year for Congressional speakers are then input to an elastic-net regression (Zou and Hastie, 2005) where the dependent variable is the common-space DW-nominate first dimension score (McCarty et al., 1997) of the legislator. We restrict the sample for this regression to the set of legislators who use the phrases in the set of 1000 at least 100 times in total, which drops a few very infrequent speakers from the sample. We select the lasso parameter λ in each year by cross-validation, and set the parameter α to 0.01. Finally, the estimated coefficients from the fitted models are used to compute a predicted ideology for each show-year.

Aggregation to channel-year level We aggregate the show-year-level predicted ideologies to the channel-year level by a simple weighted average: shows in prime time get weight of two, and non-prime-time shows get weight of one. This weighting scheme approximately

[47] Some examples of such phrases are "move (the) question," "cloture motion," "unanimous consent," and "absence (of a) quorum."

reflects the cable news audience distribution across the two time slots. Finally, we apply a moving-average smoothing filter to transform the resulting channel-year ideology estimates. This filter has a window of three years; we assign weight of 1/2 to the current year's estimate, and 1/4 each to the previous and next year's estimate.

C.2 Alternative Assumptions and Robustness

We perform four checks to assess whether the patterns in the estimated slant are robust to alternative assumptions. First, instead of estimating the elastic net year-by-year, we pool all the Congressional speech into one data set. Second, we replace the elastic net with alternative models (random forest, partial least squares, and LASSO). Third, we use a binary indicator of Republican or Democrat instead of DW-Nominate scores. Finally, we computed a measure that does not rely on phrase usage at all: the share of time (measured by word count) allocated to guests who are elected officials from either party.

Pooling Congressional Data The change in slant when estimating ideologies year-by-year reflects variation in both speech in Congress and speech on the news channels. The advantage of the year-by-year approach is that the issues on which partisan conflict focuses can change, sometimes dramatically, over time. For example, phrases related to the war in Iraq do not appear prior to 2003 but become common (and highly partisan) thereafter. A selection of Iraq-related phrases would be very informative about partisanship in 2004-2006 but totally uninformative in 2000-2002, and hence it is advantageous to allow the phrase set to change over time to track the contemporaneous issues over which partisan conflict is most intense.

The disadvantage of the year-by-year approach is that apparent changes in our measures of slant on the news channels could be driven by changes in speech in Congress, rather than on the news channels. To check that our reported increase in dispersion of slant on the news channels is not driven purely by changes in speech in Congress, we pool the Congressional Record data across all the years in our sample and estimate the slant model on this pooled data. In this pooled version, there is a single set of phrases which each get an estimated coefficient of partisanship that applies for the entire sample period.[48] This approach thus

[48] An implicit assumption here is that the relationship between DW-NOMINATE measured ideology and phrase usage is constant over the sample period. If this assumption were violated, the result would be to weaken the correlation between DW-NOMINATE-measured ideology and phrase usage (assuming the relationship between "true" ideology and phrase usage remained constant). This would tend to reduce the magnitude of the coefficient estimates,

guarantees that variation in the news channels' estimated slant over time is driven by changes in speech on the news channels only, not by changes in speech in Congress. Figure A1 confirms that the pattern of divergence from the center of estimated ideologies of FNC and MSNBC over time holds when using the pooled Congressional speech data.

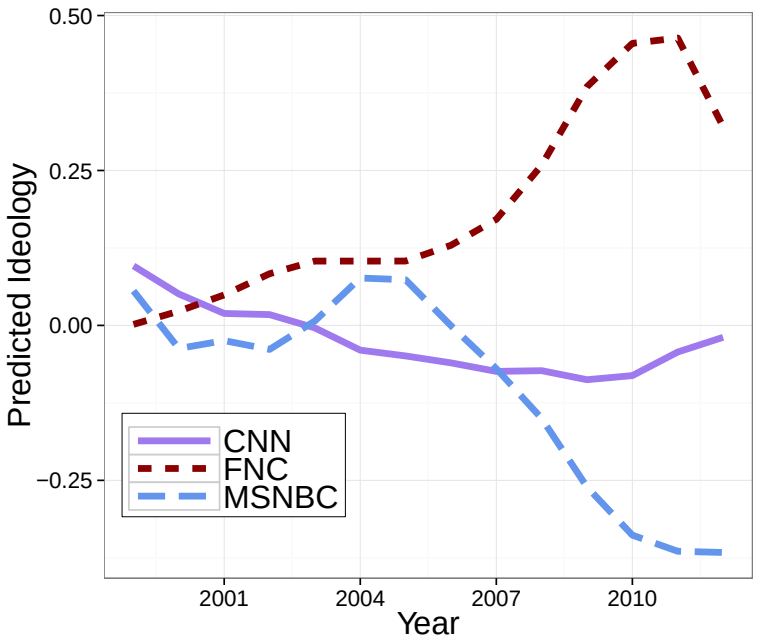

Figure A1: Estimated Ideology by Channel-Year: Each point corresponds to the estimated ideology of the news channels based on phrase usage. This version is constructed using the pooled sample of Congressional speech for the entire 2000-2012 period.

Alternative Models The elastic net imposes a specific form on the penalty term in the regularized regression, and it is possible that our reported slant measures are sensitive to this choice. To test the sensitivity of our results to the choice of elastic net, we replaced the elastic net with three alternative procedures. We use a random forest model Breiman (2001) with one hundred trees and a maximum of 2500 nodes on each tree in Figure A2; the partial least squares measure from Gentzkow and Shapiro (2010) in Figure A3; and the LASSO with penalty parameter chosen by cross validation in Figure C.2. The general pattern of diverging slant holds across all models.

and hence reduce the measured ideological separation between the channels.

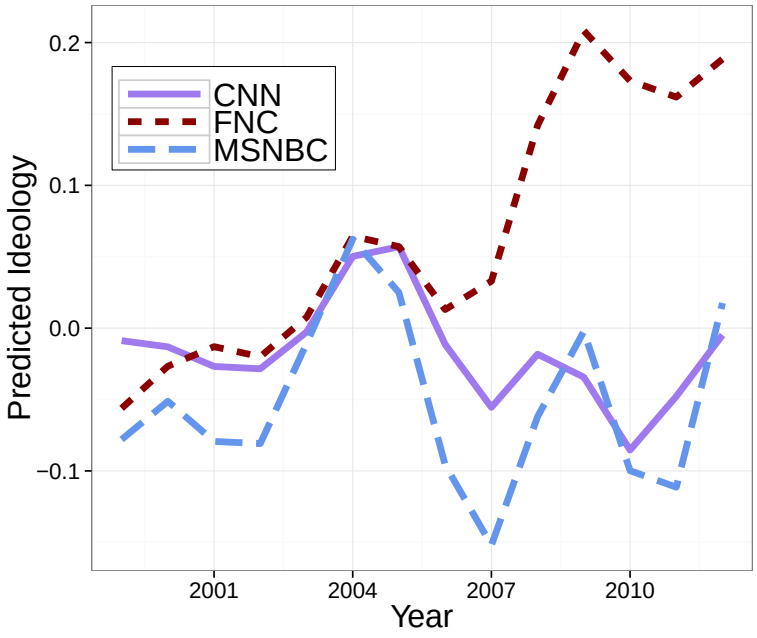

Figure A2: Random Forest Estimated Ideology by Channel-Year: Each point corresponds to the estimated ideology of the news channels based on phrase usage.

Binary Indicator of Partisanship The left-hand side of the regressions in the slant model is members of congress' first dimension DW-Nominate score. DW-Nominate is constructed from roll-call voting records, it is possible that variation in the set of issues that come up for roll call votes in Congress could drive our estimated ideology scores. If, for instance, majority parties increasingly exercised agenda control to keep bills that would split the majority caucus off the floor during the sample period, apparent polarization in Nominate scores - and hence in our measures of slant - could increase even if there were no change in speech patterns on cable news. To test this possibility, we re-estimated the model replacing the Nominate score with a binary indicator of partisanship (0 for Democrat and 1 for Republican). Although this version is noisier due to the information loss in moving from a continuous to a binary measure of ideology, the pattern of initially close estimated ideologies and increasing dispersion over time also holds here.

Time Allocated to Partisan Guests As a final check against the possibility that the ideology estimates are driven by variation in phrase usage unrelated to underlying ideology, we computed a measure of channel partisanship based not on the content of speech but simply

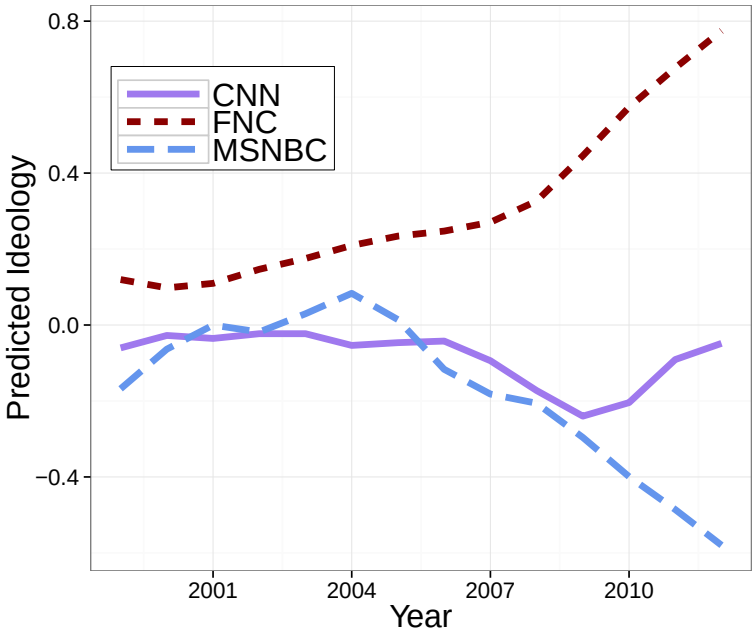

Figure A3: Partial Least Squares Estimated Ideology by Channel-Year: Each point corresponds to the estimated ideology of the news channels based on phrase usage.

the identity of the speaker. Cable news shows frequently invite current and former elected officials on as guests to comment on current events. We counted the total number of words spoken by guests on each channel who are current or former elected officials affiliated with each of the major parties, and plotted the share of words spoken by guests affiliated with the Republican party, as a fraction of total words spoken by guests of either party. The results, shown in Figure A6, show a pattern similar to the phrase-based estimates, with divergence between the channels widening after 2005.

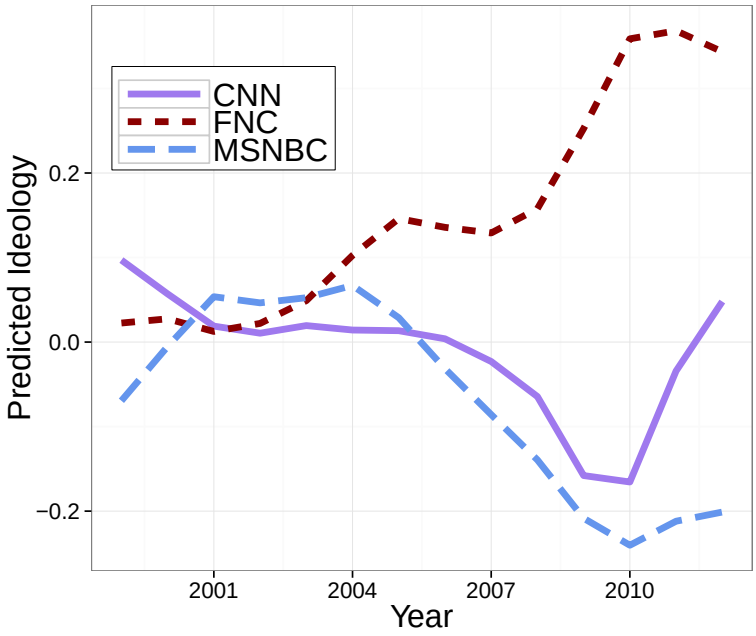

Figure A4: Cross Validated LASSO Estimated Ideology by Channel-Year: Each point corresponds to the estimated ideology of the news channels based on phrase usage.

D Update of DellaVigna and Kaplan (2007)

DellaVigna and Kaplan (2007) (henceforth DVK) compare changes in presidential vote shares in towns which had access to the Fox News Channel by the year 2000 compared to towns that did not conditional on a rich set of co-variates. In this section, we update the estimates from DVK using Nielsen data on availability of Fox News.

D.1 Data Sources

The data source in DVK is the Warren's Cable and Television Factbook (henceforth Factbook). The Factbook updates only a minority of cable systems every year. The extent of non-updating has been documented by Crawford and Yurukoglu (2012). We reproduce the relevant years from their Appendix table below in Table A6. Updating is especially poor around DVK sample year. Between 1999 and 2000, only 22% of observations were updated. Between 1998 and 1999, only 37% of observations were updated. Since Fox News was expanding across the country rapidly during these years, this infrequent updating is consequential: many towns in the Factbook were listed as not having cable access to Fox News, when in fact they did but

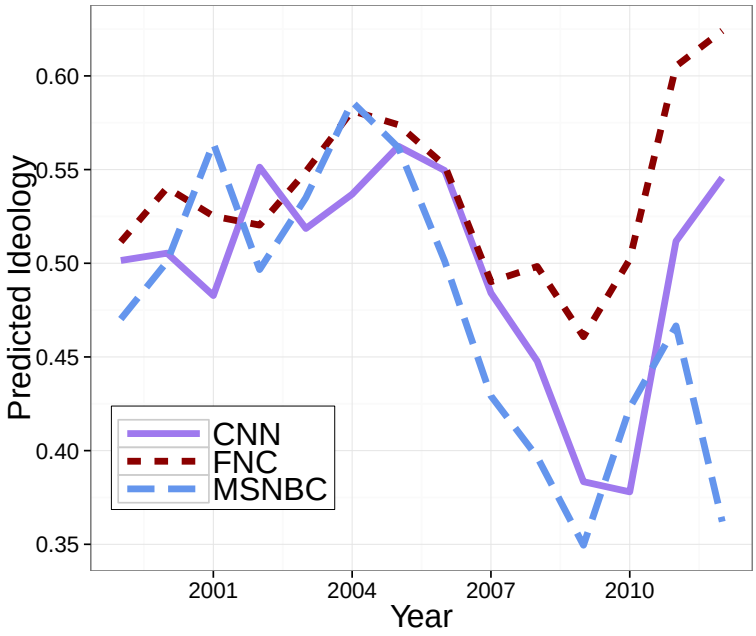

Figure A5: Estimated Ideology by Channel-Year: Each point corresponds to the estimated ideology of the news channels based on phrase usage where ideology is measured on a scale of 0 (Democrat) to 1 (Republican).

the Factbook simply wasn't updated yet. Nearly all systems in the Nielsen FOCUS data are updated every year.

To audit the Factbook data against the Nielsen FOCUS data, we consulted a third data source: cable conversion charts that appeared in weekly TV Week additions of local newspapers. These tables listed channel numbers for local cable systems. Figure D.1 provides an example capture from the microfilms of such a chart. To conduct the audit, we sorted the set of communities where FOCUS and Factbook disagreed on Fox News availability in 2000 by population size. We tried to find cable conversion charts for the largest two hundred communities. We were able to readily find conversion charts which reference the community name in the system name and provide information on Fox News Channel for 45 communities.[49] For these 45 communities, the Nielsen FOCUS data was correct on 42 (93.33%) whereas the Factbook

[49]The exact requirement is that the newspaper explicitly names the community in question. For example, we did not match Greenwich, CT to Cablevision Southern Connecticut as the newspaper did not explicitly mention that Greenwich was covered by this system. Furthermore, some conversion grids did not list all channels. For example, the Boston Globe only provided numbers for 31 basic cable channels, omitting Fox News, even though it had listings for 50 systems. The microfilm scans and spreadsheet with details on the audit are available on request from the authors.

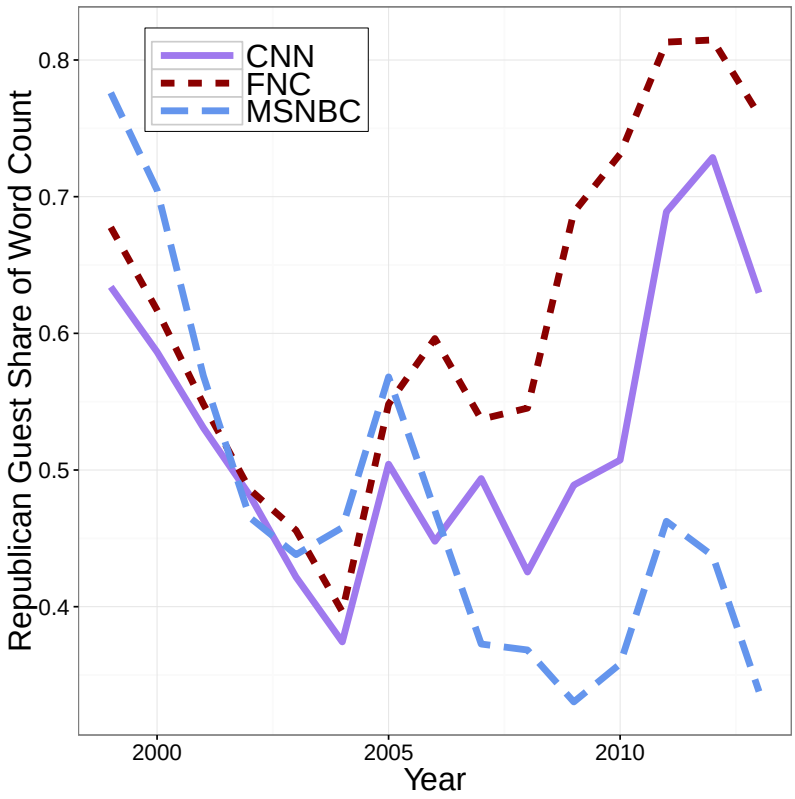

Figure A6: Estimated Ideology by Channel-Year: Each point corresponds to the number of words spoken by guests who are elected Republican officials divided by the number of words spoken by guests who are elected officials from either major party, for a given channel-year.

Table A6: Data Quality of Factbook

Year	*Variable*	*Number of Bundles*	*Fraction of Bundles*
1998	Total bundles	15,743	100.0%
	Full information	10,872	69.0%
	Updated	4,714	30.0%
	Full information and updated	3,461	22.0%
1999	Total bundles	15,497	100.0%
	Full information	10,444	67.0%
	Updated	5,663	37.0%
	Full information and updated	3,595	23.0%
2000	Total bundles	15,453	100.0%
	Full information	10,312	67.0%
	Updated	3,358	22.0%
	Full information and updated	2,478	16.0%
2001	Total bundles	15,391	100.0%
	Full information	9,793	64.0%
	Updated	4,173	27.0%
	Full information and updated	2,663	17.0%
2002	Total bundles	15,287	100.0%
	Full information	7,776	51.0%
	Updated	5,086	33.0%
	Full information and updated	1,484	10.0%
1997-2007	Total bundles	166,619	100.0%
	Full information	91,100	55.0%
	Updated	62,299	37.0%
	Full information and updated	31,493	19.0%

Notes: This table is a reproduction from Crawford and Yurukoglu (2012) indicating the degree of non-updating in Factbook data.

was correct on 3. Second, we investigated the systems with a particular large discrepancy: those where Nielsen FOCUS indicated had Fox News availability in 1998 while the Factbook indicated no availability by 2000. 353 of these systems were operated by Tele-Communcations Inc. (TCI) in 1998. Press reports from the time period indicate that Fox News would be available to over 90% of TCI customers by 1998 (Colman (1996)).

Finally, the number of subscribers for Fox News implied by the Factbook data conflict with the amount of viewership Fox News had in 2000, including the viewership data used in DVK. According to DVK, "About half of the Fox News audience, therefore, watches Fox News in ways other than via cable, possibly via satellite. This finding could also be due to measurement error in our measure of availability via cable." According to their data, 17% of households were watching Fox News in 2000. Therefore, 8.5% of all households must have been simultaneously satellite subscribers and watching Fox News. However, the market share of satellite in the year 2000 was 11.4%[50] Therefore, a vast majority of satellite subscribers must have been watching Fox News in 2000 to be consistent with the Factbook availability measures. Our Mediamark data indicate that the fraction of satellite subscribers watching Fox News in 2000 is only 19%.[51]

To correct this issue, we matched the voting and demographic data in DVK to Nielsen FOCUS. The identification numbers in the Factbook and Nielsen FOCUS do not match. We employed a matching procedure based on community names and firm names, using manual inspection when matches weren't obvious. We were able to reliably match 8,013 observations out of 9,256 to Nielsen FOCUS. Tables A7 and A8 compare the availability of Fox News according to the two data sources.

		Factbook Fox News (Year 2000)		
		0	1	Total
Nielsen Fox News	0	3,527	51	3,578
(Year 2000)	1	3,076	1,520	4,435
	Total	6,478	1,535	8,013

Table A7: Year 2000: Nielsen Fox News Availability and Factbook non-updated Fox News Availability.

[50]The cable market share was 70.2% implying a 81.6% total market share. Thus, about 14% of cable or satellite subscribers were satellite subscribers.

[51]Their viewership data and our Mediamark data agree on the aggregate 17% number. Our Mediamark data indicate the conditional probability of watching Fox News conditional on satellite is only marginally higher at 19%.

CONVERSION GRID/LOCAL CABLE SYSTEMS/RADIO STATIONS 67

Local systems

Below is a listing of cable systems and communities serviced.

Anoka Ramsey, Champlin, Andover

Apple Valley Farmington, Lakeville, Rosemount

Blaine Centerville, Circle Pines, Coon Rapids, Ham Lake, Lexington, Lino Lakes, Spring Lake Park, Oak Grove

Columbia Heights Hilltop

Lake Minnetonka Deephaven, Long Lake, Minnetrista, Shorewood, Victoria, Excelsior, Medina, Orono, Spring Park, Woodland, Greenwood, Minnetonka Beach, St. Bonifacius, Tonka Bay, Chanhassen, Maple Plain, Mound, Wayzata, Waconia, Loretto

Northwest Brooklyn Park, Brooklyn Center, Robbinsdale, Golden Valley, New Hope, Osseo, Maple Grove, Plymouth, Crystal

Roseville Arden Hills, Falcon Heights, Lauderdale, Mounds View, New Brighton, St. Anthony, Shoreview, Little Canada, North Oaks

Shakopee Chaska

Southwest Eden Prairie, Edina, Hopkins, Minnetonka, Richfield

South Washington County Washington County, St. Paul Park, Cottage Grove, Woodbury, Grey Cloud Island, Newport, Stillwater, Bayport, Oak Park Heights, Afton, Baytown Township, Denmark Township, Lakeland, Lakeland Shores, St. Croix Beach, St. Mary's Point, Stillwater Township, West Lakeland

White Bear Lake Mahtomedi, Willernie, Dellwood, Grant Township, Birchwood Village, Lake Elmo, Vadnais Heights, White Bear Township, Gem Lake, Hugo

Conversion grid

Stations may appear on different channels in each cable system. This chart lists stations and channels in the major local cable systems. • Grid listing.

	Anoka	Apple V.	Blaine	Bloom.	Col. Hgts.	Eag./Burn	Fridley	Hastings	L. Mtka.	Mpls.	Northwest	Roseville	St. L. Park	St. Paul	Shakopee	S. Wash.	Southw.	Wash. Co.	W. Bear
A&E •	55	48	46	26	36	66	28	36	29	29	36	58	28	16	29	36	28	36	58
Amer. Movie (AMC) •	38	46	3	65	40	3	65	40	45	30	40	40	65	30	30	40	65	40	40
Animal Planet (AP) •	27	66	29	29	56	29	29	34		308	34	56	29	67	47	34	29	34	56
BET •	36	65	36	33	66	36	33	54		55	54	66	33	40	60	54	33	54	66
BRAVO (BRV) •	28	43	37	30	21	37	30	66	34	27	42	96	30	48	27	66	30	66	21
C-Span (CSPN) •	71	8	35	21	58	35	21	19	12	23	33	23	21	62	23	19	23	19	23
C-Span II	3	7	39	59	20	39	59	20	6	95B	98	25	59	63	45	20	59	20	20
CNBC •	52	38	52	60	33	52	60	29	24	24	29	38	60	28	24	29	60	29	38
Cable News (CNN) •	50	31	50	3	31	50	3	31	46	3	31	36	3	3	3	31	3	31	36
CNN Headline	51	28	51	61	32	51	61	32	30	15	32	37	61	15	15	32	61	32	37
Cartoon Ch. (TOON) •		51		42	55		42	47		248	47	55	42	44	57	47	42	47	55
Cinemax (MAX) •	26	78	26	78	71	26	78	71	22	52	71	71	78	51	52	71	78	71	71
Cinemax2 (MAX2) •		79												54					
Classic Sports (CS) •				51	29		51	64		18B	64	34	51	71		64	51	64	34
Comedy Cen. (COM) •	42	56	42	31	50	42	31	50	50	31	50	50	31	45	31	50	31	50	50
Court TV (CRT) •	62	50	14		60	14		22		168	55	29	95	57		22		22	29
Discovery (DSC) •	69	47	67	28	37	67	28	37	43	22	37	59	28	22	22	37	28	37	59
Disney (DIS) •	7	27	7	76	53	7	76	44	51	50	44	53	76	58	50	44	76	44	53
E! •	34	54	34	49	51	34	49	51	54	59	51	51	49	43	59	51		51	51
ESPN •	46	29	46	52	25	46	52	25	32	16	25	30	52	7	16	25	52	25	30
ESPN2 •	47	57	47	53	26	47	53	63		26B	26	31	53	65	48	63	53	63	31
Eternal Word	74		38	46	98	38	46	21	23	96	56	24	46	61	36	21	46	21	24
Family St. (FAM) •	35	35	27	45	57	27	45	46	16	38	46	57	45	27	38	46	45	46	57
Food Network (FOOD) •					44			33		158	95	44	59			33	39	33	44
Fox News (FNC) •	53		53	63	34	53	63	30		21B	30	39	63	69	96	30	63	30	39
FX •	31	58	31		48	31	50	48	30	48	48	48	50	64		48	31	48	48
FX Movies (FXM) •														72					

Figure A7: Cable conversion chart from Minneapolis Star-Tribune in October 2000. The rows correspond to cable channels. The columns correspond to local cable systems. According to the Factbook data used in DVK, Minneapolis did not have access to the Fox News Channel by November 2000. The Nielsen FOCUS data indicate that Minneapolis did have access to Fox News Channel in 1999, and also correctly indicates the channel number of 21B.

		Factbook Fox News (Year 2000)		
		0	1	Total
Nielsen Fox News	0	4,687	355	5,042
(Year 1998)	1	1,791	1,180	2,971
	Total	6,478	1,535	8,013

Table A8: Nielsen Fox News Availability in 1998 and Factbook non-updated Fox News Availability in 2000.

About 40 percent of the control group in DVK is mis-classified as not having cable access to Fox News. About 25 percent already had access in 1998 and hadn't been updated for at least two years in the Factbook.

D.2 Estimates with Nielsen Data

We now re-run the two benchmark specifications from DVK: the county level fixed effects regression and the US House district level fixed effects regression. These correspond to equation (2) in DVK. Table A9 compares the resulting estimates.

The estimate in the Congressional district fixed effects regression remains stable and statistically significant with the Nielsen data. The estimate in the county level fixed effects regression drops from a statistically significant at 1% 0.00694 to a significant at 10% 0.00256. The difference cannot be attributed to not matching all of DVK's observations. The estimated effect is stronger when using the Factbook Fox variable, but only on the subset of matching observations . The change in results could possibly reflect that availability in the Factbook indicates a longer period of availability and the effects of exposure accumulate over time, however the Nielsen availability data only goes back to 1998 so we can not empirically test this explanation.

We now update the placebo result regarding Fox News availability in 2000. Table A10 compares the placebo regression estimates using the original data and the Nielsen data. Using the more correct data in the district fixed effect specification, the placebo regression's estimate for the effect of Fox News availability in 2000 on the change in vote shares from 1992 to 1996 is 0.0028, nearly the same as the estimate for the change in 1996 to 2000, compared to -0.00386 using the Factbook data. The coefficient's precision can not rule out a zero effect. The confidence interval for the Fox News availability in 2000 has shifted from (-0.0085, 0.0038) to (-0.0014, 0.0070).

Republican two-party vote share change between 2000 and 1996 pres. elections						
	(1)	(2)	(3)	(4)	(5)	(6)
Factbook Fox	0.00421	0.00515		0.00694	0.00778	
	(0.00154)	(0.00166)		(0.00150)	(0.00166)	
Nielsen Fox			0.00360			0.00256
			(0.00121)			(0.00141)
Observations	9,256	8,013	8,013	9,256	8,013	8,013
R^2	0.753	0.760	0.760	0.812	0.823	0.822
Data Set	Factbook	Factbook	Nielsen	Factbook	Factbook	Nielsen
Sample	Full	Matched	Matched	Full	Matched	Matched
FE	District	District	District	County	County	County

Robust standard errors in parentheses, clustered by cable firm

Table A9: District FE and County FE specifications from DVK and with alternative Fox News availability data.

For the district fixed effects specification, when examining the correlation of Fox News availability in 2000 with the level of Republican vote share in 1996, the point estimate changes from -0.0343 to 0.150, though in both cases the estimates are noisy with standard errors of 0.095 and 0.124, respectively. The coefficient in the county fixed effects specification becomes slightly more negative, which is reassuring, though again the estimate is noisy.

To summarize, using the more correct Nielsen FOCUS data, one estimates a consistent effect of 0.3 percentage points relative to an average of 0.5 percentage points with the Factbook data. The evidence on balance could be interpreted that in studying the effects of Fox News, researchers should utilize the more accurate Nielsen data, and pay special attention to the source of variation identifying the estimates and weigh the costs and benefits of using availability in 2000 or channel positions as sources of variation in viewership of Fox News. Both sources of variation are attractive on different dimensions.

	Republican two-party vote share change between 1996 and 1992 pres. elections					
	(1)	(2)	(3)	(4)	(5)	(6)
Factbook Fox	-0.00237	-0.00386		-0.00686	-0.0111	
	(0.00313)	(0.00335)		(0.00291)	(0.00286)	
Nielsen Fox			0.00280			0.00045
			(0.00212)			(0.00244)
Observations	4,006	3,527	3,527	4,006	3,527	3,527
R^2	0.620	0.625	0.626	0.732	0.725	0.732
Data Set	Factbook	Factbook	Nielsen	Factbook	Factbook	Nielsen
Sample	Full	Matched	Matched	Full	Matched	Matched
Specification	District FE	District FE	District FE	County FE	County FE	County FE

Robust standard errors in parentheses, clustered by cable firm

Table A10: OLS, District FE, and County FE Placebo specifications from DVK and with alternative Fox News availability data.

	Fox News Availability in 2000					
	Factbook	Factbook	Nielsen	Factbook	Factbook	Nielsen
Pres. republican vote share in 1996	-0.0343	-0.0182	0.150	-0.0442	-0.0584	-0.0922
	(0.0949)	(0.0995)	(0.124)	(0.110)	(0.117)	(0.117)
Observations	9,256	8,013	8,013	9,256	8,013	8,013
R^2	0.670	0.668	0.445	0.768	0.771	0.577
Sample	Full	Matched	Matched	Full	Matched	Matched
Specification	District FE	District FE	District FE	County FE	County FE	County FE

Robust standard errors in parentheses, clustered by cable firm

Table A11: OLS, District FE, and County FE specifications from DVK and with alternative Fox News availability data regressed on 1996 vote share.

E IV-2SLS Results with Individual Level Data

E.1 First Stage

Table A12 presents the analogous results using the individual-level data from MediaMark. In this version, we are able to include demographic characteristics measured at the individual level in addition to the full set of extensive zip level demographic measures. Estimating equations here take the form:

$$h^c_{izt} = \delta_{ct} + a_{zct} + \alpha^1_c x_{zt} + \alpha^2_c x_{it} + \zeta_{c,FNC} p^{FNC}_{zt} + \zeta_{c,MSNBC} p^{MSNBC}_{zt} + \epsilon^H_{ict} \quad (9)$$

Again, the FNC channel position correlates negatively with viewership, with very similar magnitude as in the independently sampled zip code level data. Unfortunately, because the individual level data span only about one-half as many clusters (cable systems) as the zip-code level data, the cluster-robust F statistics fall below ten in most cases, and the first stage coefficient on the instrument falls to zero when county-year fixed effects are included. The sample in Table A12 includes all respondents, including satellite subscribers and those who subscribe to neither wired cable nor satellite television. We use the pooled-sample first stage because the second stage data set lacks information on individuals' subscription choices. Section 4 presents a first stage estimated among cable subscribers alone; among cable subscribers, the individual-level position effect is precise and consistently negative.

In the individual level data, we can directly identify whether a respondent is a cable subscriber, a satellite subscriber, or neither.[52] We therefore run the first stage individual-level regression restricted to only cable and satellite subscribers, and interact channel positions with an indicator for whether the viewer subscribes to satellite.

E.2 Second Stage

The individual-level regressions are directly analogous, with the exception that the outcome y_{izt} is now an indicator for whether individual i states their intention to vote for the Republican presidential candidate in the election of year t:

[52] Satellite subscribers make up about 18% of MediaMark respondents, and roughly 16% of MediaMark respondents report subscribing to neither cable nor satellite television service.

Table A12: First Stage Regressions: Mediamark / Simmons Data

	FNC Minutes per Week					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Cable Position	−0.0833	−0.0977	−0.1008	−0.1068	0.0124	0.0302
	(0.0572)	(0.0542)	(0.0504)	(0.0447)	(0.0485)	(0.0464)
MSNBC Cable Position	0.0522	0.0480	0.0270	0.0628	−0.0323	−0.0115
	(0.0549)	(0.0552)	(0.0504)	(0.0441)	(0.0511)	(0.0472)
HH Income			43.5512	39.6030	40.4058	36.6810
			(2.9913)	(2.9649)	(3.0338)	(3.0511)
HH Income^2			−18.6924	−16.8152	−17.1702	−15.5555
			(1.6098)	(1.5933)	(1.6538)	(1.6464)
HH Income^3			1.9785	1.7680	1.8209	1.6416
			(0.1945)	(0.1915)	(0.2004)	(0.1974)
Age Quintile 2			10.9538	10.4238	10.6015	10.4606
			(0.9631)	(1.0032)	(0.9852)	(1.0104)
Age Quintile 3			21.8585	21.0334	21.2143	20.8256
			(1.0367)	(1.0775)	(1.0734)	(1.1106)
Age Quintile 4			31.5240	30.6014	30.9846	30.4839
			(1.1648)	(1.2012)	(1.2028)	(1.2334)
Age Quintile 5			64.2801	62.4959	62.8403	61.4261
			(1.4777)	(1.4761)	(1.5076)	(1.5137)
White			11.2290	9.8168	11.1014	10.7936
			(1.1463)	(1.2379)	(1.1839)	(1.2764)
Black			8.9943	10.7470	11.9928	13.1555
			(1.8396)	(1.7492)	(1.7361)	(1.7497)
Hispanic			−11.3233	−8.5084	−9.9711	−8.4407
			(1.4999)	(1.3540)	(1.3829)	(1.3748)
College Degree			−7.6653	−6.1894	−6.6920	−6.3910
			(0.9601)	(0.9833)	(0.9519)	(0.9897)
Man			10.5359	10.5422	10.6558	10.7509
			(0.8083)	(0.8265)	(0.8155)	(0.8317)
Fixed Effects:	Year	State-Year	State-Year	State-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Individual	Extensive	Individual	Extensive
Robust F-Stat	2.1	3.2	4	5.7	0.1	0.4
Number of Clusters	2589	2589	2589	2379	2589	2381
N	207,950	207,950	207,860	197,551	207,860	198,300
R^2	0.0099	0.0158	0.0395	0.0419	0.0737	0.0745

Cluster-robust standard errors in parentheses (clustered by cable system). Instrument is the ordinal position of FNC on the local system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. Cable system controls include the total number of channels on the system and the number of broadcast channels on the system. "Individual" demographics are measured at the level of the individual respondent. "Extensive" demographics include all of the same individual-level measures plus all of the zip-code-level demographics included in the zip-code-level analysis.

$$y_{izt} \quad = \quad \gamma_t + a_{it} + \beta^1 x_{it} + \beta^2 x_{zt} + \rho_f h_{it}^f + \epsilon_{it}^V \tag{10}$$

Predicted hours in the individual-level regression is produced by the first-stage estimates in Table A12.

Table A13: Second Stage Regressions: NAES / CCES Data

	P(Vote for Republican Presidential Candidate)		
	(1)	(2)	(3)
Pred. FNC Mins.	0.0018	0.0034	0.0023
	(−0.0142, 0.0244)	(−0.0049, 0.0234)	(−0.0012, 0.0122)
HH Income		0.3358	0.3251
		(−0.5604, 0.7036)	(−0.0755, 0.5129)
HH Income^2		−0.3090	−0.2769
		(−0.4943, 0.0952)	(−0.3887, −0.0993)
HH Income^3		0.0836	0.0740
		(0.0385, 0.1115)	(0.0505, 0.0988)
Age Quintile 2		−0.0073	−0.0008
		(−0.2267, 0.0919)	(−0.1027, 0.0414)
Age Quintile 3		−0.0426	−0.0282
		(−0.4798, 0.1463)	(−0.2317, 0.0514)
Age Quintile 4		−0.1027	−0.0764
		(−0.7632, 0.1597)	(−0.3689, 0.0372)
Age Quintile 5		−0.1893	−0.1233
		(−1.4844, 0.3452)	(−0.7469, 0.1068)
White		0.0539	0.0558
		(−0.1941, 0.1509)	(−0.0411, 0.0964)
Black		−0.3836	−0.3544
		(−0.5517, −0.3001)	(−0.4690, −0.3051)
Hispanic		−0.0434	−0.0561
		(−0.1375, 0.1871)	(−0.0910, 0.0339)
College Degree		−0.0584	−0.0478
		(−0.1235, 0.0978)	(−0.0736, 0.0147)
Man		0.0387	0.0505
		(−0.1610, 0.1299)	(−0.0533, 0.0878)
Fixed Effects:	State-Year	State-Year	State-Year
Cable Controls:	Y	Y	Y
Demographics:	None	Individual	Extensive
Number of Clusters	6659	6523	5540
N	134,970	122,738	116,009
R^2	0.0286	0.1116	0.1365

The first stage is estimated on all MediaMark/Simmons respondents. See first stage tables for description of instruments and control variables. Confidence intervals are generated from 500 independent STID-block-bootstraps of the first and second stage datasets. Reported lower and upper bounds give the central 95 percent interval of the relevant bootstrapped statistic. "Individual" demographics are measured at the level of the individual respondent. "Extensive" demographics include all of the same individual-level measures plus all of the zip-code-level demographics included in the zip-code-level analysis.

Comparing the two versions, the point estimate of the second-stage coefficient on FNC

viewing is higher in the individual-level regression. It is also much less precise, however; the individual-level confidence interval entirely covers the zip code-level confidence interval. This difference is reflective of both the greater power of the instrument in the zip code-level first stage and the much greater predictability of zip code-level Republican vote shares as opposed to individual vote intentions: R^2 values in the zip code-level reduced form regression approach 0.85, as compared to 0.15 in the corresponding individual-level regression.

There are two factors which temper the threat of misleading inference due to weak instruments in the second stage. First, we are using a single instrument in the just-identified case. Second, recalling the two-sample nature of the individual data, the intent-to-vote data span many more clusters than the viewership data.

E.3 Reduced Form

With the individual level data, these correlations are only significant in the specifications with state-year fixed effects; due to the relatively small number of clusters in this sample there is insufficient within-county variation to estimate the position effects precisely.

E.4 Demographic Placebos

Table A14: Reduced Form Regressions: NAES / CCES Data

	P(Vote for Republican Presidential Candidate)					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Cable Position	−0.0003	−0.0002	−0.0003	−0.0002	−0.0004	−0.0002
	(0.0003)	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0002)
MSNBC Cable Position	0.001	0.0002	0.0001	0.0001	−0.0003	−0.0005
	(0.0003)	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0002)
HH Income			0.481	0.414	0.452	0.398
			(0.026)	(0.027)	(0.027)	(0.028)
HH Income^2			−0.370	−0.313	−0.341	−0.298
			(0.030)	(0.030)	(0.031)	(0.032)
HH Income^3			0.090	0.077	0.083	0.073
			(0.009)	(0.009)	(0.009)	(0.010)
Age Quintile 2			0.030	0.023	0.028	0.025
			(0.005)	(0.005)	(0.005)	(0.006)
Age Quintile 3			0.031	0.020	0.028	0.022
			(0.005)	(0.005)	(0.005)	(0.005)
Age Quintile 4			0.003	−0.007	0.001	−0.003
			(0.005)	(0.005)	(0.006)	(0.006)
Age Quintile 5			0.027	0.019	0.028	0.023
			(0.005)	(0.005)	(0.005)	(0.005)
White			0.092	0.079	0.083	0.079
			(0.006)	(0.006)	(0.006)	(0.006)
Black			−0.353	−0.329	−0.338	−0.322
			(0.009)	(0.010)	(0.010)	(0.010)
Hispanic			−0.082	−0.076	−0.075	−0.076
			(0.008)	(0.008)	(0.009)	(0.008)
College Degree			−0.084	−0.062	−0.070	−0.062
			(0.004)	(0.004)	(0.004)	(0.004)
Man			0.074	0.075	0.075	0.075
			(0.003)	(0.003)	(0.003)	(0.003)
Fixed Effects:	Year	State-Year	State-Year	State-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Individual	Extensive	Individual	Extensive
Number of Clusters	6739	6739	6605	5582	6605	5582
N	135,574	135,574	123,297	116,465	123,297	116,465
R^2	0.012	0.029	0.112	0.137	0.188	0.197

Cluster-robust standard errors in parentheses (clustered by cable system). "Individual" demographics are measured at the level of the individual respondent. "Extensive" demographics include all of the same individual-level measures plus all of the zip-code-level demographics included in the zip-code-level analysis.

Table A15: Comparison of covariate groups' influence on viewing equation, voting equation, and the first stage coefficient estimate: Mediamark / Simmons Data

	R^2 Change (Viewing)	R^2 Change (Voting)	First Stage	Reduced Form
Zip Race				
Zip Age	0.000038	0.000507	−0.110166	−0.000249
			(0.044847)	(0.000135)
Zip Education	0.000204	0.000584	−0.104163	−0.000251
			(0.044891)	(0.000133)
Zip Marital Status	0.000284	0.001017	−0.106287	−0.000256
			(0.045566)	(0.000133)
Number of Clusters	2379	5582	2379	5582
N	197,551	197,551	61,326	61,326

Cluster-robust standard errors in parentheses (clustered by cable system). The first two columns are the decrease in R^2 resulting from excluding all variables in the listed group from the viewership and the voting regressions, respectively, relative to the version of the model with the complete set of demographic controls included. The third column shows the estimated first stage coefficient on FNC position when the corresponding group of demographic variables is excluded from the equation. The final column is the same exercise, for the reduced form equation. All regressions include the "Extensive" demographic set, with the exception of the indicated group of variables, plus state-year fixed effects.

F Additional Regression Tables

F.1 Reduced Form Results for 2004 and 2012

Here we present reduced form results for the 2004 and 2012 elections. For 2004, seventeen states had geo-coded data. Furthermore, we were able to match a subset of precincts for another 20 states to precincts in the same state and county in 2008, using approximate string matching of precinct names. As we had a zip code for each 2008 precinct from the spatial matching procedure described in Section A.4, this process allowed us to aggregate to the zip code level. For 2012, the reliability of matching to 2008 precincts based on precinct name, county, and state declined substantially due to the intervening 2010 census and subsequent legislative redistricting. Instead, we extracted town names where possible from the precinct names, and matched these to town names in our cable system positioning dataset. We were able to match at least some precincts to cable systems by town name for 38 states; within these states, we were able to match 46.3% of precincts to a cable system in our dataset. We then aggregated demographics to the town level and ran the 2012 reduced form regression at the town level.

The results for 2004 and 2012 largely confirm the 2008 results with a one position increase

in FNC corresponding to between -0.017 to -0.042 percentage points in 2004, -0.015 to -0.027 in 2008, and -0.028 to -0.034 in 2012.

Table A16: Reduced Form Regressions: Zip Code Voting Data, 2004 Election

	2004 Bush Vote Percentage					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Cable Position	−0.001	−0.010	−0.042	−0.031	−0.017	−0.025
	(0.032)	(0.028)	(0.015)	(0.011)	(0.011)	(0.011)
MSNBC Cable Position	0.038	0.002	0.032	0.017	0.011	0.012
	(0.036)	(0.035)	(0.018)	(0.014)	(0.014)	(0.014)
Has MSNBC Only	−0.735	0.262	−1.437	−1.817	−0.051	−2.336
	(2.214)	(2.082)	(1.128)	(1.196)	(1.040)	(1.237)
Has FNC Only	5.802	4.816	3.297	2.223	1.772	1.442
	(1.387)	(1.179)	(0.727)	(0.692)	(0.591)	(0.722)
Has Both	1.062	3.773	1.458	1.305	1.228	0.833
	(1.769)	(1.687)	(1.049)	(0.849)	(0.891)	(0.867)
Fixed Effects:	None	State	State	State	County	County
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Basic	Extended	Basic	Extended
Number of Clusters	4114	4114	4107	2955	4107	2955
N	13,463	13,463	13,405	10,112	13,405	10,112
R^2	0.132	0.255	0.650	0.774	0.812	0.854

Cluster-robust standard errors in parentheses (clustered by cable system). See first stage tables for description of instruments and control variables.

F.2 OLS Results

Table A18 presents results of regressing Republican vote share in 2008 on Nielsen mean Fox News viewership at the zip code level. Though the coefficient on FNC minutes here is positive, it is about an order of magnitude smaller than the corresponding 2SLS estimate in Table 4.

F.3 Drop Nielsen Zip Codes with Fewer than Ten Respondents

As an alternative to weighting the first stage regressions, we also consider dropping zip codes with fewer than ten respondents. These small-sample zip codes occasionally have outlier viewership numbers that are six or more standard deviations above the sample mean,[53] and

[53]Because the majority of viewers do not watch any cable news, a zipcode with a handful of Nielsen households can easily have observed ratings much higher than average if a somewhat higher than average number of those households happen to be cable news viewers.

Table A17: Reduced Form Regressions: Town Voting Data, 2012

	2012 Romney Vote Percentage					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Cable Position	−0.032	−0.022	−0.028	−0.031	−0.034	−0.033
	(0.027)	(0.021)	(0.016)	(0.014)	(0.011)	(0.014)
MSNBC Cable Position	0.012	0.011	0.006	0.008	−0.001	0.0003
	(0.015)	(0.013)	(0.010)	(0.007)	(0.007)	(0.008)
Has MSNBC Only	−10.604	−9.187	−4.643	−6.186	−4.989	−3.981
	(4.402)	(4.045)	(2.678)	(3.691)	(2.314)	(4.043)
Has FNC Only	5.525	3.012	2.717	1.312	1.263	1.113
	(2.013)	(1.730)	(1.376)	(1.651)	(0.939)	(1.365)
Has Both	5.825	2.445	1.373	0.616	−0.135	−0.635
	(2.461)	(1.909)	(1.470)	(1.657)	(0.980)	(1.316)
Fixed Effects:	None	State	State	State	County	County
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Basic	Extended	Basic	Extended
Number of Clusters	2645	2645	2638	2196	2638	2196
N	9,317	9,317	9,078	6,853	9,078	6,853
R^2	0.048	0.243	0.499	0.594	0.804	0.811

An observation is a town; the dependent variable is the town's Republican share of the two-party presidential vote in 2012. Cluster-robust standard errors in parentheses (clustered by cable system). See first stage tables for description of instruments and control variables.

Table A18: OLS Regressions: Zip Code Voting Data

	2008 McCain Vote Percentage					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Minutes	0.081	0.073	0.022	0.017	0.011	0.011
	(0.006)	(0.005)	(0.002)	(0.002)	(0.001)	(0.001)
MSNBC Cable Position	0.035	0.026	0.022	0.010	−0.009	−0.006
	(0.023)	(0.020)	(0.010)	(0.006)	(0.005)	(0.005)
Fixed Effects:	None	State	State	State	County	County
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Basic	Extended	Basic	Extended
Number of Clusters	4913	4913	4913	4162	4913	4162
N	16,948	16,948	16,946	14,281	16,946	14,281
R^2	0.155	0.288	0.766	0.856	0.914	0.929

Cluster-robust standard errors in parentheses (clustered by cable system). See first stage tables for description of instruments and control variables.

have a large influence the regression results. Table A19 confirms that the first stage when dropping these zip codes is similar to the first stage with weighting by number of Nielsen respondents.

Table A19: First Stage Regressions: Nielsen Data, Satellite and Cable Subscribers, Excluding Small Zips

	FNC Minutes Per Week					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Position × cable	−0.249	−0.297	−0.337	−0.167	−0.162	−0.253
	(0.050)	(0.046)	(0.049)	(0.065)	(0.064)	(0.068)
FNC Position × sat	−0.023	−0.058	−0.062	0.029	0.040	0.116
	(0.053)	(0.046)	(0.049)	(0.086)	(0.085)	(0.102)
MSNBC Position × cable	0.127	0.120	0.133	0.072	0.055	0.134
	(0.043)	(0.047)	(0.042)	(0.063)	(0.060)	(0.064)
MSNBC Position × sat	0.024	0.018	0.018	−0.051	−0.066	−0.102
	(0.048)	(0.043)	(0.044)	(0.113)	(0.112)	(0.139)
Fixed Effects:	State-Year	State-Year	State-Year	County-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	Basic	Extensive	None	Basic	Extensive
Chow Test p-value	0	0	0	0.063	0.054	0.002
Number of Clusters	5116	5116	4397	5116	5116	4397
N	103,037	103,031	89,874	103,037	103,031	89,874
R^2	0.020	0.042	0.047	0.280	0.292	0.321

Cluster-robust standard errors in parentheses (clustered by cable system). Positions are the ordinal position of FNC/MSNBC on the local cable system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. Cable system controls include the total number of channels on the system and the number of broadcast channels on the system. All controls (including fixed effects) are interacted with a dummy for the observation corresponding to satellite viewership. Zip codes with less than 10 Nielsen households are excluded from the sample.

F.4 MSNBC Analysis

This section contains analogous 2SLS results to those in section 4, where MSNBC viewership is treated as the endogenous variable, either instead of or in addition to Fox News viewership. Tables A20 and A21 show the first stage regression of MSNBC hours watched on cable channel positions in the zip code level and individual level datasets, respectively.

Tables A22 and A23 show single-instrument second-stage results with MSNBC viewership instrumented by MSNBC position.

Table A20: First Stage Regressions: Nielsen Data

	MSNBC Minutes Per Week						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MSNBC Cable Position	−0.099	−0.088	−0.087	−0.082	−0.082	−0.035	−0.036
	(0.014)	(0.022)	(0.016)	(0.014)	(0.013)	(0.018)	(0.015)
FNC Cable Position	0.037	0.049	0.040	0.039	0.036	0.011	0.012
	(0.013)	(0.015)	(0.011)	(0.010)	(0.009)	(0.012)	(0.011)
Has MSNBC Only	8.086	7.758	7.733	8.086	7.607	5.730	4.887
	(1.414)	(1.387)	(1.246)	(1.593)	(1.311)	(2.060)	(1.761)
Has FNC Only	−3.588	−3.231	−3.693	−3.721	−3.369	−2.535	−2.287
	(0.625)	(0.648)	(0.556)	(0.630)	(0.541)	(0.747)	(0.661)
Has Both	6.157	5.621	4.970	4.873	5.070	2.522	2.958
	(0.837)	(0.919)	(0.782)	(0.805)	(0.715)	(1.017)	(0.901)
Sat. MSNBC Minutes					0.185		0.162
					(0.018)		(0.018)
Fixed Effects:	Year	State-Year	State-Year	State-Year	State-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y	Y	Y	
Demographics:	None	None	Basic	Extended	Extended	Extended	Extended
Robust F-Stat	49.4	15.8	28.4	34.6	38.2	3.9	5.4
Number of Clusters	5633	5633	5632	4701	4632	4710	4641
N	69,731	69,731	69,683	58,394	50,970	58,537	51,082
R^2	0.095	0.126	0.164	0.178	0.323	0.370	0.488

Notes: Cluster-robust standard errors in parentheses (clustered by cable system). Instrument is the ordinal position of MSNBC on the local system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. In Column (5), the specification conditions on the average MSNBC ratings among satellite subscribers in the same zip code. Cable system controls include the total number of channels on the system and the number of broadcast channels on the system, as well as an indicator for Nielsen collection mode (diary vs. set-top). "Basic" demographics include the racial, gender, age, income, educational, and urban/rural makeup of the zip code. "Extended" demographics adds information on the percentage of homeowners; median housing values, sizes, ages, and property tax rates; the fraction of the population receiving food stamps; median social security income; the fraction of veterans; the fractions of married, unmarried, and same-sex couples; the share of federal campaign contributions that went to Republican candidates in 1996; the Republican presidential share of the county in 1996; and the religious composition of the county. Observations are weighted by the number of survey individuals in the zipcode according to Nielsen.

Table A21: First Stage Regressions: Mediamark / Simmons Data

	MSNBC Minutes					
	(1)	(2)	(3)	(4)	(5)	(6)
MSNBC Cable Position	−0.179	−0.158	−0.165	−0.161	−0.152	−0.151
	(0.030)	(0.033)	(0.032)	(0.029)	(0.033)	(0.033)
FNC Cable Position	0.085	0.074	0.076	0.077	0.075	0.080
	(0.032)	(0.030)	(0.029)	(0.028)	(0.031)	(0.033)
HH Income			23.923	22.761	23.348	22.253
			(1.717)	(1.773)	(1.696)	(1.732)
HH Income^2			−8.825	−8.555	−8.642	−8.351
			(0.953)	(0.975)	(0.943)	(0.954)
HH Income^3			0.886	0.867	0.861	0.836
			(0.119)	(0.123)	(0.119)	(0.121)
Age Quintile 2			5.583	5.889	5.796	6.130
			(0.699)	(0.714)	(0.714)	(0.735)
Age Quintile 3			8.420	8.888	8.620	8.949
			(0.743)	(0.763)	(0.772)	(0.800)
Age Quintile 4			12.385	12.896	12.854	13.246
			(0.777)	(0.808)	(0.813)	(0.841)
Age Quintile 5			22.768	23.013	22.793	22.871
			(0.854)	(0.891)	(0.892)	(0.928)
White			−0.546	−0.549	−0.483	−0.421
			(0.848)	(0.863)	(0.838)	(0.866)
Black			3.042	3.864	2.824	4.138
			(1.188)	(1.227)	(1.252)	(1.269)
Hispanic			−5.515	−3.549	−4.817	−3.529
			(0.843)	(0.791)	(0.775)	(0.816)
College Degree			3.838	3.012	3.611	2.963
			(0.528)	(0.565)	(0.543)	(0.573)
Man			5.356	5.372	5.461	5.515
			(0.486)	(0.491)	(0.481)	(0.491)
Fixed Effects:	Year	State-Year	State-Year	State-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Individual	Extensive	Individual	Extensive
Robust F-Stat	36.7	22.8	27.3	29.7	21.9	20.2
Number of Clusters	2589	2589	2589	2379	2589	2381
N	207,950	207,950	207,860	197,551	207,860	198,300
R^2	0.004	0.009	0.020	0.022	0.052	0.054

Cluster-robust standard errors in parentheses (clustered by cable system). Instrument is the ordinal position of MSNBC on the local system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. Cable system controls include the total number of channels on the system and the number of broadcast channels on the system. "Individual" demographics are measured at the level of the individual respondent. "Extensive" demographics include all of the same individual-level measures plus all of the zip-code-level demographics included in the zip-code-level analysis.

Table A22: Second Stage Regressions: Zip Code Voting Data

	2008 McCain Vote Percentage					
	(1)	(2)	(3)	(4)	(5)	(6)
Pred. MSNBC Mins.	−0.101	−0.099	−0.150	−0.058	−0.082	−0.070
	(−0.327, 0.113)	(−0.259, 0.039)	(−0.306, −0.014)	(−0.692, 0.699)	(−0.853, 0.722)	(−1.207, 1.123)
Satellite MSNBC Mins.			0.022			0.009
			(−0.003, 0.054)			(−0.181, 0.191)
Fixed Effects:	State	State	State	County	County	County
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	Basic	Extended	Extended	Basic	Extended	Extended
Number of Clusters	6029	4814	3993	5919	4729	4001
N	22,509	17,400	12,129	21,801	16,917	12,155
R^2	0.730	0.833	0.839	0.878	0.906	0.918

The first stage is estimated using viewership data for all Nielsen TV households. See first stage tables for description of instruments and control variables. Observations in the first stage are weighted by the number of survey individuals in the zipcode according to Nielsen. Confidence intervals are generated from 1000 independent STID-block-bootstraps of the first and second stage datasets. Reported lower and upper bounds give the central 95 percent interval of the relevant bootstrapped statistic.

Tables A24 and A25 show dual-instrument second-stage results with both FNC and MSNBC viewership instrumented by FNC and MSNBC positions.

Table A26 presents the analog to Table 6 for MSNBC. Here, the MSNBC cable effect is also strongly negative. The effect on satellite subscribers is around one-tenth the size of the effect on cable subscribers. We also present in Table A27 the analog of Table 5 but probing MSNBC position instead of Fox News position. While most of the coefficients are re-assuring, MSNBC position is significantly positively correlated with the predictable-by-demographics Republican vote share. Taken alone, this would suggest some degree of endogenous positioning of MSNBC, but an alternative explanation tempers this interpretation. The Fox News position displays a coefficient of the same magnitude in Table 5. This suggests an alternative interpretation that both news channel positions tend to be lower overall in less Republican areas, which would bias the Fox News effect in the opposite direction of what we find.

F.5 Separate Specifications Year by Year

In Tables A28, A29, and A30, we run the reduced form and first stage separately by year, as well as a pooled specification where all demographics interact with year dummy variables. There is no zip-level reduced form year-by-year because those data only cover the 2008 election. In the individual level reduced form (Table A28), the Fox News cable position coefficient is negative in every specification, but only significant in the pooled specification and marginally significant in 2004. Fox News position is negative and significant in every specification of the year-by-year zip-level first stage (Table A29). In the individual level year-by-year first stage

Table A23: Second Stage Regressions: NAES / CCES Data (MSNBC)

	P(Vote for Republican Presidential Candidate)		
	(1)	(2)	(3)
Pred. MSNBC Mins.	−0.0012	−0.0006	−0.0004
	(−0.0047, 0.0018)	(−0.0028, 0.0018)	(−0.0019, 0.0012)
HH Income		0.4976	0.4249
		(0.4118, 0.5742)	(0.3594, 0.4869)
HH Income^2		−0.3775	−0.3189
		(−0.4394, −0.3071)	(−0.3830, −0.2563)
HH Income^3		0.0908	0.0784
		(0.0717, 0.1084)	(0.0598, 0.0969)
Age Quintile 2		0.0332	0.0255
		(0.0162, 0.0497)	(0.0107, 0.0396)
Age Quintile 3		0.0364	0.0236
		(0.0129, 0.0579)	(0.0052, 0.0407)
Age Quintile 4		0.0114	−0.0011
		(−0.0207, 0.0421)	(−0.0244, 0.0220)
Age Quintile 5		0.0418	0.0292
		(−0.0138, 0.0926)	(−0.0089, 0.0658)
White		0.0915	0.0781
		(0.0790, 0.1018)	(0.0677, 0.0897)
Black		−0.3513	−0.3282
		(−0.3714, −0.3305)	(−0.3488, −0.3097)
Hispanic		−0.0851	−0.0770
		(−0.1031, −0.0613)	(−0.0945, −0.0609)
College Degree		−0.0819	−0.0608
		(−0.0925, −0.0699)	(−0.0688, −0.0519)
Man		0.0776	0.0768
		(0.0637, 0.0917)	(0.0659, 0.0874)
Fixed Effects:	State-Year	State-Year	State-Year
Cable Controls:	Y	Y	Y
Demographics:	None	Individual	Extensive
Number of Clusters	6659	6523	5540
N	134,970	122,738	116,009
R^2	0.0286	0.1116	0.1365

The first stage is estimated on all MediaMark/Simmons respondents. See first stage tables for description of instruments and control variables. Confidence intervals are generated from 500 independent STID-block-bootstraps of the first and second stage datasets. Reported lower and upper bounds give the central 95 percent interval of the relevant bootstrapped statistic. "Individual" demographics are measured at the level of the individual respondent. "Extensive" demographics include all of the same individual-level measures plus all of the zip-code-level demographics included in the zip-code-level analysis.

Table A24: Second Stage Regressions: Zip Code Voting Data

	2008 McCain Vote Percentage					
	(1)	(2)	(3)	(4)	(5)	(6)
Pred. Total FNC Mins.	0.168	0.158	0.101	0.176	0.147	0.104
	(−0.026, 0.415)	(0.040, 0.336)	(−0.024, 0.246)	(−0.533, 1.435)	(−0.417, 1.176)	(−0.192, 0.632)
Pred. Total MSNBC Mins.	0.042	0.024	−0.067	0.359	0.152	0.198
	(−0.261, 0.462)	(−0.182, 0.321)	(−0.288, 0.206)	(−1.489, 3.366)	(−1.718, 1.780)	(−0.944, 1.603)
Satellite FNC Mins.			−0.018			−0.027
			(−0.047, 0.007)			(−0.110, 0.035)
Satellite MSNBC Mins.			0.008			−0.063
			(−0.043, 0.051)			(−0.254, 0.149)
Fixed Effects:	State	State	State	County	County	County
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	Basic	Extended	Extended	Basic	Extended	Extended
Number of Clusters	6029	4814	3993	5919	4729	4001
N	22,509	17,400	12,128	21,801	16,917	12,154
R^2	0.730	0.833	0.840	0.878	0.906	0.918

The first stage is estimated using viewership data for all Nielsen TV households. See first stage tables for description of instruments and control variables. Observations in the first stage are weighted by the number of survey individuals in the zipcode according to Nielsen. Confidence intervals are generated from 1000 independent STID-block-bootstraps of the first and second stage datasets. Reported lower and upper bounds give the central 95 percent interval of the relevant bootstrapped statistic.

(Table A30), the coefficient tends to be negative and noisy, though still negative and significant in the pooled specification.

F.6 Turnout

In Table A31, we check whether Fox News position correlates with a measure of turnout. We sum the zip code level votes cast across parties in the precinct level data, and divide this number by the age eighteen and over population from the Census at the zip code level.[54] The coefficients on Fox News position tend to be small and noisy except with county fixed effects, where we see a significant negative coefficient on Fox News position. The results suggest that the persuasion estimates in our main specifications could be coming from both the conversion of swing voters and some additional turnout, though it is difficult to say with any precision.

[54] We dropped any zip code whose implied turnout exceeded 1.

Table A25: Second Stage Regressions: NAES / CCES Data (FNC and MSNBC)

	P(Vote for Republican Presidential Candidate)		
	(1)	(2)	(3)
Pred. FNC Mins.	0.0012	0.0033	0.0028
	(−0.0284, 0.0191)	(−0.0095, 0.0364)	(−0.0122, 0.0246)
Pred. MSNBC Mins.	−0.0009	−0.0001	0.0007
	(−0.8206, 0.5313)	(−0.3737, 0.5702)	(−0.5754, 1.0111)
HH Income		0.3401	0.2895
		(−1.0749, 0.9888)	(−0.9903, 1.0518)
HH Income^2		−0.3107	−0.2626
		(−0.5910, 0.2909)	(−0.5797, 0.2786)
HH Income^3		0.0838	0.0725
		(0.0201, 0.1170)	(0.0144, 0.1067)
Age Quintile 2		−0.0062	−0.0100
		(−0.3703, 0.1568)	(−0.3410, 0.2123)
Age Quintile 3		−0.0407	−0.0448
		(−0.7482, 0.2699)	(−0.6912, 0.3513)
Age Quintile 4		−0.0999	−0.1006
		(−1.0900, 0.3443)	(−1.0540, 0.4832)
Age Quintile 5		−0.1839	−0.1704
		(−2.2494, 0.7464)	(−1.9622, 0.9913)
White		0.0545	0.0513
		(−0.2811, 0.2014)	(−0.1827, 0.1886)
Black		−0.3828	−0.3624
		(−0.6832, −0.2501)	(−0.6602, −0.1681)
Hispanic		−0.0445	−0.0494
		(−0.2073, 0.3334)	(−0.2063, 0.2140)
College Degree		−0.0585	−0.0468
		(−0.1398, 0.1646)	(−0.1145, 0.0733)
Man		0.0398	0.0415
		(−0.2973, 0.1993)	(−0.2918, 0.2496)
Fixed Effects:	State-Year	State-Year	State-Year
Cable Controls:	Y	Y	Y
Demographics:	None	Individual	Extensive
Number of Clusters	6659	6523	5540
N	134,970	122,738	116,009
R^2	0.0286	0.1116	0.1365

The first stage is estimated on all MediaMark/Simmons respondents. See first stage tables for description of instruments and control variables. Confidence intervals are generated from 500 independent STID-block-bootstraps of the first and second stage datasets. Reported lower and upper bounds give the central 95 percent interval of the relevant bootstrapped statistic. "Individual" demographics are measured at the level of the individual respondent. "Extensive" demographics include all of the same individual-level measures plus all of the zip-code-level demographics included in the zip-code-level analysis.

Table A26: First Stage Regressions: Nielsen Data, Satellite and Cable Subscribers

	MSNBC Minutes Per Week					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Position × cable	0.064	0.057	0.053	0.050	0.051	0.048
	(0.017)	(0.014)	(0.014)	(0.023)	(0.021)	(0.024)
FNC Position × sat	0.017	0.009	0.012	−0.011	−0.009	−0.014
	(0.014)	(0.014)	(0.014)	(0.026)	(0.027)	(0.032)
MSNBC Position × cable	−0.135	−0.136	−0.128	−0.087	−0.097	−0.094
	(0.025)	(0.019)	(0.017)	(0.026)	(0.026)	(0.030)
MSNBC Position × sat	−0.007	−0.004	0.003	0.019	0.011	0.021
	(0.017)	(0.015)	(0.015)	(0.047)	(0.047)	(0.054)
Has MSNBC Only × cable	16.940	17.030	18.032	14.733	14.526	13.202
	(2.274)	(2.137)	(2.566)	(2.954)	(3.004)	(3.225)
Has MSNBC Only × sat	2.483	2.026	0.933	2.293	1.844	1.342
	(1.598)	(1.563)	(2.017)	(2.529)	(2.560)	(3.268)
Has FNC Only × cable	−2.425	−2.828	−2.382	−0.812	−1.119	−0.482
	(0.849)	(0.786)	(0.870)	(1.191)	(1.133)	(1.477)
Has FNC Only × sat	−1.336	−1.845	−2.069	−0.388	−0.854	−1.070
	(0.793)	(0.805)	(0.931)	(1.159)	(1.218)	(1.531)
Has Both × cable	13.484	13.134	13.304	12.137	11.939	12.483
	(1.245)	(1.174)	(1.232)	(2.028)	(2.010)	(2.450)
Has Both × sat	−0.075	−0.585	−1.085	−1.006	−1.350	−2.056
	(0.980)	(0.966)	(1.098)	(1.768)	(1.818)	(2.120)
Fixed Effects:	State-Year	State-Year	State-Year	County-Year	County-Year	County-Year
Cable Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	Basic	Extensive	None	Basic	Extensive
Chow Test p-value	0	0	0	0.022	0.02	0.031
Number of Clusters	5630	5629	4701	5630	5629	4701
N	124,442	124,386	105,654	124,442	124,386	105,654
R^2	0.053	0.063	0.068	0.203	0.209	0.223

Cluster-robust standard errors in parentheses (clustered by cable system). Positions are the ordinal position of FNC/MSNBC on the local cable system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. Cable system controls include the total number of channels on the system and the number of broadcast channels on the system. All controls (including fixed effects) are interacted with a dummy for the observation corresponding to satellite viewership. Observations are weighted by the number of survey individuals in the zipcode according to Nielsen.

Table A27: MSNBC cable position coefficients on predicted viewing / voting, and 1996 Republican voting and contributions.

	Predicted Viewing		Predicted Voting		1996 Contributions		1996 Vote	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MSNBC Position	−0.001	−0.008	0.036	0.034	0.0002	0.00003	0.0002	0.00004
	(0.007)	(0.010)	(0.013)	(0.016)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Fixed Effects:	State-Year	State-Year	State-Year	State-Year	State-Year	State-Year	State-Year	State-Year
Demographics:	Basic	Extended	Basic	Extended	Basic	Extended	Basic	Extended
Number of Clusters	5788	4830	6029	4814	4844	4830	5779	4830
N	71,129	59,551	22,509	17,400	59,843	59,551	70,971	59,551
R^2	0.757	0.734	0.403	0.340	0.146	0.176	0.464	0.571

Cluster-robust standard errors in parentheses (clustered by cable system). Columns 1-4 regress predicted hours of MSNBC and predicted Republican vote share, respectively, on MSNBC cable position. The predicting regressions exclude MSNBC position but include the indicated set of demographic controls. Columns 5-8 regress indicators of pre-treatment political attitudes (1996 county-level Republican presidential vote share and 1996 zipcode-level Republican campaign contribution share) on MSNBC cable position.

Table A28: Reduced Form Regressions: NAES / CCES Data, by Year

	P(Vote for Republican Presidential Candidate)			
	2000	2004	2008	Interacted
FNC Cable Position	−0.0003	−0.0003	−0.0003	−0.0003
	(0.0002)	(0.0002)	(0.0002)	(0.0001)
MSNBC Cable Position	−0.0003	0.0004	−0.00001	0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Fixed Effects:	State	State	State	State
Cable Controls:	Y	Y	Y	Y
Demographics:	Extensive	Extensive	Extensive	Interacted
Number of Clusters	4404	3829	3194	5582
N	40,559	41,607	34,299	116,465
R^2	0.126	0.144	0.159	0.141

Cluster-robust standard errors in parentheses (clustered by cable system). Columns (1)-(3) show the position coefficients when the model is run separately for each year. In column (4), the extensive demographic set is interacted with dummy variables for each year, allowing the demographic effects on voting to vary flexibly by year.

Table A29: First Stage Regressions: Nielsen Data, All Households, by Year

	FNC Minutes Per Week				
	2005	2006	2007	2008	Interacted
FNC Cable Position	−0.180	−0.163	−0.187	−0.168	−0.177
	(0.040)	(0.039)	(0.038)	(0.040)	(0.028)
MSNBC Cable Position	0.087	0.088	0.011	0.055	0.064
	(0.037)	(0.035)	(0.032)	(0.033)	(0.024)
Has MSNBC Only	−3.041	−6.044	−6.526	−0.421	−3.832
	(7.221)	(5.404)	(5.458)	(12.119)	(4.246)
Has FNC Only	24.566	19.842	23.859	25.265	23.487
	(4.259)	(3.548)	(3.545)	(4.376)	(2.274)
Has Both	16.855	12.505	23.021	21.783	18.175
	(4.431)	(3.711)	(3.686)	(4.740)	(2.360)
Fixed Effects:	State	State	State	State	State
Cable System Controls:	Y	Y	Y	Y	Y
Demographics:	Extended	Extended	Extended	Extended	Extended x Year
Robust F-Stat	20.7	17.4	24.4	18	40.1
Number of Clusters	4640	4517	4394	4233	4830
N	14,872	14,840	14,933	14,896	59,541
R^2	0.208	0.204	0.221	0.213	0.213

Cluster-robust standard errors in parentheses (clustered by cable system). Instrument is the ordinal position of FNC on the local system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. Columns (1)-(4) give the FNC position coefficient when the first stage model is run separately by year. In Column (5), the extensive demographic set is interacted with dummy variables for each year, allowing the demographic effects on viewership to vary flexibly by year. Observations are weighted by the number of survey individuals in the zipcode according to Nielsen.

Table A30: First Stage Regressions: MediaMark / Simmons Data, All Respondents, by Year

	FNC Hours Per Week									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Interacted
FNC Cable Position	−0.238	−0.129	−0.120	−0.055	−0.124	0.066	−0.271	−0.057	0.151	−0.102
	(0.066)	(0.089)	(0.097)	(0.103)	(0.108)	(0.128)	(0.126)	(0.120)	(0.128)	(0.045)
MSNBC Cable Position	0.005	−0.002	0.005	0.022	0.108	0.016	0.079	0.040	0.111	0.032
	(0.059)	(0.106)	(0.109)	(0.117)	(0.130)	(0.137)	(0.128)	(0.106)	(0.107)	(0.043)
System has FNC Only	23.888	30.039	22.633	12.435	34.952	−28.798	64.088	31.975	20.074	24.446
	(5.655)	(8.956)	(12.191)	(11.427)	(16.926)	(19.310)	(18.088)	(18.006)	(24.288)	(4.166)
System has MSNBC Only	2.267	5.431	−13.769	−15.302	−8.819	−85.713	18.710	−68.251	−26.497	0.754
	(5.513)	(7.553)	(11.564)	(13.546)	(20.321)	(25.021)	(28.166)	(18.173)	(19.997)	(3.867)
System has Both	19.748	21.321	17.707	0.457	29.839	−16.475	58.994	17.761	13.637	17.045
	(5.974)	(7.944)	(11.568)	(12.623)	(15.348)	(19.646)	(17.483)	(18.800)	(22.024)	(4.144)
Fixed Effects:	State	State	State	State	State	State	State	State	State	State
Cable System Controls:	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Demographics:	Extended	Extended	Extended	Extended	Extended	Extended	Extended	Extended	Extended	Extended x Year
Robust F-Stat	13	2.1	1.5	0.3	1.3	0.3	4.6	0.2	1.4	5.3
Number of Clusters	811	782	747	741	738	684	679	712	1330	2379
N	24,245	24,416	23,229	22,864	23,384	22,909	22,476	23,002	11,026	197,551
R^2	0.018	0.025	0.029	0.032	0.038	0.047	0.046	0.054	0.067	0.045

Cluster-robust standard errors in parentheses (clustered by cable system). Instrument is the ordinal position of FNC on the local system. The omitted category for the availability dummies is systems where neither FNC nor MSNBC is available. Columns (1)-(9) run the model separately for each year. In Column (10), the extensive demographic set is interacted with dummy variables for each year, allowing the demographic effects on viewership to vary flexibly by year.

Table A31: Reduced Form Regressions: Precinct Voting Data, Turnout

	2008 Presidential Turnout					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Cable Position	0.036	−0.012	−0.008	−0.008	−0.020	−0.031
	(0.020)	(0.014)	(0.010)	(0.011)	(0.013)	(0.014)
MSNBC Cable Position	−0.006	0.010	−0.006	−0.002	−0.003	0.003
	(0.018)	(0.010)	(0.008)	(0.008)	(0.009)	(0.010)
Fixed Effects:	None	State	State	State	County	County
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Basic	Extended	Basic	Extended
Number of Clusters	5516	5516	5513	4508	5513	4508
N	20,390	20,390	20,353	16,274	20,353	16,274
R^2	0.020	0.196	0.404	0.465	0.522	0.596

The dependent variable is turnout in the presidential election, measured as number of presidential votes cast divided by the voting-age population in the zip code. Cluster-robust standard errors in parentheses (clustered by cable system).

G More on Channel Positions

Our main arguments for the validity of channel positions as instrumental variables for the effect of watching cable news on voting Republican consisted of correlating channel positions with observable variables: demographics (aggregated in the manner they predict voting and viewership), pre-Fox News political variables, and satellite viewership of Fox News, together with the institutional narrative of the period 1992-2000 as leading to effective randomness in channel position assignment. In this section, we further probe the validity for the instrumental variables assumption. First, we show the first stage and satellite placebo for a variety of similarly positioned channels. Second, we show support for the validity of the satellite placebo test, by showing that cable and satellite subscribers have similar demographics. Third, we examine whether Fox News viewership is correlated with nearby or future Fox News positions. Fourth, we show that Fox News and MSNBC channel positions are highly correlated with the best available position on the system at the time they were added.

G.1 First Stage for other Cable Channels

In Table A32, we display the coefficients on own-channel position for a variety of other cable channels, estimated in the individual-level viewership data. For each channel, we run a stacked regression where we interact cable channel position with dummy variables for whether

the individual subscribers to cable or to satellite. As with the other checks on instrument validity, the results are mostly reassuring. 26 out of 32 channels have a significantly negative position effect on cable subscribers at 99% confidence (2 more, for a total of 28 out of 32 at 95% confidence). 9 out of 32 have a significantly negative cable channel position effect on satellite subscribers at 90% confidence (only 2 at 99%), suggesting some degree of endogenous positioning for these channels.

Table A32: First Stage Regressions for Other Channels: MediaMark / Simmons Data, All Respondents

	Own Position Effect			Own Position Effect	
Channel	Cable Subscribers	Satellite Subscribers	Channel	Cable Subscribers	Satellite Subscribers
ABC Family	−0.0033	0.0001	FX	−0.0024	−0.0009
	(0.0007)	(0.0008)		(0.0004)	(0.0006)
A&E	−0.0033	0.0004	HGTV	−0.0037	−0.0022
	(0.0006)	(0.0010)		(0.0005)	(0.0009)
AMC	−0.0003	0.0008	History Channel	−0.0048	−0.0032
	(0.0006)	(0.0007)		(0.0007)	(0.0011)
Animal Planet	−0.0023	0.0001	Lifetime	−0.0021	−0.0030
	(0.0005)	(0.0009)		(0.0009)	(0.0012)
BET	−0.0015	−0.0001	MSNBC	−0.0034	−0.0005
	(0.0004)	(0.0008)		(0.0006)	(0.0008)
Bravo	−0.0038	−0.0003	MTV	−0.0009	−0.0011
	(0.0003)	(0.0004)		(0.0003)	(0.0005)
Cartoon Network	−0.0008	−0.0018	Nickelodeon	−0.0014	0.0005
	(0.0005)	(0.0008)		(0.0003)	(0.0006)
CMT	−0.0012	−0.0007	SyFy	−0.0039	−0.0005
	(0.0002)	(0.0003)		(0.0005)	(0.0008)
CNBC	−0.0017	−0.0004	Spike	−0.0007	−0.0014
	(0.0007)	(0.0009)		(0.0006)	(0.0008)
Comedy Central	−0.0021	0.0005	TLC	−0.0028	−0.0004
	(0.0005)	(0.0008)		(0.0005)	(0.0007)
Court TV	−0.0026	0.0003	TNT	−0.0043	−0.0021
	(0.0004)	(0.0007)		(0.0009)	(0.0012)
Discovery Channel	−0.0027	−0.0012	Travel Channel	−0.0022	−0.000004
	(0.0008)	(0.0012)		(0.0003)	(0.0003)
Disney	−0.0027	−0.0006	TV Land	−0.0015	−0.0014
	(0.0003)	(0.0006)		(0.0003)	(0.0004)
E!	−0.0020	−0.0004	USA	−0.0022	−0.0016
	(0.0004)	(0.0005)		(0.0007)	(0.0011)
ESPN2	−0.0021	0.0008	VH1	−0.0011	0.0001
	(0.0005)	(0.0009)		(0.0003)	(0.0004)
Food Network	−0.0035	−0.0015	Weather Channel	−0.0006	0.0025
	(0.0006)	(0.0010)		(0.0012)	(0.0017)

Cluster-robust standard errors in parentheses (clustered by cable system). The main regressors are the ordinal position and availability of the indicated channel on the local cable system. All regressions include controls for individual and zipcode level demographics as well as cable system characteristics, and state-year fixed effects.

G.2 Cable and Satellite Subscriber Observable Correlations

Across locations, satellite subscriber characteristics correlate strongly with cable subscriber characteristics. Table A33 shows the regression coefficients of mean satellite subscriber characteristics on mean cable subscriber characteristics in the same cable system territory, nearly all of which are positive and large. Since the means of these characteristics are measured with sampling error - as they are constructed from the television viewership survey samples - the OLS coefficients are attenuated. In the table, we address this measurement error problem in two ways.[55] First, we progressively restrict the regression to markets with more and more survey respondents as these markets will have less sampling error. Second, we instrument for the mean cable characteristic with lead and lagged mean cable characteristic. Survey respondents are sampled independently from year to year. Consistent with measurement error, the coefficients generally tend upwards to one when we restrict to system-years with more respondents. Furthermore, the IV coefficients are generally very close to one.

In the same vein, we can look directly at viewership patterns. Satellite viewers watch 1.2 fewer minutes per week of Fox News Channel on average relative to cable viewers (on an overall mean of 90 minutes). At the bottom of Table A33, we regress predicted mean viewership of satellite subscribers (predicted from demographics) on that of cable subscribers. We also regress the cable system territory mean residual viewership of satellite subscribers (net of demographics) on the cable system territory mean residual viewership of cable subscribers. Across the board, cable and satellite subscribers within the same cable system territory display strong correlations of both demographics and viewing behavior.

G.3 Adding and Dropping Demographics

In Table A34, we show that the coefficients on FNC position in both the first stage viewership regression and the reduced form do not change substantially as we add or remove subsets of variables that are highly predictive of both voting Republican and watching FNC. For example, consider the zip code fraction of campaign contributions going to Republicans in 1996, before the arrival of FNC. This variable is an extremely strong predictor of Republican voting, with t-statistics exceeding 8. It is also a significant predictor of FNC viewership in 2008. However, including this variable on the right-hand side does not appreciably change the coefficients on FNC position in either the first stage or the reduced form.

[55] One could also dis-attenuate the coefficients as the variance induced by sampling is known. This exercise is complicated because each cable system-year has different sampling variance.

Characteristic	N>0	N>10	N>50	N>100	IV
Black	0.649	0.733	0.836	0.978	1.043
	(0.0129)	(0.0141)	(0.0242)	(0.0405)	(0.0348)
Num Zips	5,843	4,685)	1,252	342	2,436
College	0.454	0.576	0.728	0.793	1.013
	(0.0165)	(0.0193)	(0.0371)	(0.0633)	(0.0707)
Num Zips	5,843	4,685)	1,252	342	2,436
HH Income	0.448	0.603	0.781	0.870	0.973
	(0.0150)	(0.0164)	(0.0287)	(0.0646)	(0.0656)
Num Zips	5,843	4,685)	1,252	342	2,436
Age	0.264	0.350	0.414	0.449	0.812
	(0.0162)	(0.0197)	(0.0411)	(0.0704)	(0.147)
Num Zips	5,843	4,685)	1,252	342	2,436
Hispanic	0.618	0.758	0.850	0.842	0.966
	(0.0143)	(0.0157)	(0.0250)	(0.0365)	(0.0380)
Num Zips	5,843	4,685)	1,252	342	2,436
Party ID R	0.104	0.285	0.448	0.588	1.348
	(0.0364)	(0.0567)	(0.127)	(0.215)	(0.626)
Num Zips	896	453)	78	25	361
Party ID D	0.165	0.274	0.341	0.548	1.348
	(0.0359)	(0.0583)	(0.126)	(0.215)	(0.626)
Num Zips	896	453)	78	25	361
Predicted Fox News	0.737	0.833	0.961	0.967	1.004
	(0.0133)	(0.0137)	(0.0202)	(0.0291)	(0.0436)
Num Zips	5,843	4,685)	1,252	342	2,436
Predicted MSNBC Viewing	0.498	0.505	0.581	0.679	0.725
	(0.0118)	(0.0130)	(0.0254)	(0.0436)	(0.0563)
Num Zips	5,843	4,685)	1,252	342	2,436
Fox News Residual	0.0977	0.165	0.392	0.424	0.688
	(0.0195)	(0.0253)	(0.0510)	(0.0814)	(0.254)
MSNBC Residual	0.0814	0.117	0.381	0.567	0.320
	(0.0158)	(0.0190)	(0.0504)	(0.0873)	(0.129)

Note: The first column of coefficients uses all cable system territory-years. These coefficients are attenuated because the mean cable is constructed from samples of survey respondents which can be as few as 2 per cable system territory-year. The second column of coefficients restricts to those with more than ten surveyed respondents. The third column of coefficients restricts to those with more than fifty survey respondents. The fourth column of coefficients restricts to those with more than 100 survey respondents. The final column of coefficients are uses lead and lagged means of cable subscribers as instrumental variables, as respondents are sampled independently from year to year.

Table A33: Regression coefficients of demographic characteristics and cable news viewership of satellite subscribers on the characteristics of cable subscribers in the same cable territory-year in MediaMark / Simmons viewership data.

Table A34: Comparison of covariate groups' influence on viewing equation, voting equation, and the first stage coefficient estimate: Nielsen Data.

	R^2 Change (Viewing)	R^2 Change (Voting)	First Stage	Reduced Form
Race	0.0001	0.075	−0.172	−0.019
			(0.028)	(0.009)
Density / Urban	0.00004	0.001	−0.170	−0.026
			(0.028)	(0.008)
Age	0.0004	0.003	−0.139	−0.025
			(0.028)	(0.008)
Education	0.0001	0.007	−0.178	−0.030
			(0.029)	(0.008)
Marital Status	0.0001	0.012	−0.170	−0.034
			(0.028)	(0.009)
1996 Voting / Contribs.	0.010	0.056	−0.163	−0.023
			(0.027)	(0.009)
Religion	0.00001	0.005	−0.175	−0.022
			(0.029)	(0.008)
(No Demographics)	0.013	0.540	−0.075	0.004
			(0.039)	(0.020)
Number of Clusters	4830	4814	4830	4814
N	59,541	17,400	59,541	17,400

Cluster-robust standard errors in parentheses (clustered by cable system). The first two columns are the decrease in R^2 resulting from excluding all variables in the listed group from the viewership and the voting regressions, respectively, relative to the value for the model with the complete (extended) set of controls. The third column shows the estimated first stage coefficient on FNC position when the corresponding group of demographic variables is excluded from the equation. The final column is the same exercise, for the reduced form equation. All regressions include the "Extended" demographic set, with the exception of the indicated group of variables, plus state-year fixed effects.

G.4 Future and Nearby Channel Positions

We examine whether future cable news channel position predicts current viewership conditional on current position. If political tastes are shifting over time, and channel positions are endogenous but sticky, then future position should predict current viewership. A location which has become more Republican would watch more Fox News, but, if channel positions were endogenously tailored and sticky, their channel position may not have adjusted yet, so future position, after adjustment, would be informative about current ideology. The zip-level results for Fox News are in Table A35. Position in 2008 does not predict viewership in 2005, conditional on position in 2005.

Table A35: First Stage Regressions: Nielsen Data, Future Position Placebo

	Cable Subscribers		All Households		Satellite Subscribers	
FNC Position in 2005	−0.2077	−0.1812	−0.0913	−0.0777	0.0827	−0.0320
	(0.0719)	(0.1194)	(0.0565)	(0.0836)	(0.1112)	(0.1785)
FNC Position in 2008	−0.0600	0.0173	−0.0691	0.0041	−0.1497	0.0279
	(0.0761)	(0.1129)	(0.0606)	(0.0814)	(0.1144)	(0.1727)
Fixed Effects:	State-Year	County-Year	State-Year	County-Year	State-Year	County-Year
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	Basic	Extended	Basic	Extended	Basic	Extended
Number of Clusters	3837	3842	3969	3974	3785	3790
N	13,384	13,416	13,934	13,966	12,244	12,271
R^2	0.0958	0.3887	0.2122	0.4421	0.0521	0.2055

Cluster-robust standard errors in parentheses (clustered by cable system). The outcome is Fox News minutes per week in 2005 among cable subscribers, all households, and satellite subscribers, respectively in columns (1)-(2), (3)-(4), and (5)-(6). We include only zip codes that had access to Fox News in 2005, and regress hours per week on both the actual position in 2005, and the future position in the same zip code in 2008. Observations are weighted by the number of survey individuals in the zipcode according to Nielsen.

We also examine whether Fox News position in nearby systems predicts local viewership. If unobserved political tastes were uncorrelated with local positions, then they should also be uncorrelated with nearby positions even though ideology and demographics are correlated nearby. For each zip code-year in the data, we found the nearest zip code in the data for that year which wasn't in the same cable system. The results are in Table A36. We do not see a significant correlation of nearby position on local viewership in our preferred specifications. In Table A37, we see that nearby positions also do not correlate with 2008 McCain vote share.

Table A36: First Stage Regressions: Nielsen Data, All Households, Nearby Position

	FNC Minutes per Week					
	(1)	(2)	(3)	(4)	(5)	(6)
FNC Position	−0.1042	−0.0477	−0.1265	−0.1493	−0.0915	−0.1651
	(0.0400)	(0.0376)	(0.0264)	(0.0264)	(0.0317)	(0.0252)
FNC Position in Nearby Zip	−0.0452	−0.0213	−0.0227	−0.0185	−0.0022	−0.0110
	(0.0224)	(0.0218)	(0.0154)	(0.0159)	(0.0197)	(0.0139)
Fixed Effects:	Year	State-Year	State-Year	State-Year	County-Year	State-Year
Cable System Controls:	Y	Y	Y	Y	Y	Y
Demographics:	None	None	Basic	Extended	Extended	Extended+Sat.Hrs.
Number of Clusters	5788	5788	5787	4829	4829	4759
N	70,755	70,755	70,707	59,145	59,145	51,711
R^2	0.0292	0.0725	0.1898	0.2126	0.4292	0.3769

Cluster-robust standard errors in parentheses (clustered by cable system). FNC minutes per week (among all Nielsen households) are regressed on both the actual position and the position on a neighboring system. Regressions include controls for availability on both the actual and neighboring system. Observations are weighted by the number of survey individuals in the zipcode according to Nielsen.

Table A37: Reduced Form Regressions: Zip Code Data, All Households, Nearby Position

	2008 McCain Vote Percentage			
	(1)	(2)	(3)	(4)
FNC Position	0.0270	0.0270	−0.0204	−0.0084
	(0.0209)	(0.0209)	(0.0088)	(0.0085)
FNC Position in Nearby Zip	0.0036	0.0036	−0.0086	0.0039
	(0.0118)	(0.0118)	(0.0051)	(0.0053)
Fixed Effects:	State-Year	State-Year	State-Year	County-Year
Cable System Controls:	Y	Y	Y	Y
Demographics:	None	Basic	Extended	Extended
Number of Clusters	4996	4996	4222	4231
N	17,588	17,588	14,719	14,757
R^2	0.2914	0.2914	0.8434	0.9177

Cluster-robust standard errors in parentheses (clustered by cable system). 2008 McCain vote share is regressed on both the actual position and the position on a neighboring system. Regressions include controls for availability on both the actual and neighboring system.

G.5 Best Available Channel Position

We demonstrate one example of this historical influence in Table A38. We regress the ordinal positions of Fox News and MSNBC on the system's best available ordinal position in 1998, along with a control for the overall size of the system - its total number of channels.[56] The best available position in 1998 is a strong predictor of the current position, *even though* the positioning data here extends through 2008. A system's channel configuration prior to the addition of Fox or MSNBC exerts a lasting influence on the positioning of Fox and MSNBC today.

Coefficient	MSNBC	Fox
(Intercept)	33.8	30.7
	(0.573)	(0.432)
Number of Channels	0.032	0.032
	(0.003)	(0.002)
Best Available	0.181	0.148
	(0.014)	(0.012)
R^2	0.066	0.077
N	29,337	38,328

Table A38: Ordinal channel position vs. best available ordinal channel position, among systems where the channel (MSNBC or Fox News) was added in 1998 or later. Standard errors clustered by cable system.

[56] Our lineup data begins in 1998, and hence we restrict the sample for this regression to cable systems that did not have Fox/MSNBC in 1998. "Best available" is defined as the lowest open slot (unoccupied by an existing channel) in the region of the lineup dedicated to cable (i.e. non-network and non-local-access) channels. We define the cable region by locating the positions of CNN, ESPN, TNT, and The Discovery Channel, and consider any open slot above at least one of those channels to be available.

H Solution Algorithm for Viewership Problem

Define ρ_{ict} as the Lagrange multipliers associated with the non-negativity constraints on T_{ict}. By complementary slackness, if $\rho_{ict} > 0$ then $T_{ict} = 0$. From the first order condition, $\rho_{ict} = \lambda_{it} - \gamma_{ict}$ where λ_{it} is the Lagrange multiplier on consumer i's budget constraint. Therefore, T_{ict} can be zero if and only if $\gamma_{ict} < \lambda_{it}$.

For all the channels with $T_{ict} > 0$, $\lambda_{it} = \gamma_{ict}/(1 + T_{ict})$. Additionally, each consumer faces a time-budget constraint, $\sum_c T_{ict} = B$, where B is the total time available (in our scaling, the number of hours in a week: 168). This gives a system of equations with solution:

$$\lambda_{it} = \frac{1 + \sum_{c^+} \gamma_{ic^+t}}{B + C^+}$$

where c^+ are the indices of the channels that i watches a positive amount, and C^+ is the total number of such channels. Given this result, the iterative solution is to replace the γ_{ict}'s below the cutoff $(1 + \sum_c \gamma_c)/(B + C)$ with zero. If there were any γ_{ict}'s below this threshold, we now have a new cutoff defined by the remaining positive γ_{ict}'s, and we repeat the process again. There are at most C steps of this until we hit the final set of positive γ_{ict}'s, at which point we compute the times watched as:

$$T_{ict} = (T + C^+)\frac{\gamma_{ict}}{\sum_{c^+} \gamma_{ic^+t}} - \mathbf{1}(\gamma_{ict} > 0)$$

I Comparison of Regression Coefficients in Real and Simulated Data

	CNN Hours		FNC Hours		MSNBC Hours	
Regressor	Real	Simulated	Real	Simulated	Real	Simulated
CNN Position	-0.0038	-0.0084	-0.0009	0.0008	-0.0007	0.0003
FOX Position	0.0015	-0.0001	-0.0015	-0.0067	0.0014	-0.0003
MSN Position	0.0001	-0.0001	0.0006	0.0003	-0.0027	-0.0035
FOX Only	0.0389	-0.0084	0.3844	1.3971	-0.0476	0.0487
MSN Only	-0.0057	-0.0146	0.0165	0.1491	0.3546	0.7967
Both Available	0.0064	-0.0252	0.2806	1.3316	0.2769	0.7760
Number of Channels	0.0007	0.0001	0.0002	0.0003	-0.0003	-0.0003
Number of Broadcast Channels	-0.0079	-0.0044	-0.0060	-0.0032	0.0004	-0.0016
Age Quintile 2	0.2560	0.2859	0.1799	0.2885	0.0915	0.1503
Age Quintile 3	0.4167	0.4002	0.3610	0.2521	0.1395	0.1383
Age Quintile 4	0.6060	0.5935	0.5227	0.4636	0.2059	0.1925
Age Quintile 5	1.2475	1.1083	1.0711	1.1149	0.3790	0.4104
Income	0.6725	0.3916	0.7089	-0.0500	0.3998	0.1508
Income^2	-0.2374	-0.0971	-0.3055	-0.3782	-0.1482	-0.2310
Income^3	0.0227	0.0100	0.0324	0.0706	0.0149	0.0383
White	-0.1579	-0.1960	0.1774	0.3106	-0.0098	0.0229
Black	0.0444	-0.0012	0.1722	-0.1412	0.0497	-0.0160
Hispanic	-0.1756	-0.1687	-0.1728	-0.1591	-0.0938	0.0106
College Graduate	0.1865	0.1524	-0.1195	-0.0883	0.0632	0.1168
Man	0.1394	0.1312	0.1750	0.1325	0.0884	0.0986
1996 County R Share	-0.1976	0.0011	0.6419	-0.0310	-0.0223	0.0059

Table A39: Comparison of regression coefficients in real data and simulations: first stage regression at the individual level. Dependent variable is individual-level hours watched of each channel.

This section reports the fit of the indirect inference estimation routine. Tables A39 and A40 report the individual and zip-code level first stage regression coefficients, respectively. Table A41 reports the auxiliary regression of an indicator for watching any of the channel on individual demographics and cable positions. Tables A42 and A43 report the second stage IV and OLS regressions at the individual and zip levels.

J GSS Polarization Benchmark

We use the General Social Survey to construct a mass polarization measure for the US between 1996 and 2014. We apply the Esteban and Ray (1994) measure to a distribution of ideology scores created from answers to a battery of questions for which we can comfortably assign an ideology to the multiple choice answer. For example, a series of questions begins with the opening "We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems, and for each one I'd like you to name some of these problems, and for each one I'd like you to tell me whether you think we're spending too much money on it, too little money, or about the right amount." They then ask about "Improving and protecting the environment," with answer options of "too little," "about right," and "too much." We assign "too little" to be an answer that is Democrat (contributing a value of -1 to the individuals overall score) and "too much" as Republican (contributing a value of +1 to the individuals overall score), while "about right" (contributing a zero to the individuals overall score). We use 12 questions about questions more related to taxes, spending, and regulations, and 19 questions more related to social issues and values.[57] We then create an aggregate score for each individual equal to the sum of the economic score divided by 12 and the social score divided by 19. We then calculate the Esteban-Ray measure to the distribution of these scores for each year available. Figure A8 plots these measures from 1996 to 2014. The measures are basically flat from 1996 to 2004, then the social score rises from 2004 to 2014 which drives a modest increase in the overall score over the same time period.

[57]The variables names for the economic questions are: natenvir, natheal, natcity, natfare, tax, eqwlth, confinan, conbus, conlabor, helppoor, helpnot, and helpsick. The same for the social questions are: reliten, abdefect, abnomore, abhlth, abpoor, abrape, absingle, abany, spkhomo, colhomo, libhomo, spkath, colath, libath, conclerg, grass, pornlaw, xmarsex, and homosex.

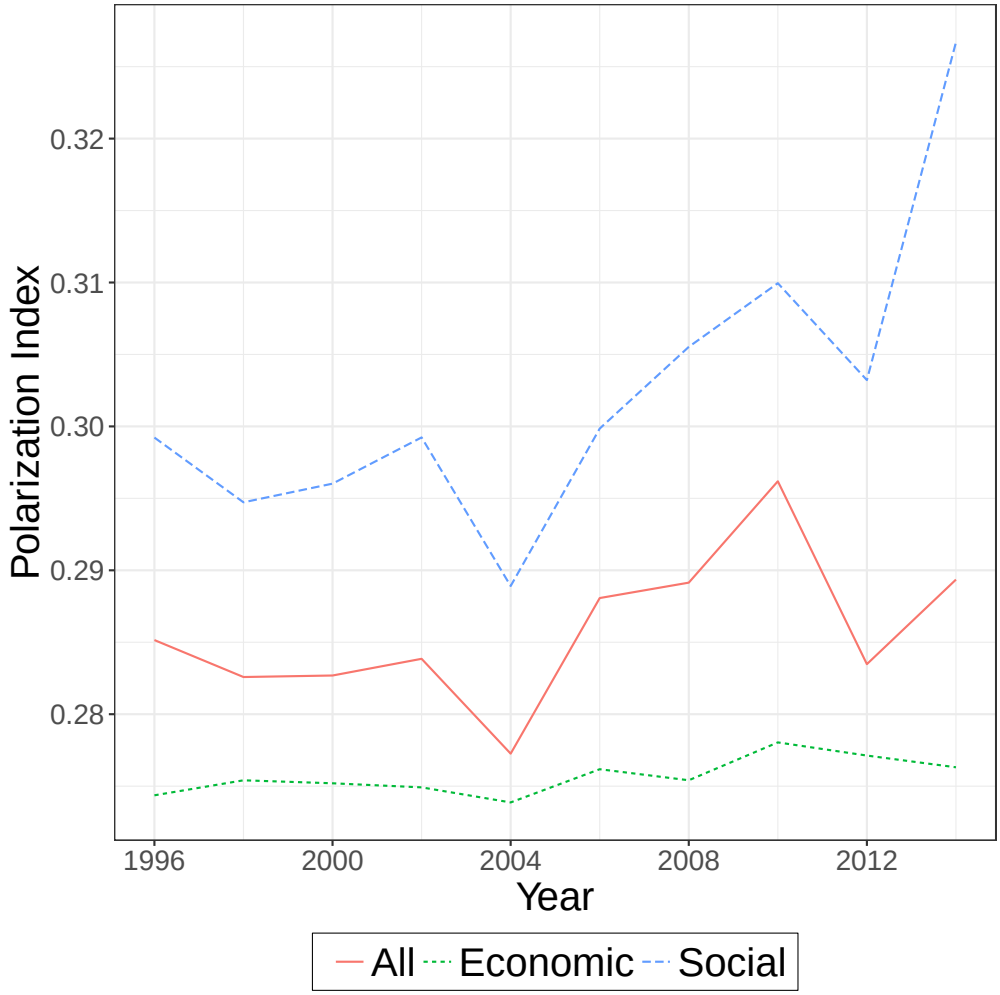

Figure A8: Esteban-Ray polarization measures computed using individual ideology scores constructed from responses to questions in the General Social Survey (GSS). The "Social" score includes only preferences on social policy questions like abortion, gay marriage, gun control, and so on. The "Economic" score includes only preferences on economic policy questions like taxes, international trade, business regulation, and so on. The "All" score combines both types.

	CNN Hours		FNC Hours		MSNBC Hours	
Regressor	Real	Simulated	Real	Simulated	Real	Simulated
CNN pos	-0.0027	-0.0054	0.0019	0.0010	0.0002	0.0001
FOX pos	0.0009	0.0003	-0.0033	-0.0043	0.0006	0.0000
MSN pos	0.0003	-0.0001	0.0009	0.0001	-0.0014	-0.0021
FOX Only	-0.0670	-0.0930	0.3723	0.8305	-0.0620	-0.0135
MSN Only	-0.0050	-0.0178	-0.0202	0.0103	0.1278	0.4004
Both Available	-0.1280	-0.0927	0.2780	0.8220	0.0821	0.3688
Number of Channels	-0.0001	-0.0002	-0.0004	-0.0004	-0.0002	0.0000
Number of Broadcast Channels	-0.0011	0.0042	-0.0051	0.0035	0.0008	0.0008
Nielsen Diary Market	-0.0559	0.0168	-0.1067	0.0029	-0.0356	0.0094
Log Population Density	-0.0066	-0.0046	-0.0177	-0.0073	0.0012	-0.0017
Percent Black	0.2616	0.2061	-0.4682	-0.2786	0.0475	0.1434
Percent Asian	0.0679	0.5497	-0.2136	0.0250	-0.1004	0.0310
Percent Other	0.3632	0.3221	0.5660	-0.3146	0.2717	0.1272
Percent Hispanic	-0.0414	-0.1372	-0.4037	-0.0934	-0.0753	-0.0444
Percent Male	0.2960	0.4305	2.1267	0.3432	0.3573	-0.0822
Percent Age 10-20	0.1428	-0.3086	-1.2863	-0.7501	0.3658	0.8269
Percent Age 20-30	0.4524	-0.1326	-1.6617	-0.2846	0.2384	0.6719
Percent Age 30-40	0.6939	-0.4529	-2.4931	-0.1636	0.4895	1.0751
Percent Age 40-50	0.3961	0.4848	-2.9705	-0.5794	-0.0944	0.4682
Percent Age 50-60	-0.0249	0.4462	-1.4036	-0.5868	0.3974	0.7346
Percent Age 60-70	1.6054	-0.1694	1.9905	-0.6619	0.8937	0.3962
Percent Age 70-80	1.8094	1.2224	3.4916	2.1240	0.8530	1.7386
Percent Age 80+	2.4572	0.3938	-1.0987	0.2538	1.0178	0.7552
Income Decile 2	0.0066	-0.0227	0.0439	-0.0830	0.0050	-0.0103
Income Decile 3	0.0129	-0.0071	0.0369	-0.0680	-0.0054	0.0040
Income Decile 4	-0.0114	-0.0078	0.0656	-0.0859	-0.0086	-0.0158
Income Decile 5	-0.0190	0.0081	0.0295	-0.0497	-0.0186	0.0037
Income Decile 6	-0.0400	0.0031	0.0182	-0.0917	-0.0250	0.0086
Income Decile 7	-0.0464	0.0235	0.0113	-0.0997	-0.0288	0.0144
Income Decile 8	-0.0480	0.0328	0.0228	-0.0840	-0.0330	0.0006
Income Decile 9	-0.0550	0.0702	-0.0079	-0.1217	-0.0426	-0.0014
Income Decile 10	-0.0590	0.0965	0.0193	-0.1018	-0.0435	0.0114
Percent HS Grad	0.2279	0.2207	0.0923	0.4498	0.1484	0.1515
Percent Some College	0.4931	-0.0068	0.9744	-0.1557	0.2755	0.0096
Percent Bachelors'	0.3295	-0.0267	1.4768	-0.1671	0.2556	0.0551
Percent Post-Grad	0.8696	0.5791	0.0432	-0.2022	0.5092	-0.0535
Percent Suburban	0.0767	-0.1377	0.2993	-0.1306	0.0498	-0.0511
Percent Urban	0.0475	-0.1187	0.2100	-0.1009	0.0556	-0.0502
1996 County R Share	-0.2069	-0.0893	0.5183	-0.0683	-0.1123	-0.0214

Table A40: Comparison of regression coefficients in real data and simulations: first stage regression at the zipcode level. Dependent variable is zipcode-level average hours watched of each channel.

	CNN-Zero		**FNC-Zero**		**MSNBC-Zero**	
Regressor	Real	Simulated	Real	Simulated	Real	Simulated
CNN Position	-0.0008	-0.0001	-0.0002	0.0003	-0.0002	0.0002
FOX Position	0.0003	-0.0001	-0.0005	-0.0004	0.0004	-0.0001
MSN Position	0.0000	0.0000	0.0002	0.0000	-0.0009	-0.0003
FOX Only	0.0160	0.0038	0.0824	0.2340	-0.0067	0.0038
MSN Only	0.0294	0.0021	0.0067	0.0002	0.1227	0.1870
Both Available	0.0171	0.0049	0.0654	0.2307	0.0993	0.1840
Number of Channels	0.0003	0.0000	0.0003	0.0000	0.0001	-0.0001
Number of Broadcast Channels	-0.0019	-0.0009	-0.0019	-0.0007	-0.0007	-0.0004
Age Quintile 2	0.0568	-0.0025	0.0395	-0.0244	0.0306	-0.0027
Age Quintile 3	0.0967	0.1241	0.0842	0.1143	0.0435	0.0512
Age Quintile 4	0.1321	0.1685	0.1080	0.1469	0.0588	0.0771
Age Quintile 5	0.2199	0.2416	0.1687	0.1439	0.0835	0.0082
Income	0.3180	0.3405	0.2443	0.3408	0.2102	0.2630
Income^2	-0.1175	-0.1394	-0.0983	-0.0738	-0.0795	-0.0252
Income^3	0.0115	0.0129	0.0100	0.0066	0.0079	0.0002
White	-0.0257	-0.0060	0.0197	-0.0469	-0.0004	-0.0207
Black	0.0119	0.0260	0.0490	0.1034	0.0091	0.0549
Hispanic	-0.0436	-0.0482	-0.0382	-0.0226	-0.0350	-0.1113
College Graduate	0.0610	0.0772	-0.0181	-0.0175	0.0385	0.0343
Man	0.0432	0.0429	0.0475	0.0634	0.0371	0.0400
1996 County R Share	0.0200	-0.0094	0.1487	-0.0071	0.0327	-0.0049

Table A41: Comparison of regression coefficients in real data and simulations. Dependent variable is an (individual-level) indicator for watching any of the channel.

	Vote Intention - IV		**Vote Intention - OLS**	
Regressor	Real	Simulated	Real	Simulated
FOX Predicted Hours	0.2127	0.0445		
CNN pos	0.0000	0.0002		
MSN pos	-0.0001	0.0000		
CNN Most-Watched			-0.0912	-0.0578
FOX Most-Watched			0.3073	0.2533
MSN Most-Watched			-0.0971	-0.0218
FOX Only	-0.0697	-0.0199	-0.0215	0.0224
MSN Only	-0.0017	0.0002	0.0163	0.0041
Both Available	-0.0522	-0.0212	-0.0066	0.0264
Number of Channels	-0.0006	0.0001	-0.0007	0.0000
Number of Broadcast Channels	0.0006	0.0000	-0.0005	0.0001
Age Quintile 2	-0.0103	0.0733	0.0467	0.0804
Age Quintile 3	-0.0489	0.0420	0.0658	0.0449
Age Quintile 4	-0.1096	-0.0143	0.0136	0.0068
Age Quintile 5	-0.2018	0.0044	0.0310	0.0580
Income	0.3104	0.5407	0.4242	0.4246
Income^2	-0.2918	-0.1149	-0.3043	-0.1010
Income^3	0.0803	0.0075	0.0707	0.0073
White	0.0443	0.1115	0.0899	0.1182
Black	-0.3662	-0.2804	-0.2920	-0.2697
Hispanic	-0.0277	-0.0772	-0.0859	-0.0797
College Graduate	-0.0522	-0.0940	-0.0508	-0.0759
Man	0.0367	0.0518	0.0427	0.0466
1996 County R Share	0.4810	0.0257	0.4894	0.0190

Table A42: Comparison of regression coefficients in real data and simulations. Dependent variable is individual-level Republican vote intention.

	Vote Intention - IV		Vote Intention - OLS	
Regressor	Real	Simulated	Real	Simulated
FOX Predicted Hours	0.0783	0.1002		
CNN pos	-0.0001	0.0003		
MSN pos	0.0000	0.0000		
CNN Hours			-0.0052	-0.0227
FOX Hours			0.0105	0.0240
MSN Hours			-0.0111	-0.0190
FOX Only	0.0007	0.0096	0.0306	0.0611
MSN Only	-0.0050	-0.0103	0.0073	-0.0199
Both Available	-0.0039	-0.0023	0.0143	0.0616
Number of Channels	-0.0001	0.0001	-0.0002	0.0000
Number of Broadcast Channels	0.0008	0.0000	0.0019	0.0002
Nielsen Diary Market	0.0090	0.0012	0.0151	-0.0052
Log Population Density	-0.0075	0.0020	-0.0086	0.0006
Percent Black	-0.4687	-0.3122	-0.5090	-0.3255
Percent Asian	-0.0133	-0.1085	-0.0337	-0.0945
Percent Other	-0.2625	-0.0986	-0.1716	-0.1677
Percent Hispanic	-0.1593	-0.0731	-0.2092	-0.0781
Percent Male	0.1447	0.1176	0.3167	0.2454
Percent Age 10-20	-0.0945	-0.1251	-0.6868	-0.2507
Percent Age 20-30	-0.4102	-0.2713	-0.8117	-0.4524
Percent Age 30-40	-0.4059	-0.3194	-1.2890	-0.4273
Percent Age 40-50	-0.0597	0.0332	-0.4025	-0.3862
Percent Age 50-60	-0.5314	-0.0808	-0.8885	-0.1065
Percent Age 60-70	-0.8083	-0.1636	-1.1453	-0.5558
Percent Age 70-80	-0.0943	-0.3253	0.0176	0.0176
Percent Age 80+	-0.2447	-0.2336	-0.7991	-0.3938
Income Decile 2	0.0253	0.0205	0.0500	0.0139
Income Decile 3	0.0354	0.0296	0.0625	0.0204
Income Decile 4	0.0374	0.0429	0.0687	0.0337
Income Decile 5	0.0416	0.0432	0.0702	0.0363
Income Decile 6	0.0450	0.0554	0.0773	0.0467
Income Decile 7	0.0578	0.0671	0.0941	0.0584
Income Decile 8	0.0670	0.0761	0.1010	0.0655
Income Decile 9	0.0815	0.1020	0.1074	0.0861
Income Decile 10	0.1001	0.1438	0.1197	0.1183
Percent HS Grad	-0.0425	0.0058	-0.0692	0.0690
Percent Some College	-0.0766	0.0244	0.0744	0.0225
Percent Bachelors'	-0.1721	0.0334	0.0001	0.0859
Percent Post-Grad	-0.4056	0.1130	-0.3799	0.0593
Percent Suburban	-0.0119	0.0205	0.0046	0.0117
Percent Urban	-0.0218	0.0109	-0.0064	0.0053
1996 County R Share	0.4572	0.0318	0.5034	0.0301

Table A43: Comparison of regression coefficients in real data and simulations. Dependent variable is individual-level Republican vote intention.