Messaging the Bases: Tailoring Political Ads to Audiences*

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Abstract

Advertising is a crucial instrument in political campaigns. A correctly-placed and designed ad energizes a politician's base and depresses the opponent's. I theoretically and empirically examine how politicians strategically vary ad content and placement to reflect the political makeup of audiences to invoke desired electoral reactions. Politicians can select ads that increase the salience of policy positions or highlight valence (non-policy) attributes via positive ads about themselves or negative ads about opponents. In turn, ads affect voters' choices of candidates and whether to abstain due to alienation or indifference. I characterize theoretically how the optimal composition of ads varies with audience demographics and candidate characteristics. I then use the texts of different ads in states with competitive gubernatorial or presidential contests in 2008 and 2012 to identify the types of ads used on different tv shows. I combine these data with viewer demographic and polling data, uncovering empirical findings consistent with the theory (e.g., opposing candidates target different (and more polarized) audiences with policy ads, positive valence ads are mostly targeted to a candidate's alienated base).

Keywords: Political advertising, strategic communication, abstention, mobilization.
JEL Classification: D72, D83

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1 Introduction

How do politicians advertise? Advertising is indispensable for every political campaign since ads, especially local television ads (tv ads), are the main instrument used by candidates to communicate with voters (Martin and Peskowitz, 2017; Fowler et al., 2018; Liberini et al., 2018).[1] A question naturally arises: do politicians strategically select their ads to speak to different groups of voters?

Tv ads can vary in terms of their content and tone: some ads highlight policy positions, while others focus on the candidates non-policy traits (valence). The latter can be positive towards a candidate by emphasizing desirable traits such as leadership, or they can be negative by attacking the opponent's unpopular attributes such as instances of flip-flopping. Interestingly, politicians simultaneously employ these different types of ads, but vary their placement in the different tv shows. Table 1 provides suggestive evidence for the two claims. U.S. presidential (general election) candidates in 2008 and 2012 simultaneously used policy ads, positive valence ads (own positive traits) and negative valence ads (opponents negative traits). But the placement of each type varied across and within networks. For example, Democratic candidates avoid policy ads on news shows on FOX/FOX NEWS, and instead prefer to publish such ads on CNN or general entertainment shows on FOX/FOX NEWS (e.g., Simpsons). Similarly, they emphasize their positive traits on MSNBC and general entertainment shows on FOX. In sharp contrast, Republican candidates are significantly more likely to discuss policy on news shows on FOX/FOX NEWS, and avoid praising their own positive traits on MSNBC. In fact, Republicans only attack their opponent on MSNBC.

Since MSNBC is associated with the Democratic base and FOX NEWS with the Republican base, my paper asks:

1. What function does each type of ad serve in a campaign, given that politicians are strategic?

2. And, how does ad placement, content and tone vary with the ideological makeup of the expected audience?

To answer these questions, I develop a theory of targeted political advertising where candidates

[1]Local tv is the primary source of news and entertainment for voters (see Owen (2014); Hendricks and Schill (2014); Hillygus and Shields (2008) and https://www.pewresearch.org/fact-tank/2018/12/10/social-media-outpaces-print-newspapers-in-the-u-s-as-a-news-source/). Political candidates incorporate this fact in their campaigning decisions, since they spent over 60% of their advertising budget —roughly $\
(4 billion dollars— on local tv ads (see for example, https://mediaproject.wesleyan.edu/spending-update/ and https://mediaproject.wesleyan.edu/2020-summary-032321/.

[2]Gen Enter refers to general entertainment programs.

Table 1: Presidential Ads Post Labor Day 2008 and 2012

Democrat	Share of No Ads	Share of Negative Valence Ads	Share of Policy Ads	Share of Positive Valence Ads
CNN - Gen Enter[2]	0.31	0.17	0.27	0.25
CNN - News	0.16	0.21	0.20	0.44
FOX/FOX NEWS - Gen Enter	0.37	0.08	0.22	0.33
FOX/FOX NEWS - News	0.74	0.07	0.03	0.16
MSNBC - Gen Enter	0.12	0.30	0.09	0.48
MSNBC - News	0.13	0.20	0.10	0.56
Republican	**Share of No Ads**	**Share of Negative Valence Ads**	**Share of Policy Ads**	**Share of Positive Valence Ads**
CNN - Gen Enter	0.55	0.22	0.04	0.18
CNN - News	0.46	0.26	0.05	0.23
FOX/FOX NEWS - Gen Enter	0.63	0.26	0.11	0.00
FOX/FOX NEWS - News	0.25	0.33	0.33	0.10
MSNBC - Gen Enter	0.88	0.12	0.00	0.00
MSNBC - News	0.79	0.20	0.01	0.00

tailor their ads in different tv shows in order to mobilize their base to turn out to vote, and demobilize the opposing one to abstain from voting. Then, I analyze tv ads in the 2008 and 2012 U.S. gubernatorial and presidential general elections to uncover empirical findings consistent with the theoretical predictions.[3]

My theoretical model considers a static electoral competition where candidates can reach voters by placing ads in tv shows. The ideological makeup of the audiences varies across the different tv shows.[4] In particular, voters care both about the candidates policy (or ideology) positions and their valence (non-policy traits).[5] Policy is a horizontal dimension of differentiation—voters disagree about its optimal level (Downs, 1957)—whereas valence is orthogonal to policy (Groseclose, 2001) and is a vertical dimension of differentiation—ceteris paribus higher valence candidates are preferred. After consuming the ads in their tv show, the voters can cast a ballot for their preferred candidate or abstain from voting. Following Adams and Merill (2003), voters derive utility from the act of voting, but abstain if they are either alienated—i.e., their preferred candidate is not sufficiently attractive—or indifferent between the two candidates—i.e., their preferred candidate is too similar to the

[3]Both offices are part of the executive branch, and thus I circumvent concerns about voter behavior associated with congressional and senatorial elections.

[4]The assumption that audiences vary in their ideological composition is consistent with the evidence in Ridout et al. (2012) discussed below.

[5]I use the terms policy and ideology interchangeably.

opponent.[6] Candidates aim to affect the turnouts of different voters by altering their margins of abstention by varying their mix of policy, positive valence and negative valence ads in the different tv shows, Ideally, a candidate's policy ads should serve a dual purpose for an aligned voter: they (i) should decrease the salience of the policy divergence with the candidate, and (ii) should increase the salience of the policy divergence with the opponent; but they risk doing the exact opposite with non-aligned voters. Positive valence ads boost the candidate's valence, while negative valence ads lessen the opponent's valence.

The theoretical predictions are sharp. First, candidates strategically tailor ads to tv shows based on the ideological composition of the audience and their margins of abstention. Even though each candidate's optimal mix of ads (in a tv show) does not depend on the opponent's strategy, systematic correlations between the opponents' ads derive due to the strategic matching of messages to audiences—that is, due to differential targeting of the underlying viewer demographics. The suggestive evidence in Table 1 is consistent with this logic. Opposing candidates target policy ads to different and more polarized audiences. Specifically, each candidate highlights policy issues in tv shows watched mostly by their base, and attacks the opponent in shows watched by the opponent's base. Positive valence ads are mostly used to mobilize the alienated, and perhaps heavily ideological, base. Moderate voters are targeted with a mix of ads —positive and negative valence. Policy ads are targeted to these voters only if they can persuade swing voters to attach less weight on policy in their utility. Finally, I find that as the ideological gap between candidates widens, it becomes easier to motivate both the ideological and moderate base on the policy dimension. In contrast, candidates with higher initial valence increase their positive advertising.

The intuition underlying the results is keen. A correctly-placed ad mobilizes the base and demobilizes the opposing one. Given the viewers' ideological differences, a single type of ad cannot achieve the desired reactions from the various voting bases. Instead, each type of ad activates a different part of a voter's utility, and thus it is primarily targeted to a specific type of voter in order to elicit the desired reaction.

A candidate's own alienated base, comprised mostly of the fringe ideological base, is energized by positive ads highlighting their preferred candidate. These voters abstain because they do not derive enough utility from voting for their candidate, but will never switch to the opponent. Thus, the candidate must boost these voters utility without wasting resources in

[6]The two sources of abstention create some tension in the interpretation consistency of voter utility. I discuss this and possible solutions in more detail in the discussion after the model is formally set up. Briefly, alienation as defined implies that the utility is derived from the process of voting. In contrast, indifference can naturally be interpreted as outcome orientated; the utility difference between the two candidates should not matter to a voter who only cares about voting. However, my model is equivalent to assuming equal proportions of two sub-populations: one that cares about voting and one that cares about outcomes.

decreasing the utility they derive from the opponent. In contrast, the candidate's indifferent base abstains because they enjoy small utility differences between the candidates. These are mostly ideologically-moderate voters who are mobilized with a mix of ads that together aim to separate the candidates and increase the utility distance between them. The candidates avoid emphasizing policy on tv shows watched by the opponent's base, since such ads would invigorate these voters to turn out to vote. Instead, the candidate reduces the opponent's valence through negative attack ads in an effort to decrease the utility the opponent's base derives from voting them and hence inducing them to abstain.

A distinction between the opponent's fringe and moderate base is interesting. The former abstains only due to alienation so that solely attacking the opponent's valence suffices to maximize their abstention. In contrast, the opposing party's moderate base is mostly indifferent, so if positive ads are sufficiently effective, the candidates will target such ads to the opponent's moderate base. While these voters will not switch their vote, positive ads will decrease the utility difference with the opponent and thus effectively increase indifference among the opponent's moderate base.

Lastly, the technology of policy ads is important. If policy ads persuade the base, then ceteris paribus more policy ads are targeted towards the fringe ideological voters than those who are ideological closer to the candidate. To understand why, realize that the marginal gain from persuading a fringe voter on the policy dimension is higher than the marginal gain with a moderate voter. Thus, candidates invest in persuading the ideologically distant base.

I test the theoretical predictions against the gubernatorial and presidential tv ads in the general elections of 2008 and 2012. I focus on states and markets with competitive races, and I only consider local tv ads —over 99% of tv ads.[7]

I begin the empirical analysis by classifying ads into policy, positive valence and negative valence based on their text. Political ads can discuss multiple different topics and they can be partly positive and negative. Both of these issues make classification challenging. As a result, I devise an algorithm that identifies the type of the ad by calculating the percentage of its text devoted to policy and non-policy topics. The algorithm also produces a measure of ad sentiment ad (i.e. positive/negative). My procedure compares favorably to alternative solutions such as direct labeling of ads into policy, positive or negative based on their text, and Natural Language Processing techniques that use external resources to count words from predefined categories. The former is not transparent about which

[7]As I discuss in the data section, I use polling data to identify competitive races and media markets. Restricting the analysis to competitive races relaxes any concerns about the goal of ads; for example, advertising to boost down-ballot candidates when the top-ticket candidate is either a heavy favorite or a heavy underdog.

topics (e.g., abortion, healthcare and so on) are considered policy and which are considered valence. More importantly, it fails to produce a quantitative measure of policy and non-policy statements (or policy and negative statements) within the ad. The latter misses context, such as quoting opponents or contradictory statements to highlighting flip-flopping, which changes the meaning of a statement.[8] My proposed methodology addresses all of these concerns. First, I assign a topic and tone (or sentiment) to each statement within the ad (see details below). Then, I find the size of each statement based on the number of characters it uses, which I use to find the total size of each topic and tone category within the ad. In the last step, I designate topics as either policy or valence, and calculate the total size of policy and valence statements, and classify the ad accordingly. Thus, my algorithm is (i) transparent about the mapping of topics to policy/valence, (ii) provides a quantitative measure of policy/valence and positive/negative statements, and (iii) deals with contexts, e.g., quoting the opponent.

Using the classified ads and data on viewer demographics, I document that (i) all three types of ads are *simultaneously* used by candidates, and (ii) tv shows vary in the demographic composition of their audiences, which allows candidates to target groups of voters with tailored messages. Then, I provide evidence that candidates mix their ads across tv shows in a way that is consistent with the theoretical predictions. First, I show that individual viewer demographics such as race, age, education and wealth are differentially targeted by presidential candidates. For example, I find that minority and less educated overs are systematically targeted with Democratic policy and positive valence ads, and Republican negative valence. In contrast, Democrats target white voters with negative ads and Republicans target the same voters with positive ads. Next, I show that as the audience becomes more conservative, Democrats switch from policy and positive ads to more negative ads, whereas Republicans switch from negative ads to policy and positive ads.

I conclude my analysis of presidential ads by examining how opposing candidates *differentially* target *bundles* of demographics, and, particularly, I examine whether they target the same audience with different types of ads. To achieve this, I implement a two-stage process. In the first stage, I predict (instrument) the share of each type of ad for each candidate on the set of viewer demographic and polling variables. This achieves two goals, an intuitive one and a technical one. First, it captures how candidates tailor ads based on the *expected* audience. Second, it circumvents endogeneity and bias concerns. In particular, it enables me to isolate the targeting intended for the underlying voter demographics. In the second

[8]Moreover, (to the best of my knowledge) I am the first to classify ads into either policy or valence class. As a result, there are no external resources that split words into policy and valence categories that allow me to leverage such Natural Language Processing techniques.

stage, I estimate the correlation coefficients between the expected shares of the different type of ads for the two opposing candidates. I repeat the analysis using weekly data as well as aggregated data from the post-Labor Day electoral campaign. The theory provides sharp predictions. Candidates target the majority of their policy and positive valence ads to a different audiences. And, for a given audience, opposing candidates want to activate different parts of the utility of the voter. Thus, they avoid using policy or positive valence in front of the same audience, and a higher share of negative valence ads are targeted to the audiences the opponent targets with mostly policy and positive valence.

Consistent with the model predictions, I find significant negative correlations between (1) the shares of policy ads by opposing candidates, and (2) their shares of positive valence ads. This indicates that presidential opposing candidates speak to different audiences about policy and positive valence. I also find that opponent's policy and positive valence ads are negatively correlated. This further validates the predictions, since it implies that candidates switch away from policy and positive valence when the opponent talks about positive valence or policy. Instead, the share of policy and positive ads are positively correlated with negative valence ads and the probability of the opponent not advertising in a show. That is, candidates increase policy and positive valence in those shows where the opponent does not advertise or attacks the candidate.

Next, I examine ads in gubernatorial elections. I again investigate how opposing ad strategies of opposing candidates correlate, albeit using raw correlations due to the lack of consistent demographic data on viewers. The correlations are again consistent with the model predictions in a similar manner to the discussion above.

Using the multiplicity of gubernatorial candidates, I test the effect of ideological distance between the opposing candidates. I find that as the ideological distance increases, (1) the probability of advertising policy or positive valence in the same show decreases, whereas (2) the probability of both using negative valence ads increases. Moreover, consistent with model predictions, I find that candidates increase the share of their policy ads with their base, since it becomes easier to motivate them on that dimension. Finally, I examine the effects of initial candidate valence. I find that higher own valence increases positive advertising, and decreases negative. Higher opponent valence has the opposite effects: it decreases positive advertising and increases negative. Both observations are predicted by my model.

Contribution. Ad targeting is a well-known phenomenon (Fowler et al., 2018). My contribution is to present and test novel mechanisms that establish how different forms of abstention—alienation and indifference— interact with viewer ideology to determine the

targeting of tailored ads.[9] These mechanisms provide a theoretical framework for the observation in Fowler et al. (2018) that *"while Democratic campaigns may be more likely to target Democrats, a lot of Republicans are still being exposed to Democratic ads, and a lot of Democrats are being exposed to Republican ads."* (p.p.96-97). My theory suggests that this reflects deliberate strategic decisions by politicians in order to evoke specific responses from the different voter groups. Although I consider tv ads, my analysis has implications for other forms of political communication such as social media, political rallies and debates. In particular, my theoretical results suggest that politicians should leverage rallies and micro-targeted social media ads to activate different parts of their base with policy and positive ads. Debates should be used to address indifferent voters, and public posts on social media should be more negative as they will be consumed by wider audiences.

I also contribute to the literature that aims to measure the effect of ads on turnout. As I discuss below, the evidence is mixed, and my results provide insights about why the contradictory findings obtain. Specifically, my theory suggests that one needs to account for the composition of ad content that voters are exposed to when measuring ad turnout effects as well as the ideological preferences of the audience. Some ads mobilize voters and others demobilize. Thus, failing to account for the differences in content conflates the two effects and potentially biases estimates.

Finally and importantly, I develop a procedure for classifying ads based on their text. This design advances on existing classification techniques by allowing for flexible and transparent definition of policy and valence, and it can adopted to other settings.

Literature Review

My paper speaks to several strands of the literature, which I summarize below.

Political advertising effects

First, I contribute to the rich literature on the effects of political advertising on voter turnout and candidate choice. Despite the vast volume of previous work, the evidence

[9] In fact, Fowler et al. (2018) document four generations of ad targeting. First, targeting took the form of advertising in certain times of the day in an effort to reach broad demographic groups (e.g., daytime for women). Since 2004, consumer surveys have been used to relate consumer demographics to tv shows. The third generation, starting around 2012, entailed using additional demographic data from cable boxes and satellite subscriptions to match voter types to tv-shows. The final generation saw the rise of addressable ads: using data from satellite subscriptions, politicians now target specific households in addition to tv shows. The theory and empirical results of the current paper apply to all generations of targeting even though I use data from the second and third generations.

on the relationship between political ads and aggregate voter turnout is mixed. In an early contribution, Ansolabehere and Iyengar (1995) argue that negative ads demobilized voters in the 1992 U.S. senate and California races, which leads them to conclude that negative ads drive down aggregate turnout. Freedman and Goldstein (1999) and Goldstein and Freedman (2002) dispute this claim. Using voter exposure and ad-tracking data, they find that negative advertising in fact mobilizes voters and increases aggregate turnout. Still, other work suggests that negative ads neither stimulate nor depress aggregate voter turnout; Clinton and Lapinski (2004) and Krasno and Green (2008) are two notable contributions. Clinton and Lapinski employ a series of experiments that aim to measure the effect of negative ads on the turn out decisions of respondents from different political backgrounds. Krasno and Green exploit that some states are split into multiple media markets, which results in residents of the same state being exposed to different quantities of ads. Neither find evidence that negative ads significantly affect aggregate turnout. More recently, Krupnikov (2011) argues that the discrepancy in these findings is resolved when timing of ad exposure is taken into account. Specifically, voters exposed to negative advertising closer to the election day are demobilized, which causes turnout to decrease.

The empirical evidence is also mixed on whether ads of any type significantly impact aggregate turnout. Freedman et al. (2004) and Hillygus (2005) use survey data to study the 2000 U.S. elections and find that exposure to ads increases voter turnout. They also find that ads are particularly effective among the least engaged voters, and those who were initially planning to abstain from voting. Shachar (2009) and Gordon and Hartmann (2013) present similar findings in their structural models for elections between 1996 and 2008. Ashworth and Clinton (2007) study the same elections as Freedman et al. (2004), but focus on battleground states, and fail to find evidence that ads have any effect on voter turnout. Similarly, Lovett and Peress (2015) make the case that any significant effects of ads on turnout dissipate when one controls for confounding factors in congressional elections. In a quasi-experimental design similar to Krasno and Green (2008), Spenkuch and Toniatti exploit the discontinuity emerging when adjacent counties within the same state fall in different media markets. They also find that find that aggregate turnout was not affected by political ads in the presidential elections between 2004 and 2012. My theory and analysis predicts that ads will motivate some voters and discourage others, and that tight predictions only obtain when one conditions on audience characteristics.

In contrast, researchers find that political ads unambiguously have a positive effect on vote shares and candidate choice. Gordon and Hartmann (2013), Spenkuch and Toniatti (2018) and Esteban-Casanelles (2021) provide compelling evidence that advertising increases

candidates' vote shares.[10,11] However, it is not evident whether ads persuade voters to change their choice of candidate, or whether ads mobilize core partisan voters. Huber and Arceneaux (2007) leverage a similar regression-discontinuity design to Spenkuch and Toniatti (2018) and the 2000 National Annenberg Survey data to conclude that advertising mainly persuades voters. Similarly, Franz and Ridout (2007) and Franz and Ridout (2010) argue that persuasion was the main channel of influence in the presidential elections of 2004 and 2008. Lovett and Peress (2015) presents similar findings in congressional elections. Sides et al. (2021) employ different quasi-experimental research designs and perform a comprehensive study of elections for different offices in the U.S. between 2000 and 2018, They conclude that political ads affect outcomes through persuasion of voters and not mobilization. In contrast, structural analysis by Shachar (2009) and Gordon and Hartmann (2013) indicates that advertising mobilizes voters.[12] A similar conclusion is offered by Spenkuch and Toniatti (2018)'s quasi-experimental analysis. Specifically, the authors demonstrate that advertising affects the composition of voters that turn out to vote, and thus mobilizes partisans. In a recent contribution, Law (2020) uses survey data from the American National Election Study (ANES) to decompose of the effect of ads into persuasion and mobilization. Interestingly, the author finds that advertising both mobilizes and persuades: persuasion is the main channel of influence, accounting between 60% and 70% of the effect, and mobilization for the rest. My theoretical and empirical findings suggest that politicians' strategies are consistent with mobilizing partisans, but I also allow for persuasive effects for ads.

Although, ad effects on outcomes are strong, they are short-term and decay quickly (Gerber et al. (2011); Sides and Vavreck (2014); Durante and Gutierrez (2014); Sides et al. (2018); Canen and Martin (2021)).[13] Sides et al. (2021) show that ads broadcast after Labor Day affect outcomes, while ads played in the summer have no effect on election outcomes. Canen and Martin (2021) also find that while ads might not change voters political preferences, they stimulate their news consumption and engagement with campaigns, which alters voters information sets. Since fewer voters are uninformed closer to the election, the returns to ads decrease closer to elections. Thus, the findings by Canen and Martin (2021)

[10] Da Silveira and De Mello (2011) show that campaign spending has meaningful effects on outcomes in Brazil.

[11] Experimental evidence by Tomz and Houweling (2008); Kendall et al. (2015); Hager (2019) suggests that factual or informative ads about candidate platforms have a positive impact on a candidate's vote share.

[12] McGhee and Sides (2011) cite evidence from exit-polls and suggest that campaigning affects the composition of voters. Similarly, Holbrook and McClurg (2005) demonstrate that presidential campaigning has strong positive effects on activating core supporters. Rekkas (2007) instead considers campaign spending in a framework that allows abstention, and finds that campaign spending increases candidates' vote shares and mobilizes voters.

[13] Pons (2018) demonstrates that other forms of communication, such as in-person visits to voters, also have short-term effects on vote choice.

help explain why most ads (around 80%) are played more than two weeks before the election day.

Targeting and messaging tailoring

Previous work has identified that candidates of opposing political parties target their respective ads to different tv shows. Ridout et al. (2012) use survey data to show that Democratic and Republican voters exhibited diverging viewing habits. They argue that this enabled opposing presidential candidates between 2000 and 2008 to target their ads to different voter profiles and tv outlets. While I find evidence that some tv shows are targeted by only one political party in 2008 and 2012 election, I also find significant overlap tv shows targeted by opposing candidates.[14] A crucial difference from my paper is my examination of how opposing candidates tailor their ad content within these overlapping shows — and perhaps how their messaging differs from that in non-overlapping shows — in order to influence the alienation and indifference abstention margins of different voters. Similarly, Lovett and Peress (2015) document significant variation in U.S. viewer demographics for the different tv shows, and show that this allowed congressional candidates in 2005 to target specific voters. Lovett and Peress find that both Democratic and Republican candidates targeted swing voters. However, Lovett and Peress do not consider how the mix of types of ads varies within different tv shows.

Che et al. (2007) develop a nested-logit model where voters first decide whether to turn out to vote, and then for which candidate to vote. Using the American National Election Survey (ANES) data for 2000, they find that U.S. House and Presidential candidates switched between positive and negative ads so as to maximize turnout and vote share. However, Che et al. do not provide a mechanism for what makes a specific type of ad optimal given the expected audience. This insight is at the core of my paper.

Other work examines whether targeting specific sub-populations with issue-specific messages increases their turnout (Sides and Karch, 2008; Clinton and Lapinski, 2004). Sides and Karch (2008) argue that being exposed to ads mentioning a policy issue of interest did not differentially increase the turnout of senior citizens or veterans in the elections between 1998

[14] In Table 8, I record the probability a candidate ever advertises in a show regardless of the volume of ads. I find that 47% of the tv-shows in 2008 and 57% of the tv-shows in 2012 saw ads by both Democrats and Republicans. If I adjust for the volume ads, Democrats and Republicans advertise in the same show 79% of the time in 2008 and 86% of the time in 2012, see Table 9. Thus, there exists a significant overlap in the shows in which both parties advertise. There is also a substantial number of shows in which only one party advertises. According to my model, I should observe candidates adopt different types of ads when they both advertise. Further, in the shows when only one candidate advertises, I should expect to see more policy and positive valence ads as discussed in my theoretical analysis.

and 2002. Clinton and Lapinski (2004) use experimental methods to study targeted messages in the 2000 presidential election. They do not find evidence that targeted messages have long-term effects on turnout. This is a distinct observation from the main thesis of the current paper. In particular, my theory suggests that the optimal candidate message to different voters depends on the ideological distribution of voters, margin of abstention (i.e., indifference or alienation), and whether the candidates wishes to mobilize or demobilize these voters.

Recent contributions by Le Pennec (2019) and Adams et al. (2016) are philosophically closest to the present paper. Le Pennec demonstrates that politicians indeed vary their messaging based on the audience. Specifically, French parliamentary candidates emphasize non-policy issues when the national party's platform is unpopular in their district. Similarly, Adams et al. provide theoretical and empirical analyses of Japanese House of Representative candidates who can advertise policy positions or highlight valence. Adams et al. (2016) and Le Pennec (2019) examine the binary choice to emphasize policy or valence stemming from the comparative advantage between opposing candidates. In contrast, my paper emphasizes how the interplay of the audience's ideology and expected margin of abstention determines the tailoring of ad content to evoke desired voter reactions.

Platform and valence competition

My paper also speaks to the literature on vote buying and endogenous valence (Snyder, 1989; Klumpp and Polborn, 2006; Ashworth and Bueno de Mesquita, 2009; Boyer et al., 2017; Serra, 2010). Harrington and Hess (1996) consider a spatial electoral competition model with candidate valence. Candidates spend resources on positive or negative advertising, but not on valence ads. Positive ads move the candidate closer to the marginal voter; negative ads move the opposing candidate away from the marginal voter. Harrington and Hess show that candidates with high initial valence run positive campaigns, whereas candidates with low initial valence run negative campaigns. Chakrabarti (2007) extends this work to allow for valence ads, and shows that higher valence candidates run personal (valence orientated) campaigns. Lower valence candidates run ideological (policy orientated) campaigns. Similarly, Polborn and Yi (2006) predict that lower quality candidates tend to highlight their opponent's valence instead of building on their own. In this literature, voters cannot abstain so that campaigning works through persuasion by default. Moreover, voter are either reached by a campaign or not, which implies that the strategic decision on which part of a voter's utility to target is absent.

In a seminal work, Adams and Merill (2003) endogenize voters abstain due to alienation

and indifference. Candidates optimally choose their policy positions to affect abstention among their base. Specifically, Adams and Merill assume that Democratic and Republican voters are drawn from different distributions, and candidate's ideal policy position equates the marginal reduction in alienated voters to the marginal increase in indifferent voters.

Finally, Herrera et al. (2008) consider a reduced form of abstention where the effectiveness of targeting by campaigns is captured by a single parameter. Voters that are not reached by the campaigns abstain from voting by default. In contrast, I model the source of abstention and its interplay with the ideological position of the voter. My paper's novel contribution is to characterize how candidates adapt their ad messaging given this interplay.

The paper is organized as follows. In Section 2, I set up and solve the theoretical model. In Section 3, I discuss data sources and describe in detail the procedure I follow to classify ads. Then, I present the empirical analysis of presidential and gubernatorial ads from 2008 and 2012. Section 4 concludes. Theoretical proofs and empirical results are contained in Appendix A and Appendix B, respectively. Additional data details are in Appendix C. Appendix D considers variations of the theoretical model.

2 Theoretical Model

2.1 Setup

I consider a political contest with advertising, a discrete policy issue x and two candidates, D and R.[15] Candidate positions are immutable and common knowledge, satisfying $x_D \leq 0 \leq x_R$. Voters care about ideology (policy) and candidate valence. Valence is orthogonal to ideology (Groseclose, 2001), and, ceteris paribus, higher valence candidates are preferred.[16] Voters are divided into T tv shows. For simplicity, I assume that each voter h watches only one tv show t. Equation (1) describes the utility voter h with ideology x_h who watches tv show t derives from voting for candidate k:

$$U_{h,t}(k; x_h) = -a^k_{h,t}|x_h - x_k| + V^k_{h,t} + \epsilon^k_h. \tag{1}$$

Here $a^k_{h,t} \geq 0$ measures the salience of the ideology difference between candidate k and voter h in the voter h's utility. Notice that $a^k_{h,t}$ varies across opposing candidates. One can think of the policy issue x as a composite of different issues that each candidate wishes to implement — citizen candidates who cannot commit to different policies. That is, there exists a status quo that each candidate tries to change. As a result, different voters might perceive the

[15] The terms policy and ideology are used interchangeably.

[16] Valence is not an indicator of ability about the policy issue.

changes differently. $V_{h,t}^k$ reflects the valence that voter h attaches to candidate k. Finally, ϵ_h^R is a stochastic preference shift that is uniformly distributed on $(\underline{\epsilon}, \bar{\epsilon})$, where $\underline{\epsilon} < 0 < \bar{\epsilon}$. I normalize ϵ_h^D to zero.

Policy salience $a_{h,t}^k$ and valence $V_{h,t}^k$ are not intrinsic; they are influenced by the ads the candidates place on tv show t. Denote the policy, positive valence and negative valence ads used by candidate k on tv show t by q_t^k, p_t^k and n_t^k, respectively. Policy ads affect the policy salience according to

$$a_{h,t}^k = a_1^k(q_t^k; x_h) + a_2^k(q_t^{k'}; x_h),$$

for $k \neq k'$ and $k, k' = \{D, R\}$. I consider a framework where a candidate's policy ads increase policy salience with the opponent's base. Conversely, policy ads decrease the salience with ideologically aligned voters. In the analysis section, I discuss an alternative specification in which policy ads increase the salience of policy for all candidates and voters.

The valence index for candidate D increases in p_t^D and initial valence stock V_D, and decreases in n_t^R according to

$$V_{h,t}^D = V_1(p_t^D; V_D) + V_2(n_t^R; V_D),$$

where

$$\frac{\partial V_1}{\partial p_t^D} > 0, \ \frac{\partial V_1}{\partial V_D} > 0, \ \frac{\partial V_2}{\partial n_t^D} < 0, \text{ and } \frac{\partial V_2}{\partial V_D} > 0.$$

The valence index for candidate R, $V_{h,t}^R$, is defined analogously.

Voting is costly and these costs vary across voters. Thus, some voters might abstain from voting — abstention is cost free. Specifically, voter h incurs cost c_h in order to vote, where c_h is uniformly distributed on $[\underline{c}, \bar{c}]$ and distributed independently of voter ideology. I assume that $\underline{c} < 0$ to capture the positive payoff some voters enjoy from exercising their civic duty. Following Adams and Merill (2003), I consider two margins of abstention: alienation and indifference. Alienation occurs when the utility from the preferred candidate is less than the cost of voting; that is, $\max\{U_{h,t}(D; x), U_{ht}(R; x)\} < c_h$. Indifference arises when the utility difference between the two candidates does not justify incurring c_h, that is $|U_{h,t}(D; x) - U_{h,t}(R; x)| < c_h$.

Candidates can affect the margins of abstention among the viewers of show t through the mix of ads they place in show t, which in turn affect policy salience and candidate valence indexes. Given the ideological makeup of the audience, each candidate chooses a bundle of ads in order to mobilize their own base and demobilize the opposing one. That is, within tv-show t candidate D chooses a bundle of ads (q_t^D, p_t^D, n_t^D) to maximize the difference between

the votes $s_t(D)$ that D receives and the votes $s_t(R)$ that R gets. Thus, D's solves

$$\max_{q_t^D, p_t^D, n_t^D} s_t(D) - s_t(R), \text{ subject to } q_t^D + p_t^D + n_t^D \leq B_t^D, \tag{2}$$

where B_t^D are the total ads by candidate D in show t. Candidate R faces an analogous optimization problem within show t. Taking B_t^D and B_t^R as given, the solutions to (2), and the analogous problem for R, define a Nash equilibrium for the bundle of ads within show t.

I show that the additive separability of opposing candidate ads in $a_{h,t}^k$ and $V_{h,t}^k$ implies that each candidate has a dominant strategy. As a result, within show t, I define a *dominant strategy equilibrium*. That is, each candidate's best response depends solely on the tv show characteristics, i.e., the expected distribution of voter ideologies, and not on the opponent's strategy. The model is designed so that candidates target audiences and any correlation between the ads of opposing candidates derives solely from the differential targeting of the audience by the candidates.

My model characterizes the targeting of voters and the mix of ads within a show by opposing candidates. In other words, I do not explicitly solve for the levels of ads B_t^k across shows. Solving for B_t^k requires assumptions about both the distribution of voter ideologies within and across shows, and the size of the audience in each show. Moreover, the main mechanism of my theory is the tailoring of ads in order to manipulate the margins of abstention given the ideological makeup of the audience. While the intensity of ads is also a form a targeting, it is a secondary mechanism in the present model. However, one should expect candidates not to advertise on shows with small audience sizes, and on shows populated by voters that are very closely ideologically aligned with the opponent. Such voters are harder to demobilize as they require significant investment in advertising.

Parametric Assumptions

In the current section, I impose parametric assumptions that I use to derive predictions for my empirical analysis. First, I assume that the ideal policy (or ideology) of a voter h can take one of five possible values: $-1, x_D, 0, x_R, 1$. The aggregate distribution of ideology is characterized by a function $F_0(x)$. Within tv show t, $\pi_{-1,t}$ of t's viewers have preferred policy position -1, $\pi_{x_D,t}$ prefer position x_D, $\pi_{0,t}$ prefer position 0, $\pi_{x_R,t}$ prefer position x_R, and $\pi_{1,t}$ prefer position 1. Each voter watches a single tv show. Thus, if $\zeta_t = \pi_{-1,t} + \pi_{x_D,t} + \pi_{0,t} + \pi_{x_R,t} + \pi_{1,t}$, the within show voter distribution $F_t(x)$ must satisfy the following aggregation

condition[17]

$$\sum_{t}^{T} \zeta_t F_t(x) = F_0(x) \text{ for all } x. \tag{3}$$

I assume that advertising has a quadratic impact on the salience of policy for voter h in tv show t

$$a_{h,t}^{D} = \begin{cases} A(\alpha - \sigma_1 q_t^D(1 - \frac{\beta_q}{2} q_t^D)), & \text{if } x_h = -1 \text{ or } x_h = x_D \text{ or } x_h = 0, \\ A(\alpha + \sigma_2 q_t^D(1 - \frac{\beta_q}{2} q_t^D) + \sigma_1 q_t^R(1 - \frac{\beta_q}{2} q_t^R)), & \text{if } x_h = x_R \text{ or } x_h = 1, \end{cases}$$
$$a_{h,t}^{R} = \begin{cases} A(\alpha + \sigma_2 q_t^R(1 - \frac{\beta_q}{2} q_t^R) + \sigma_1 q_t^D(1 - \frac{\beta_q}{2} q_t^D)), & \text{if } x_h = 0 \text{ or } x_h = x_D, \\ A(\alpha - \sigma_1 q_t^R(1 - \frac{\beta_q}{2} q_t^R)), & \text{if } x_h = 0 \text{ or } x_h = x_R \text{ or } x_h = 1. \end{cases} \tag{4}$$

Here q_t^k reflects the policy ads by candidate $k \in \{D, R\}$ on tv show t. The value $A \cdot \alpha$ captures the initial importance of ideology/policy, while weights σ_1 and σ_2 capture the potency of ads in affecting how voters perceive policy differences between them and the candidates. Here $\beta_q > 0$ reflects that policy ads are assumed to have diminishing marginal returns.

In the analysis, I set $\sigma_1 = 1$ and $0 < \sigma_2 \leq 1$. Assuming $\sigma_1 = 1$ proxies for a form of persuasion from the candidate's base; for example, candidate D's policy ads q_t^D decrease $a_{h,t}^D$ and increase $a_{h,t}^R$ with D's base. Conversely, $\sigma_2 > 0$ implies that k's policy ads increase k's distance from the opponent's base. After I characterize the optimal number of policy ads, I briefly discuss how the results change if instead $\sigma_1 = -1$, and/or $\sigma_2 < 0$.

Note that k's policy ads do *not* affect how the opponent's base perceives the opponent's policy positions. However, the main theoretical results are robust to this assumption.

I assume that positive and negative advertising affect candidate valence according to

$$V_{h,t}^{D} = V_D(v + p_t^D(1 - \frac{\beta_p}{2} p_t^D) - \delta \cdot n_t^R),$$
$$V_{h,t}^{R} = V_R(v + p_t^R(1 - \frac{\beta_p}{2} p_t^R) - \delta \cdot n_t^D),$$

where $p_{k,t}, n_{k,t}$ refer to positive valence and negative valence (attack) ads by candidate $k \in \{D, R\}$ in tv show t. Value $V_k \cdot v$ is the initial valence index (i.e., endowment) of candidate k, and δ reflects the potency of negative advertising. I assume that $\delta < 1$. The effects of positive valence ads are characterized by diminishing marginal returns, so that $\beta_p > 0$. Negative ads have constant effects. Assuming constant returns to negative ads allows for simpler expressions of the optimal mix of ads within shows. However, if negative ads have diminishing marginal returns, the explicit solutions about the distribution of expenditures

[17] Let $\underline{\zeta} = \min_t \zeta_t$, then we must have $T \leq 2\kappa/\underline{\zeta}$ since $1 \geq \sum_t^T \zeta_t/(2\kappa) \geq T\underline{\zeta}/(2\kappa)$.

across shows can be derived.

2.2 Discussion: Interpretation of utility

Adams and Merill (2003) examine U.S. elections and document the existence of different groups of voters (or partisans). Some voters have sharp policy preference and they strongly favor one candidate. Others have weaker policy preferences and smaller utility differences between opposing candidates. Both groups have members that abstain from voting, and it is important to account for this empirical fact and to understand how politicians target their advertising to these different groups of voters.

To address this, I consider a model in the spirit of Adams and Merill (2003) that features abstention by alienation as well as indifference. Alienation arises if the *utility from the favored candidate* is below a voter-specific threshold, and indifference occurs when the *utility difference between the candidates* is below the same threshold. Heavily ideological voters abstain due to alienation, while moderate voters are more likely to abstain due to indifference.

As defined, the two margins of abstention create a tension in the consistency of the interpretation of voter utility. In my model, I assume voters derive utility from the process of voting rather than the potential election outcomes. Abstaining from alienation is consistent with this interpretation. However, labeling voters, who abstain because they weakly prefer a candidate, as indifferent implies that they are outcome-orientated voters. If a voter cares only about voting, then the utility difference is irrelevant.

This discrepancy can be resolved in multiple ways that are consistent with my model. First, I can assume two different sub-populations: one group cares about the process of voting, and the other cares about election outcomes. The former group abstains from alienation, and the latter group abstains from indifference. As I show in Appendix D, the model in the main text is a special case of this version with equal proportions of each type of voter. If the proportions are not equal, the model remains qualitatively the same but becomes less analytically tractable and only numerical solutions are obtained. These numerical solutions robustly yield the same testable predictions. In addition, testable predictions emerge by varying the relatives shares of the two sub-populations. However, these predictions cannot be tested because there is no way to measure the shares of each population in the data.

Second, I can extend the definition of alienation to consider both the utility from the preferred candidate as well as the disutility from the opponent. This would make alienation consistent with outcome-based voting, and it would impact fringe voters. If the magnitude

of disutility from the opponent exceeds the utility from the preferred candidate, candidates would target more negative advertising to the fringe base. The last possibility entails re-interpreting voting costs as stochastic preference shifters capturing mental agony from voting for the wrong candidate. Thus, moderate voters abstain because they are "indifferent" in the sense that their assessment of the two candidates is very similar.

2.3 Analysis

Within tv show t, voters who prefer candidate D over R are considered to be D's base. Voter h with ideology x_h prefers D over R if

$$\epsilon_{h,R} \leq \tilde{\epsilon}_t(x_h) = a^R_{h,t}|x_h - x_R| - a^D_{h,t}|x_h - x_D| + V^D_{h,t} - V^R_{h,t}. \tag{5}$$

Voter h is an alienated member of D's base if $U_{h,t}(R; x_h) < U_{h,t}(D; x_h) < c_h$. Thus, the share of D's base with ideology x watching show t that is alienated is

$$A_t(D; x) = \frac{\bar{c} - U_{h,t}(D; x)}{\bar{c} - \underline{c}}.$$

In contrast, a voter is indifferent about voting if the utility difference between two candidates is small relative to their cost of voting. That is, voter h prefers D but is indifferent about voting if $U_{h,t}(D; x_h) - U_h(R; x_h) < c_h < U_{h,t}(D)$. Thus, the share of D's base in tv show t who have ideology x and abstain due to indifference (assuming $U_{h,t}(R; x) > 0$ for all h at x, see below) is given by

$$I_t(D; x) = E\left[\frac{U_{h,t}(R; x)}{\bar{c} - \underline{c}}\right] = \frac{\mathcal{U}_t(R; x)}{(\bar{c} - \underline{c})} + \frac{\bar{\epsilon} + \underline{\epsilon}}{2(\bar{c} - \underline{c})}.$$

Here $\mathcal{U}_t(R; x) = -a^R_t|x_R - x| + V^R_t$ is the direct utility from voting for R. Implicit in the derivation of $A_t(D; x)$ and $I_t(D; x)$ is the assumption that viewers of show t who have the same ideology x also have the same values for a^k_t and V^k_t. Analogously, the alienation and indifference shares for candidate R with the viewers of t are

$$\begin{aligned} A_t(R; x) &= E\left[\frac{\bar{c} - U_{h,t}(R; x)}{\bar{c} - \underline{c}}\right] = \frac{\bar{c} - \mathcal{U}_t(R; x)}{(\bar{c} - \underline{c})} - \frac{\bar{\epsilon} + \underline{\epsilon}}{2(\bar{c} - \underline{c})}, \\ I_t(R; x) &= \frac{U_{h,t}(D; x)}{\bar{c} - \underline{c}}, \end{aligned}$$

for all x.

Alienation among k's base decreases in the utility $U_{h,t}(k; x_h)$ that they derive from voting

for k. Conversely, indifference among k's base increases in the utility the base derives from voting for the opponent. Thus, by increasing the utility voters get from voting for them, k reduces own alienation, and increases opponent indifference. Given the ideological differences in these two groups, a different mix of ads is needed to achieve both two goals. Similarly, candidate k can minimize own indifference and increase opponent alienation by reducing the utility voters derive from voting for the opponent. As I show below, the ideological differences between the two groups inform how a candidate varies the ads between the two groups.

From equation (4), viewers of show t with ideologies $x \leq x_D$ have the same policy salience parameters a_t^k and the same valence indexes V_t^k. Similarly, viewers of t with ideologies x_R also share a_t^k and V_t^k. Thus, it follows that $U_t(D;-1) < U_t(D;x_D)$ and $E[U_t(R;-1)] < E[U_t(R;x_D)]$. That is, voters located at $x = -1$ and $x = 1$ are relatively more likely to abstain due to alienation than indifference. In contrast, voters with ideology $x = x_D$ and $x = x_R$ are relatively more likely to abstain because they are indifferent.

Assumption 1. *$A(1 + x_R) > (\bar{\epsilon} + V_R \cdot v)/\alpha$ and $A(1 - x_D) > V_D \cdot v/\alpha$.*

Assumption 2. *(i) $A(x_R - x_D) < (\underline{\epsilon} + V_R \cdot v)/(\alpha + 1/\beta_q)$; and,*

(ii) $A(x_R - x_D) > \max\{(-\underline{\epsilon} + (V_D - V_R)v + \delta V_R \bar{B})/\alpha,\ (\bar{\epsilon} + (V_R - V_D)v + \delta V_D \bar{B})/\alpha\}$ with $V_R(v - \delta\bar{B}(1 + \alpha\beta_q)) + \underline{\epsilon} > 0$, and $\bar{B} = 1/\beta_q + 1/\beta_p$.

Assumption 3. *$A(x_R - x_D) > \delta V_R$ and $A(x_R - x_D) > \delta V_D$.*

Assumptions 1 and 2 add more structure and reduce the number of cases to consider, therefore streamlining the analysis. Under Assumption 1, fringe voters — $x_D = -1$ and $x_R = 1$ — can abstain due to alienation, but not due to indifference. Similarly, Assumption 2 implies that voters with ideology $x \leq x_D$ either abstain or vote for D, and voters at $x \geq x_R$ either abstain or vote for R. Thus, only voters with ideology $x = 0$ switch their candidate choice based on the ads they consume and the idiosyncratic shock ϵ_h^R (i.e., marginal voters).[18] Together, Assumptions 1 and 2 are consistent with a structure derived when ideology is continuously distributed: a marginal voter located between the two candidates, moderate voters who can be indifferent about voting, and heavily ideological voters who can be alienated. Moreover, $U_{h,t}(R;x_D)$ and $U_{h,t}(D;x_R)$ are positive under Assumption 2. Assumption 3 ensures that candidates do not use only negative advertising by imposing enough ideological difference between the candidates such that policy ads motivate some voters.

[18] Equivalently, I can assume that only voters with ideology $x = 0$ experience an idiosyncratic shock ϵ_h^R. Under this framework, ϵ_h^R can be interpreted as uncertainty about the preferences of centrist voters.

Among the viewers of show t, candidate D receives

$$\begin{aligned} s_t(D) = \pi_{-1,t}\left(1 - A_t(D;-1)\right) + \pi_{x_D,t}\left(1 - A_t(D;x_D) - I_t(D;x_D)\right) \\ + \pi_{0,t}\frac{\tilde{\epsilon}(0) - \underline{\epsilon}}{\bar{\epsilon} - \underline{\epsilon}}\left(1 - A_t(D;0) - I_t(D;0)\right) + \left(\pi_{x_R,t} + \pi_{1,t}\right)\cdot 0, \end{aligned} \tag{6}$$

votes. Viewers with ideology $x = -1$ either vote for D or they are alienated. Voters at $x = x_D$ vote for D if they vote, but they can be indifferent or alienated. From equation (18), share $\tilde{\epsilon}(0)$ of centrists (i.e., $x = 0$) prefer D over R. Of those, share $A_t(D;0)$ have high voting costs, and share $I_t(D;0)$ consider the candidates too similar.

Analogously, the number of votes R receives from show t is given by

$$\begin{aligned} s_t(R) = \left(\pi_{-1,t} + \pi_{x_D,t}\right)\cdot 0 + \pi_{0,t}\frac{\bar{\epsilon} - \tilde{\epsilon}(0)}{\bar{\epsilon} - \underline{\epsilon}}\left(1 - A_t(R;0) - I_t(R;0)\right) \\ + \pi_{x_R,t}\left(1 - A_t(R;x_R) - I_t(R;x_R)\right) + \pi_{1,t}\left(1 - A_t(R;1)\right). \end{aligned}$$

Within tv-show t candidate D chooses a bundle of ads (q_t^D, p_t^D, n_t^D) to maximize the difference between the votes they receive and the votes R receives; that is, the bundle solves optimization problem (2). This characterization reflects the dominant strategy nature of the equilibrium.

Proposition 1. *A unique solution exists within show t. Denote $\zeta_t = \pi_{-1,t} + \pi_{x_D,t} + \pi_{0,t} + \pi_{x_R,t} + \pi_{1,t}$.*

If $\pi_{-1,t}/\zeta_t$ or $\pi_{x_D,t}/\zeta_t$ is sufficiently large, then $q_t^D > 0$. Similarly, if $-A \cdot x_D > \delta \cdot V_R$ and $\pi_{0,t}/\zeta_t$ is sufficiently large, then again $q_t^D > 0$. If $\pi_{x_R,t}$ or $\pi_{1,t}$ are sufficiently large, then $q_t^D = 0$.

If $\pi_{-1,t}/\zeta_t$ is sufficiently large then $p_t^D > 0$. Similarly, if $\delta < V_D/V_R$ then $p_t^D > 0$ if either of $\pi_{x_D,t}/\zeta_t, \pi_{0,t}/\zeta_t$ or $\pi_{x_R,t}/\zeta_t$ is sufficiently large. Conversely, $q_t^D = 0$ if $\pi_{1,t}/\zeta_t$ is sufficiently large.

Policy and positive valence ads by R, q_t^R and p_t^R, are defined analogously.

The number of negative valence ads by candidate k in show t is given by $B_t^k - q_t^k - p_t^k$. Proposition 1 suggests that opposing candidates target policy ads to their respective bases, and thus different audiences. Centrists are targeted with *some* policy ads if they are sufficiently effective at persuading marginal voters to switch choice of candidate relative to negative valence ads. No policy ads are targeted to shows watched mostly by the opponent's base. If $\sigma_2 < 0$ in a_t^k (equation (4)), then policy ads persuade the opposing base, and some policy ads are targeted to the opponent's moderate base in order to increase indifference.

Heavily ideological (fringe) voters are targeted with positive valence ads by their preferred candidate. Candidate k targets positive valence ads to moderate voters of all bases if they are sufficiently effective relative to negative valence ads. Emphasizing positive traits with moderate voters shrinks the indifference margin of the base (since they are more likely to be indifferent), and expands opponent's indifference margin. Again no positive valence ads are directed towards shows seen mostly by the opponent's fringe base.

Tv shows that are overwhelmingly watched by the opponent's base, especially the fringe, are targeted with ads underscoring the negative attributes of the opponent. Among moderate voters this increases indifference, and among the fringe voters it increases alienation.[19]

Proposition 2. *Denote* $\zeta_t = \pi_{-1,t} + \pi_{x_D,t} + \pi_{0,t} + \pi_{x_R,t} + \pi_{1,t}$.

Then, policy ads q_t^D*: (i) always increase in* $\pi_{-1,t}$*; (ii) increase in* $\pi_{x_D,t}$ *if* $\pi_{x-1,t}/\zeta_t$ *is not too large; (iii) increase in* $\pi_{0,t}$ *if either* $\pi_{-1,t}/\zeta_t$ *and* $\pi_{x_D,t}/\zeta_t$ *are small, or if either of* $\pi_{x_R,t}/\zeta_t$ *and* $\pi_{1,t}/\zeta_t$ *is sufficiently large; (iv) always decrease in* $\pi_{x_R,t}$ *and* $\pi_{1,t}$.

Moreover, q_t^D *increases in* $x_R - x_D$ *if* $\sigma_2 < \pi_{x_D,t}/\pi_{x_R,t}$*; is independent of* V_D *but decreases in* V_R*. Finally,* q_t^D *is independent of* B_t^D*, but decreases in* σ_2 *and* δ*, and increases in* A.

Proposition 3. *Positive valence ads* p_t^D*: (i) increases in* $\pi_{-1,t}$*; (ii) increase in* $\pi_{x_D,t}$*,* $\pi_{0,t}$ *and* $\pi_{x_R,t}$ *if* $\pi_{-1,t} < \pi_{1,t}$*; and, (iii) decrease in* $\pi_{1,t}$*. The effects are proportional to* $\delta V_R/V_D$.

Moreover, p_t^D *is independent of* $x_R - x_D$*,* A *and* B_t^D*; increases in* V_D*, and decreases in* V_R *and* δ.

Candidates target most policy and valence ads to their fringe base (Propositions 2 and 3). The former follows from $\sigma_1 = 1$ in the definition $a_{h,t}^k$ in equation (4). If instead $\sigma_1 \leq 0$, then policy ads fail to reduce the ideological concerns of fringe voters, and as a result, no policy ads are targeted to them. These fringe voters abstain only from alienation, and thus k combines policy and positive valence ads to boost the utility they derive from voting for them. In fact, if show t contains only fringe voters, then candidate k targets $1/\beta_q$ policy ads, $1/\beta_p$ policy ads and zero negative valence ads.

Voters, who align ideologically with k (i.e., x_D for candidate D), are targeted with the next most policy ads. Policy ads decrease the salience of ideological differences between a candidate and their base, and increase it between their base and the opponent. For voters at x_D, the first channel is turned off. Hence, the marginal benefit from policy ads is higher for voters at $x = -1$ than for voters at $x = x_D$. Accordingly, as the share of viewers with

[19] The finding that negative advertising is used to depress the turnout of the opponent's base is consistent with the Anderson et al. (2016), who find that negative ads about a rival product hurt the rival more than the benefit the advertiser.

ideology x_D increases, the number of policy ads increases only when the increase of their share is at the expense of more right-wing ideologies (i.e., $x \geq 0$). Similarly, the number of policy ads by D increase in the share of centrist voters, $x = 0$, if again this higher share reduces the share of more right-wing ideologies, $x \geq x_R$. In contrast, policy ads decrease in the share of voters with ideology $x \geq x_R$.

As discussed above, moderate voters of all bases are relatively more likely to abstain from indifference. This means that the utility voters get from both candidates matter. Positive valence are used if they are effective (Proposition 1), and they increase in the share of moderate voters if the ratio of $x = -1$ voters does not decrease relative to $x = 1$.

Overall, candidates mobilize their own base by targeting policy and positive valence ads in the shows watched by the base. However, as the ideological makeup of the audience tilts towards the opponent's base, candidates decrease their policy and positive valence advertising. Instead, they switch to negative advertising to increase abstention by the opponent's base.

Finally, if the ideological gap between opponents widens, candidates increase policy advertising in shows watched by their base, and decrease it in all other shows.[20] Higher initial own valence implies more positive advertising, whereas higher initial opponent valence results in less policy and positive valence advertising.

Discussion: Ad intensity and testable predictions

My model is linear in the number of ads in a show. To see this, notice that the constant effects for negative ads imply that the value function in (2) is linear in B_t^k. As a result, I cannot solve for an interior solution for B_t^k. When there are diminishing marginal returns to negative ads an interior solution an obtains. However, as noted earlier, solving for the full equilibrium requires strong assumptions about the distribution of voters within and across tv shows, and the sizes of audiences. Since this is a secondary form of targeting, I do not focus on this in my analysis.

Instead, I briefly describe a solution algorithm for B_t^k. Specifically, candidates rank tv shows based on their expected contribution to k's probability of winning. The expected contribution clearly depends on the ideological makeup of the audience and the size of the audience. Ads are then assigned to shows according to this ordering. Imposing that no tv show is watched by more than half of the electorate suffices for candidates to want to

[20] In a variation of the model with diminishing returns to negative advertising, I find that positive valence ads move in the opposite direction of policy ads when the ideological gap increases.

advertise in multiple shows. That is,

$$\max_t \zeta_t < \sum_t \zeta_t/2,$$

where $\zeta_t = \pi_{-1,t}+\pi_{x_D,t}+\pi_{0,t}+\pi_{x_R,t}+\pi_{1,t}$. Next, notice that the optimal number of policy and positive valence ads is independent of B_t^k (number of ads in show t) — Propositions 2 and 3. With constant returns to negative valence ads the number of negative valence ads is $B_t^k - q_t^k - p_t^k$, which is not pinned down when B_t^k is continuous. However, with decreasing returns (or binary B_t^k) and further distribution assumptions suffices to characterize the distribution of ads across shows.

The above procedure may yield some boundary solutions in which candidates do not place ads on certain shows. These will be shows with small audience size or shows populated by voters that very closely ideologically aligned with the opponent.

Overall, the testable predictions of my model can be summarized as follows:

P1: Opposing candidates' ads of the same type —policy, positive valence, and negative valence— are negatively correlated.

P2: A candidate's policy ads are negatively correlated with the opponent's positive valence ads.

P3: Certain viewer demographics should be targeted by different type of ads by opposing candidates.

P4: As ideological distance between opponents increases, the probability that candidates advertise policy in different shows increases.

P5: Candidates are more likely to target policy and positive valence ads in shows that the opponent does not advertise or uses negative valence ads.

3 Empirical Analysis

3.1 Data

To test the theoretical predictions outlined in the previous section, I combine multiple data sources: (i) tv ad data from the Wisconsin Advertising Project and the Wesleyan Media Project (Goldstein et al., 2011; Fowler et al., 2014, 2015, 2017); (ii) polling and voting data from the Real Clear Politics website aggregator; (iii) audience demographic data from

the Gfk/MRI "Survey of the American Consumer"; (iv) data on the county composition of Designated Market Areas (DMAs) from Sood (2016) and the American Consumer Survey (Bureu, 2010, 2012); (v) data on candidate's ideology from the Database on Ideology, Money in Politics, and Elections (DIME) (Bonica, 2016). I summarize these databases in turn.

Political Ads and Tv Shows

The Wisconsin Advertising Project (WAP) and Wesleyan Media Projects (WMP) databases contain the universe of political advertising on television in the U.S. for 2008 and 2012, respectively. Each observation corresponds to a unique ad play on U.S. television. The variables of interest are: the title of the ad played (a unique ad identifier), the sponsor of the ad, the name of the tv-show, the station, the network affiliate, the media market (DMA), and date and time the ad was played. Although, the state in which a tv station is located is available, I instead use the DMA as the geography identifier. As I discuss below, viewers within a DMA receive the same station offerings, and a DMA can spawn over multiple states. Thus, a station might be located in a battleground state but not in a battleground market.

Classifying ads and defining shows. WAP and WMP provide storyboards and videos of each ad played in 2008 and 2012, which I transcribe to obtain the texts of the different ads.[21] I use these texts to classify each ad as either policy, positive valence or negative valence. Determining the type of each ad is crucial for testing the theoretical predictions. In the model above, an ad has a single type: policy, positive valence or negative valence. In practice, a single ad can touch on multiple themes, which makes classification challenging.

One approach entails classifying ads directly based on the whole text. However, direct classification approach is prone to errors and inconsistencies for two reasons. First, it obfuscates which topics are considered policy or valence, and second, it does not yield a quantitative measure for the percentage of the ad that is spent on the different topics. Thus, ads that touch on both policy and non-policy issues, and/or contain both positive and negative statements, are likely to be erroneously classified. The former also implies that direct classification is inflexible when one wants to vary which topics are considered policy issues.

An alternative approach utilizes resources that classify words into different themes (e.g., NRC Lexicon with positive and negative sentiment words), and counts the number of words in each theme. Ads are then classified based on the size of each theme. Two main issues

[21] The Wisconsin Advertising Project provided storyboards, while the Wesleyan Media Project made the videos available. The storyboards were transcribed using the *PyPDF2* python package, whereas I used the *VLC* and *ffmpeg* shell utilities to decode each video file to an audio file. Microsoft Azure is then utilized to transcribe each audio file.

make such an approach unsuitable. First, the classification of words by external resources is not congruent with the policy and non-policy distinction required in the current analysis. Second, this approach misses the context of most statements. For example, ads often quote the opposing candidate in order to highlight a disagreement. Alternatively, they display contradictory statements by the opponent to emphasize their propensity to flip-flop rather than to take a position on a policy issue. Imposing ex ante rules that address these concerns make the problem computationally expensive.

Instead, I develop a modular, and rule-based algorithm for classifying ads that resolves these issues. Table 2 provides an example for a presidential ad of 2008. First, I split the ad text into individual statements/sentences — the field "Order" in Table 2 reflects the order in which the statements appear within the ad. For each statement, I compute its size based on its number of characters, and assign a topic and tone category based on its content.[22, 23] I also rank statements based on their similarity — the number of common words — such that similar statements are consistently classified. The topic categories include issues such as abortion, health-care, leadership, religion, etc. — a complete list is given in Appendix C. The tone is either positive, negative or neutral. Next, I use the calculated size of the different statements to find the total size of each topic and tone category within each ad. Lastly, I split the different topic categories into policy and valence.[24] This allows me to find total size of policy, positive and negative statements within each ad. Therefore, an ad is considered to be a policy ad if the size of the policy statements exceeds the size of the valence ones. If not, then the ad is classified as a valence ad. Similarly, the sizes of positive and negative categories determine the sentiment of the ad. This approach offers several advantages. First, it is transparent about which topics are designated as policy and non-policy. Second, I provide a quantitative measure of the different topics mentioned in the ad, which allows for consistent classification of ads. Third, it accounts for context such as contradictory statements and quoting the opponent. It also offers the opportunity to extend the current analysis in multiple ways. For example, it is flexible in the definition of policy and valence categories, which allows one to examine how placement of controversial vs non-controversial ads differs (e.g., ads focusing on abortion vs ads focusing on taxes). Similarly, it allows for a continuous measure of policy and valence within each ad, which can supplement the binary classification that I use in this paper. Finally, the individual

[22] WAP and WMP provide a set of variables characterizing each ad. However, the default characterization does not achieve the systematic classification needed for my analysis and suffers from the issues discussed with direct classification.

[23] I use Python's NLTK package to break text into sentence tokens which serve as statements.

[24] Some statements are assigned multiple subject categories or tone categories. The size of the statement is split equally into each subject category and tone category.

statements constitute a rich training set that can be utilized to future train future machine learning models to predict the topic and tone of statements in other elections.

Table 3 lists the policy categories for the current analysis, and Table 4 provides examples of sorted statements: Statements 1, 2 and 3 highlight policy issues such as health-care, war and abortion, whereas statements 4 to 8 either emphasize positive character traits of a preferred candidate or negative traits of the opponent. Table 5 summarizes the share of each type of ad used in the presidential and gubernatorial elections of 2008 and 2012.

Next, I define the tv shows in my sample. A unique tv show is identified by the tv show name, affiliate, market (DMA), and time of day. For example, NBC local news in New York is considered a different tv show from NBC local news Chicago. This allows me to account for the unobserved voter distribution within the different markets.

I only consider ads in local tv markets. This choice reflects the fact that over 99% of presidential and gubernatorial ads are in local tv stations.[25] I also discard ads played during movies or infomercials. The underlying mechanism of my theory postulates that regular television programming aggregates political preferences, which politicians exploit to tailor ad content. Movies and infomercials are hard to justify as preference aggregators. Following Sides et al. (2021), I only consider ad plays from September to Election day. For gubernatorial elections, I also require that the ad be played after the parties' primary elections.[26] I restrict attention to competitive contests; DMAs with presidential poll margin within 5% points and gubernatorial elections with final vote margin within 10% (see below for more details). Finally, I only consider tv shows with a sufficient number of ad plays; specifically, at least twenty ad plays in the period under examination.

Viewer Demographic, Polling Data and DMA Boundaries

Data on viewer demographics come from the Gfk MRI Survey of the American Consumer for the fall seasons of 2008 and 2012. Each wave is administrated to over 24,000 U.S. adults, and it contains an extensive list of respondent demographics including age, gender, race, household income, education level, ideological leanings and public engagement. The respondents also identify the tv shows they watch among a list of approximately 600 options.

Polling data is collected from the aggregator site Real Clear Politics. This includes all the state polls capturing the intent-to-vote for presidential and gubernatorial elections as

[25] According to Fowler et al. (2018) two reasons drive this phenomenon. First, local tv stations allow for better targeting of voters during the period under examination. Second, cable and national network ads are prohibitively expensive.

[26] Primaries dates are collected from Ballotpedia and Wikipedia.

well as the final vote for each election. Links to some detailed polls were available, which I followed to obtain favorability scores for gubernatorial candidates. If a link did not work, I used *www.web.archive.org* to reach a live version of the website. For presidential candidates, I use the mapping of states to DMAs to assign a polling score for each candidate in each DMA based on the latest available poll of each state within the DMA.

Relating viewer demographic and polling data to the political ads data is challenging. As described in the previous section, political ads are aggregated at the DMA level, whereas demographic and polling data are at the state level. To match shows to demographics and poll data, I first used Sood (2016)'s mapping to find in which DMA each county belongs.[27] Then, I used the Census' American Community Survey to find the population of each county within the DMA, which allows me to calculate the population of the different states within the DMA. Thus, the demographic and polling data for each DMA are derived as a weighted average of the respective state data, where the weights are given by the relative populations of the different states within the DMA. For example, in Figure 1 the red border captures the Albany-Schenectady-Troy DMA. The graph shows that 9.5% of the DMA's population lives in Massachusetts, 88% lives in New York, and 2.5% lives in Vermont. Hence, Albany's demographic and polling data is weighted average of the same data from Massachusetts, New York and Vermont with weights 0.095, 0.88 and 0.025, respectively.

Using the polling data I focus the analysis to battleground markets. A market is defined as battleground if the weekly polling difference between the candidates is within five percentage points. Taken together with the requirement of a minimum number of ad plays, I retain 40% of the ad plays in the 2008 presidential election, and 63% of the 2012 presidential ad plays. Similarly, I only consider competitive gubernatorial elections; that is, elections with final vote difference within margin within ten points. In 2008, the competitive gubernatorial elections were Indiana, Missouri, Montana, North Carolina, Vermont and Washington, and in 2012 they were Indiana, Missouri, Montana, North Carolina, New Hampshire, Utah, Washington and West Virginia. The results are robust to using different cutoffs.

Candidate Ideological Scores (DIME)

Ideological scores for the gubernatorial candidates are obtained from the Bonica (2016) DIME database. Bonica leverages contributions to candidates to yield time-invariant ideological scores. Unlike DW-Nominate, the DIME scores are available for every candidate who run

[27] For some years, Sood (2016) database only contains the shapefiles of the different DMAs. Since each county belongs to a single DMA in a given year, I use Census county shapefiles to find if a county falls within a DMA for the given year. This allows me to characterize the composition of each DMA.

for any office in the US during the period between 1979-2014. I use DIME to examine the effect of ideological distance between opposing candidates on advertising.

3.2 Analysis

In this section, I examine whether political candidates strategically varied ad placement and messaging in the 2008 and 2012 election cycles, and present empirical findings consistent with the predictions of my theoretical model.

The theoretical model suggests that if the audience ideological makeup of the different tv shows varies such that candidates can target tailored ads, then all types of ads — policy, positive and negative valence — are simultaneously being employed by opposing candidates. As discussed above, Table 5 summarizes the shares of the different type of ads used by presidential and gubernatorial candidates between September and Election Day. It is clear that all three types of ads are simultaneously used by opposing candidates during a campaign. This is consistent with the theoretical mechanisms that each type of ad serves a different function.

Tables 6 and 7 record summary statistics for the shares of viewer demographics for the tv shows in the 2008 and 2012 samples. The standard deviation and inter-quartile range suggest that there is substantial variation in the audience composition of different shows, which can potentially allow candidates to tailor ad content to elicit desired voter reactions. The variation in the audience makeup of the different tv shows can also be observed in Figures 2-11. For example, Figures 2 and 7 plot the shares of all ideological groups—very conservative, conservative, middle of the road, liberal, very liberal and other—for all tv shows. If there is no variation in the ideological makeup of the audiences, then Figure 2 would be rectangular. Similarly, Figures 3- 11 capture the variation in the audiences in age, race, education and household income. There is substantial variation in the audience composition of the different shows. Combined with the evidence in Ridout et al. (2012), this provides support for the claim the audiences vary among tv shows. That is, tv shows (stochastically) aggregate political preferences, a crucial requirement for the theoretical mechanism of my model.

In the analysis that follows, I examine presidential and gubernatorial elections separately. For the presidential elections, I consider how the mix of ads by Democratic and Republican candidates varies with audience characteristics. For gubernatorial races, I pool all elections and years, and exploit the variation in the set of candidates to examine the effects of ideological and valence differences on ad strategies. Focusing on these dimensions, instead of

party labels, makes the analysis more interesting and tractable. Evaluating gubernatorial ad strategies based on party labels can produce misleading correlations. Compared to federal candidates, party labels of gubernatorial candidates are less predictive of the ideological distance between them and the opponent's base. Thus, conditioning on party can conflate different relationships. For example, consider the distinction between Democratic gubernatorial candidates in West Virginia versus Washington. A similar reasoning leads me to pool the 2008 and 2012 elections since I do not anticipate structural changes in the nature of ad strategies by gubernatorial candidates. The 2008 and 2012 presidential elections were analyzed separately since each party was mapped to a single candidate, and each year had a substantial volume of ads.

Presidential Elections

I rely on the intuition and predictions of my theory to guide the analysis. Candidates exploit the aggregation of voter ideologies (demographics) that tv shows induce to tailor ad content in order to target specific components of the voters' utility. The choice of ad content depends on the audience composition and its margin of abstention. Opposing candidates can advertise in the same show but they should target different parts of the voter's utility. Thus, observable viewer characteristics should be informative about candidate strategies. I first use this observation to examine whether individual demographics and average show ideology are differentially being targeted by opposing candidates. Then, I extend the analysis to consider how combinations of demographics are targeted.

Individual Demographics. First, I examine differences in how Democratic and Republican candidates target demographic $d \in \{male, white, black, \dots\}$ with ads of type $j \in \{q, p, n\}$. Here q represents policy, p indicates positive valence and n indicates negative valence. I consider the following Linear Probability Model (of the individual ad plays)

$$\begin{aligned} P^{j}_{t,m,i} = \alpha^{j,d} + \beta_1^{j,d} \cdot (Dem - Rep)_{t,m,i} + \beta_2^{j,d} \cdot share\_d_{t,m} \\ + \delta^{j,d} \cdot (Dem - Rep)_{t,m,i} \cdot share\_d_{t,m} + u_{t,m,i}, \end{aligned} \tag{7}$$

where t indexes tv shows, m DMA markets and i ad plays. Then, $P^{j}_{t,m,i}$ equals to 1 if ad i played in show t and DMA m is of type j. $(Dem-Rep)_{t,m,i}$ equals to 1 if ad i is sponsored by the Democratic candidate, and -1 if it is sponsored by the Republican candidate. $share\_d_{t,m}$ is the share of viewers of show t that fall within demographic *demo*.

Coefficient $\delta^{j,d}$ captures the difference in targeting demographic d with ad type j, d between Democrats and Republicans. If $\delta^{j,d} > 0$ then as *demo* increases among viewers

of show t, ads of type j, d are more likely placed by Democrats. Conversely, if $\delta^{j,d} < 0$ then the same ads are more likely placed by Republicans.

Evidence consistent with theory requires either (i) $\delta^{q,d}, \delta^{p,d} > 0 > \delta^{n,d}$, or (ii) $\delta^{q,d}, \delta^{p,d} < 0 < \delta^{n,d}$. The former implies that demographic d is targeted by Democratic policy and positive valence ads, and Republican negative valence ads. The latter implies that demographic d is instead targeted with Democratic negative valence ads, and Republican policy and positive valence ads.

Tables 10 and 11 present the results of (7) for 2008 and 2012, respectively. I highlight all cases that are consistent with theory, and I adjust for multiple hypothesis testing using the Bonferroni correction. Overall, I find that certain demographics are targeted differently by opposing candidates (and some targeted groups change between cycles). For example, Democratic candidates target minority voters with policy and positive ads, while Republican candidates target the same voters with negative ads. Similarly, I find that white voters are targeted with negative ads by Democratic candidates and positive ads by Republican candidates. Voters with less than high school education receive Democratic policy and positive ads, and in line with the theory Republican negative ads. The same holds for viewers residing in houses with values over $200k. In the presidential campaign of 2012, Republican targeted older (age 55 and over) and middle to low income (income between $20k and $40k) with positive and policy ads. As predicted by the theory, Democrats pushed negative messages to these voters.

Audience Ideology Next I consider the relationship between the average ideology of a show's audience (defined in (8) below) and candidate strategy. The Gfk MRI survey asks respondents to place themselves on five-point ideological scale: very liberal, somewhat liberal, middle of the road, somewhat conservative, and conservative. I calculate the share of each ideology among the viewers of show t (in DMA m), and define the average audience ideology as[28]

$$\begin{aligned} Ideol_{t,m} = &-1 \cdot share\_very\_liberal_{t,m} - 0.5 \cdot share\_liberal_{t,m} \\ &+ 0 \cdot share\_middle_{t,m} \\ &+ 0.5 \cdot share\_conservative_{t,m} + 1 \cdot share\_very\_conservative_{t,m}. \end{aligned} \tag{8}$$

A show with ideology close to zero could be inhabited by middle of the road viewers or equal

[28]The 2012 Gfk MRI survey also records each respondent's party identification. So, I define the average party identification among the viewers of show t as $Party_t = -1 \cdot share\_democrat_t + 1 \cdot share\_republican_t$. I use this variable in the first-stage regressions when I examine the extent to which candidates target bundles of voter demographics.

number of conservative and liberals. I distinguish between these two cases by defining a binary variable activated when middle of the road viewers are the majority of the viewers.

To capture the effect of audience ideology on candidate ad strategy, I consider the regression[29] — one for each candidate k —

$$P^{j,k}_{t,m,i} = \alpha^{j,k} + \beta^{j,k} \cdot \text{Ideol}_{t,m} + \gamma^{j,k}_1 \cdot Poll\_RD_m + \gamma^{j,k}_2 \cdot Middle_{t,m} + \gamma^{j,k}_3 \cdot NoIdeol_{t,m} + u^{j,k}_{t,m}, \quad (9)$$

where $P^{j,k}_{t,m,i}$ equals 1 if ad play i in show t (in DMA m) corresponds to ad of type j. Otherwise, it equals 0. $Ideol_{t,m}$ defined in 8, $Poll\_RD_m$ is the polling difference between the Republican and Democratic candidates in DMA m, $Middle_{t,m}$ and $NoIdeol_{t,m}$ equal 1 if middle of the road and no ideology, respectively, comprise more than half of the audience. Otherwise, each is 0. The coefficient of interest is $\beta^{j,k}$.

It must be noted that ideology does not perfectly capture voting bases. For example, conservative Democrats form a significant part of the Democratic party. However, how voters identify ideologically should be correlated with how they view candidates' policy positions. Ex ante, ideologically liberal voters should be closer in terms of policy to Democrats and more conservative voters should be closer to the Republican policies. My theory then predicts that as the average ideology of a show's audience becomes more conservative, Democrats should be reducing their share of policy and positive valence ads, and increasing the negative valence ads. Republicans should follow the opposite strategy.

I present the results from regression 9 in Table 16.[30] The top panel reflects the Presidential ads for 2008, and the bottom panel presents the results for 2012. Overall, I find evidence that Republicans increase their policy and positive valence ads as the audience becomes more conservative (i.e. $\beta^{q,R} > 0$ and $\beta^{p,R} > 0$). I also find evidence that Democrats switch from positive valence ads to negative valence ads as the audience becomes more conservative ($\beta^{p,D} < 0 < \beta^{n,D}$). Lastly, Republicans reduce their negative ads with more conservative audiences ($\$\beta^{\text{n,R}}<0$). In sum, the average audience ideology affects candidate strategies in ways consistent with the theoretical predictions. Opposing candidates target policy and positive ads to shows in which the viewers are closely aligned with their base, and target

[29]Note that I restrict the analysis to the shows with enough engaged voters; that is, at least 15% of the viewers engaged in some form of public activity such as writing to a public official or attending a rally. In contrast to the earlier analysis, I make informed guesses about the relationship between ideology and candidate ads. Thus, I exclude shows which are consumed by viewers who abstain for different reasons other than the ones identified in the theory (e.g., apathetic voters). The results are robust to the 15% cutoff selection, however the chosen cutoff balances the "apathetic voter" concern while retaining a large sample.

[30]Although not presented, the results are similar when I instead consider the share of the different types of ads. In this specification, I account for the shows in which the only the opponent advertises. The results are available upon request.

negative ads to the viewers that are associated with the opponent's base.

Tailoring to a Bundle of Demographics. So far in the analysis I have tested for targeting of a single demographic characteristic at a time. I now proceed to examine the interplay of all viewer and market demographics, and how they affect candidate advertising. To do this, I follow a data driven methodology to classify shows that uses a two-stage process, and avoids a priori restrictions on the relationship between demographics and political preferences.

In the first stage, I estimate the systematic part of candidate's ad strategies given tv show and market characteristics. Specifically, I regress the share of each type of ad on a set of viewer and market demographics. This provide a measure for the tailoring of ads for the specific audience. In the second stage, I calculate the correlation between the ad strategies of opposing candidates.

In the theoretical model, correlations between the ad types of opposing candidates derive solely from the differential targeting of viewer demographics. Examining the correlation between the predicted shares of each type of ad captures the extent of differential targeting of the same audience by opposing candidates. Since the predicted shares depend only on the show characteristics, significant correlation statistics are due to the mechanism of my theory; candidates target demographics with tailored messages to elicit specific reactions. Thus, observed correlations of opposing candidate ad strategies provide a test of the theoretical predictions.

I repeat the analysis for two frequencies of data aggregation: weekly and whole period (i.e., aggregate from September to Election day). The first-stage results are available in the Online Appendix. The estimated second-stage correlations for the weekly predicted shares are presented in Tables 17 and 18. The correlations for the aggregated period are shown in Tables 19 and 20. Candidates have four possible actions in each tv show: no advertisement, negative valence advertisement, positive valence advertisement and policy advertisement. Weekly ad data is a higher frequency, which raises concerns of over-representation of no advertising as a response. Aggregating over the whole period helps ameliorate such concerns.

Consistent with the theory, I find significant negative correlations between the policy ads of opposing candidates with magnitudes ranging between -0.05 and -0.13. Similarly, there is strong negative correlation between the positive valence ads ranging between -0.05 and -0.08. These findings indicate that Democratic and Republican candidates target policy and positive valence to different voters, a pattern consistent with the theoretical predictions. Moreover, I find that a negative correlation exists between the weekly negative valence ads of opposing candidates, which implies that a candidate attacks their opponent in different shows than the opponent does.

Policy ads are also negatively correlated with the opponent's positive valence ads. With weekly data, this ranges between -0.09 and -0.10 for 2008, and -0.03 and -0.10 for 2012. Over the whole period, the negative correlation between policy ads and positive valence ranges between -0.10 and -0.13 for 2012. This again is consistent with the theory which predicts that positive valence ads are mostly used to mobilize the alienated base, and policy ads are targeted towards aligned voters. As a result, opposing candidates promote their policy and positive valence ads in distinctly different shows than their opponents. Furthermore, I find that policy and positive valence ads are positively correlated with the opponent's (i) weekly predicted probability of not advertising, and (ii) negative valence ads over the whole period. The latter ranges between 0.06 and 0.14 for 2008 and 2012, which is consistent with the prediction that candidates highlight the opponent's negative attributes to demotivate the opponent's base. The former suggests that policy and positive valence is optimal in shows where candidates expect the opponent not to advertise.

All in all, the main predictions of the model are consistent with the ad strategies followed by presidential candidates in 2008 and 2012. First, I show that certain demographics are differentially targeted by candidates in ways consistent with the theory; one candidate favors policy or positive valence, and the opponent negative valence. I also consider how the average ideology of a show's viewers informs the ad strategies of candidates. As predicted by the theory, Democrats are more likely to use policy and positive valence ads in shows with more liberal voters, and negative valence in shows with more conservative viewers. Republicans increase their positive valence advertising in shows with more conservative viewers, and increase their negative valence ads in shows with more liberal viewers. Finally, I find that opposing candidates strategies are correlated in the directions predicted by the theory.

Gubernatorial Elections

Next, I analyze the ad strategies of gubernatorial candidates in 2008 and 2012. First, I consider how the shares of the different types of ads between opposing opponents correlate. This provides further evidence consistent with the correlations induced by the strategic variation of ad placement and content predicted by the model. Then, I test the theoretical predictions about the effect of valence and ideological distance between opponents on ad strategies.

Correlations. In Table 21, I present the correlation between the ad strategies of opposing candidates using, first, the weekly shares of the different ad types, and second, the aggregated shares for the whole period between September and Election day. Similar to the presidential

analysis results, the share of policy and positive valence ads between opposing candidates are negatively correlated. Moreover, candidates increase policy and positive valence ads in shows in which the opponent does not advertise. In other words, opposing candidates highlight their policy positions and emphasize their positive valence traits to different audiences. This is consistent with the theoretical prediction that each candidate targets policy and positive valence to their alienated and indifferent bases.

The correlation patterns of negative valence ads suggest that negative ads are targeted to the opponent's base. First, I find that opposing candidates' negative valence ads are negatively correlated. This implies that each candidate targets their negative ads to a different group of voters than their opponent. Second, a candidate's own share of negative ads is positively correlated with the opponent's share of positive ads and policy ads (for the whole period). This again is consistent with the prediction that candidates target the opponent's base with negative ads in an effort to demobilize them.

Ideology Distance. Next, I consider the effect of ideological difference between opposing candidates on advertising strategies. First, I test the theoretical prediction that candidates increase their share of policy ads and decrease their share of negative valence ads. To capture this, I estimate the regression equation

$$share\_j_{t,k,s} = \beta^j \cdot Dime\_Diff_s + u_{t,k},$$

where $share\_j_{t,k,s}$ is the share of ads of type $j = \{q, p, n\}$ by candidate k in show t and state s, and $Dime\_Diff_s$ measures the absolute difference between the DIME scores of the two candidates in state s. The results in Table 22 are in line with the theory. As the ideological distance between the opponents widens, candidates increase their share of policy ads and decrease their share of negative ads; the effect is approximately one for one, $\beta^q = 0.008$ and $\beta^n = -0.012$. No significant effect on positive valence ads exists, which is again consistent with the theory.

I then proceed to examine how the probability that opposing candidates use the same type of ad in the same show varies with ideological distance. Specifically, I estimate the regression equation

$$P^j_{t,s} = \alpha^j + \beta^j \cdot Dime\_Diff_s + u_{t,s},$$

where $P^j_{t,s}$ reflects the probability that opposing candidates in state s both target tv show t with ads of type $j = \{q, p, n\}$; $Dime\_Diff_s$ again measures the absolute difference between the DIME scores of the two candidates in state s. The results are shown in Table 23.

The probability that both candidates highlight policy or positive traits in the same show decreases by 5 ($\beta^q = -0.052$) and 0.5 ($\beta^p = -0.005$) percentage points, respectively, as the distance between opponents increases. In contrast, it becomes more likely that both candidates use negative ads in the same show, $\beta^n = 0.037$. In terms of the theoretical model, the results in Tables 22 and 23 suggest that candidates mobilize their bases with policy and positive valence ads, and target negative valence ads to the indifferent voters in the middle. As the ideological gap between opponents increases, it becomes easier to motivate the base on the policy dimension. Thus, candidates target even more of their policy ads to their base.

For the last part of the analysis of ideological differences, I estimate the regression equation (10). Specifically, I follow a two-step process analogous to that for the presidential ads. I instrument the opponent strategies on show, market and election characteristics to capture how candidates tailor ads to audiences based on their demographics. Thus, the only source of correlation between the ad types of opposing candidates is the targeting of demographics and not the opponent's strategy.

$$\begin{aligned} share\_j_{t,k,s} = \beta_0 &+ \beta_1^j \cdot Opp\_No\_Ads_{t,k,s} + \beta_2^j \cdot Opp\_Policy\_Share_{t,k,s} + \beta_3^j \cdot Opp\_PosVal\_Share_{t,k,s} \\ &+ \gamma_1^j \cdot High\_Ideol\_Dif_{k,s} \cdot Opp\_No\_Ads_{t,k,s} \\ &+ \gamma_2^j \cdot High\_Ideol\_Dif_{k,s} \cdot Opp\_Policy\_Share_{t,k,s} \\ &+ \gamma_3^j \cdot High\_Ideol\_Dif_{k,s} \cdot Opp\_PosVal\_Share_{t,k,s} \\ &+ u_{t,k,s}. \end{aligned} \tag{10}$$

$share\_j_{t,k,s}$ again reflects the share of ads of type $j = \{q, p, n\}$ by candidate k in show t and state s; $High\_Ideol\_Dif_{k,s}$ is an indicator variable equal to one when the absolute difference in ideology between opposing candidates exceeds two.[31] $Opp\_No\_Ads_{t,k,s}$ captures the probability k's opponent in state s does not advertise in show t, and $Opp\_Policy\_Share_{t,k,s}$ and $Opp\_PosVal\_Share_{t,k,s}$ are the expected share of policy and positive valence ads, respectively, by k's opponent in show t and state s. Coefficients β_1^j, β_2^j and β_3^j capture the effect of the corresponding opponent ad type relative to the opponent's negative valence ads. The estimates of regression (10) are shown in Table 24. Ideologically distant candidates switch away from policy and positive valence to negative valence when the opponent talks about policy or their positive valence. Specifically, $\beta_2^n + \gamma_2^n = 0.307$ and $\beta_3^n + \gamma_3^n = 0.503$, which indicates that negative ads increase in opponent's policy and positive valence ads. Similarly, $\beta_2^q + \gamma_2^q = -0.373$ and $\beta_3^q + \gamma_3^q = -0.232$, and $\beta_2^p + \gamma_2^p = -0.125$ and $\beta_3^p + \gamma_3^p = -0.065$ imply that a candidate's policy and positive valence ads decrease in the opponent's policy

[31] The DIME score can take any value on the real line. Setting the cutoff value equal to 2 splits the sample into equal sub-samples. The results are robust to alternative cutoff values.

and positive valence ads. Moreover, ideologically-distant opponents are more likely to use more policy and less negative valence ads in shows where their opponent is least likely to advertise; $\beta_1^n + \gamma_1^n = -0.442$ and $\beta_1^q + \gamma_1^q = 0.419$. In contrast, opposing candidates with small ideological differences both target moderate voters with policy and positive valence ads ($\beta_2^p, \beta_3^q > 0$). Lastly, I also find evidence that even ideologically-similar candidates target their extreme base with positive valence ads. To see this, notice that $\beta_1^p > 0$ which suggests that a candidate advertises positive valence in shows where the opponent does not advertise.

Valence Effect Finally, I consider the effect of valence on ad strategies. Specifically, I measure the effect of initial valence stock on how candidates advertise by estimating the regression

$$\begin{aligned} share\_j_{t,k,s} = \beta_0^j + \beta_1^j \cdot Own\_Fav\_Unfav_{t,k,s} + \beta_2^j \cdot Opp\_Fav\_Unfav_{t,k,s} \quad (11) \\ + \gamma_1^j \cdot Favored_{t,k,s} \cdot Own\_Fav\_Unfav_{t,k,s} \\ + \gamma_2^j \cdot Favored_{t,k,s} \cdot Opp\_Fav\_Unfav_{t,k,s} \\ + \theta_k + u_{t,k,s}. \quad (12) \end{aligned}$$

Again $j_{t,k,s}$ reflects the share of ads of type $j = \{q, p, n\}$ by candidate k in show t and θ_k are candidate fixed effects; $Own\_Fav\_Unfav_{t,k,s}$ measures the difference between the favorables and unfavorables of candidate k in state s; $Opp\_Fav\_Unfav_{t,k,s}$ reflects the same difference for k's opponent. The former proxies for own candidate valence, and the latter for the opponent's valence. Both are lagged by a week to avoid simultaneity. $Favored_{t,k,s}$ indicates whether candidate k has higher favorables-unfavorables than their opponent, and it is defined at the state level. The results are presented in Table 25. Consistent with the model predictions, higher own valence increases positive valence ads and decreases negative ones; that is, $\beta_1^n < 0 < \beta_1^p$. In contrast, candidates increases their negative ads and decrease their positive ones as the opponent's valence increases, i.e., $\beta_2^n > 0 > \beta_2^p$. Policy ads are independent of initial valence as the theory suggests.

4 Conclusion

In this paper, I first theoretically characterize a novel mechanism of strategic communication between politicians and voters, and then provide extensive empirical evidence supporting the implications of those mechanisms. I find that politicians exploit the aggregation of political preferences that tv shows induce to tailor ads and messages to different audiences. These messages target specific parts of a voter's utility based on their most likely margin of abstention and ideology. By employing this strategy, candidates aim to maximize the

turnout of their own political base, and minimize the turnout of the opposing one. This is an important new source of strategic variation of ad placement and ad content that helps to explain the distribution of different types of ads across shows.

A crucial part of the empirical analysis is the classification of ads into different types: policy, positive valence and negative valence. To achieve this, I develop an algorithm that provides a flexible and systematic method of classification based on ad content, which also facilitates multiple future extensions (e.g., examining placement of controversial vs non-controversial issues, and incorporating future elections).

My findings emphasize the importance of taking into account the *type* of ads that voters are exposed to when examining the relationship between political advertising and turnout. My theoretical and empirical results also have implications for other forms of political communication. For example, a political rally provides a venue for candidates to mobilize the base by targeting the horizontal part of their utility (i.e., candidates talk about policy). In contrast, a debate enables targeting of indifferent voters, which requires targeting the vertical component of utility (i.e., candidates talk about valence). In terms of social media targeting, my results suggest that controversial topics will be microtargeted with ads, and not publicly shared or posted, since the latter mobilizes the opposing base as well.

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5 Appendix

5.1 Appendix A - Proofs

Proof of Proposition 1: Substitute out n_t^D from (2) by using $n_t^D = \bar{B}_t^D - q_t^D - p_t^D$. Since negative ads have constant marginal effects and policy is additively separable from valence, the optimization problem with respect to policy ads q_t^D and p_t^D can be solved separately. Consider first the second-order conditions. Define $S\tilde{O}C_x^q$ and $S\tilde{O}C_x^p$ the second-order derivatives for policy and positive valence, respectively, if a show's viewers are exclusive comprised of voters with ideology x. For any show t, we can express the second-order derivative with respect to q_t^D and p_t^D as

$$SOC_t^q = \pi_{-1,t} \cdot S\tilde{O}C_{-1}^q + \pi_{x_D,t} \cdot S\tilde{O}C_{x_D}^q + \pi_{0,t} \cdot S\tilde{O}C_0^q + \pi_{x_R,t} \cdot S\tilde{O}C_{x_R}^q + \pi_{1,t} \cdot S\tilde{O}C_1^q,$$
$$SOC_t^p = \pi_{-1,t} \cdot S\tilde{O}C_{-1}^p + \pi_{x_D,t} \cdot S\tilde{O}C_{x_D}^p + \pi_{0,t} \cdot S\tilde{O}C_0^p + \pi_{x_R,t} \cdot S\tilde{O}C_{x_R}^p + \pi_{1,t} \cdot S\tilde{O}C_1^p,$$

where

$$S\tilde{O}C_{-1}^q = -\frac{(1+x_D)\beta_q}{\bar{c}-\underline{c}}, \qquad S\tilde{O}C_{-1}^p = -\frac{V_D\beta_p}{\bar{c}-\underline{c}},$$
$$S\tilde{O}C_{x_D}^q = -\frac{(x_R-x_D)\beta_q}{\bar{c}-\underline{c}}, \qquad S\tilde{O}C_{x_D}^p = -\frac{V_D\beta_p}{\bar{c}-\underline{c}},$$
$$S\tilde{O}C_0^q = -\frac{x_D(2\underline{c}-\bar{\epsilon}+\underline{\epsilon})\beta_q}{(\bar{c}-\underline{c})(\bar{\epsilon}-\underline{\epsilon})}, \quad S\tilde{O}C_0^p = \frac{V_D(2\underline{c}-\bar{\epsilon}+\underline{\epsilon})\beta_p}{(\bar{c}-\underline{c})(\bar{\epsilon}-\underline{\epsilon})},$$
$$S\tilde{O}C_{x_R}^q = \frac{(x_R-x_D)\sigma_2\beta_q}{\bar{c}-\underline{c}}, \qquad S\tilde{O}C_{x_R}^p = -\frac{V_D\beta_p}{\bar{c}-\underline{c}},$$
$$S\tilde{O}C_1^q = 0 \qquad\qquad S\tilde{O}C_1^p = 0.$$

It follows then that the second-order conditions with respect to q_t^D fails if $\pi_{x_R,t}$ or $\pi_{1,t}$ are sufficiently high. Similarly, the second-order conditions with respect to p_t^D fails if $\pi_{1,t}$ is sufficiently high. Moreover, it is immediate from SOC_t^q and SOC_t^p that a unique solution q_t^D, q_t^D for any show t.

Next, denote $\tilde{q}_x$ and $\tilde{p}_x$ the solution to the first-order condition of (2) with respect to q_t^D

and p_t^D, respectively, if a show's viewers are exclusive comprised of voters with ideology x.

$$\begin{aligned}
\tilde{q}_{-1} &= \frac{n^q_{-1}}{d^q_{-1}} = \frac{A(1+x_D)}{A(1+x_D)\beta_q}, & \tilde{p}_{-1} &= \frac{n^p_{-1}}{d^p_{-1}} = \frac{V_D}{V_D\beta_p},\\
\tilde{q}_{x_D} &= \frac{n^q_{x_D}}{d^q_{x_D}} = \frac{A(x_R-x_D)-\delta V_R}{A(x_R-x_D)\beta_q}, & \tilde{p}_{x_D} &= \frac{n^p_{x_D}}{d^p_{x_D}} = \frac{V_D-\delta V_R}{V_D\beta_p},\\
\tilde{q}_0 &= \frac{n^q_0}{d^q_0} = \frac{-Ax_D-\delta V_R}{A(-x_D)\beta_q}, & \tilde{p}_0 &= \frac{n^p_0}{d^p_0} = \frac{V_D-\delta V_R}{V_D\beta_p},\\
\tilde{q}_{x_R} &= \frac{n^q_{x_R}}{d^q_{x_R}} = \frac{-(A(x_R-x_D)\sigma_2+\delta V_R)}{-A(x_R-x_D)\beta_q\sigma_2}, & \tilde{p}_{x_R} &= \frac{n^p_{x_R}}{d^p_{x_R}} = \frac{V_D-\delta V_R}{V_D\beta_p},\\
\tilde{q}_1 &= 0, & \tilde{p}_1 &= 0.
\end{aligned}$$

Then in show t, the generic solutions to the first-order conditions are given by

$$\tilde{q}_t^D = \frac{(\bar{\epsilon}-\underline{\epsilon})(\pi_{-1,t}\cdot n^q_{-1}+\pi_{x_D,t}\cdot n^q_{x_D}+\pi_{x_R,t}\cdot n^q_{x_R}-\pi_{1,t}\delta V_R)+((\bar{\epsilon}-\underline{\epsilon})-2\underline{c})\pi_{0,t}\cdot n^q_0}{(\bar{\epsilon}-\underline{\epsilon})(\pi_{-1,t}\cdot d^q_{-1}+\pi_{x_D,t}\cdot d^q_{x_D}+\pi_{x_R,t}\cdot d^q_{x_R})+((\bar{\epsilon}-\underline{\epsilon})-2\underline{c})\pi_{0,t}\cdot d^q_0}, \quad (13)$$

$$\tilde{p}_t^D = \frac{(\bar{\epsilon}-\underline{\epsilon})(\pi_{-1,t}\cdot n^p_{-1}+\pi_{x_D,t}\cdot n^p_{x_D}+\pi_{x_R,t}\cdot n^p_{x_R}-\pi_{1,t}\delta V_R)+((\bar{\epsilon}-\underline{\epsilon})-2\underline{c})\pi_{0,t}\cdot n^p_0}{(\bar{\epsilon}-\underline{\epsilon})(\pi_{-1,t}\cdot d^p_{-1}+\pi_{x_D,t}\cdot d^p_{x_D}+\pi_{x_R,t}\cdot d^p_{x_R})+((\bar{\epsilon}-\underline{\epsilon})-2\underline{c})\pi_{0,t}\cdot d^p_0}, \quad (14)$$

Let $\zeta_t = \pi_{-1,t}+\pi_{x_D,t}+\pi_{0,t}+\pi_{x_R,t}+\pi_{1,t}$ denote the number of viewers of show t. If \$SOC$_t^q$<0\$—$\pi_{x_R,t}/\zeta_t$ and $\pi_{1,t}/\zeta_t$ are sufficiently small—candidate D targets $q_t^D = \max\{\tilde{q}_t^D, 0\}$ policy ads to show t. Similarly, if \$SOC$_t^p$<0\$—$\pi_{1,t}/\zeta_t$ is sufficiently small—then candidate D targets $p_t^D = \max\{\tilde{p}_t^D, 0\}$ policy ads to show t.

The rest of the results follow immediately from definitions (13) and (14) by letting the corresponding ratio $\pi_{x,t}/\zeta_t$ grow. □

Proof of Proposition 2: Suppose $q_t^D > 0$. From (13),

$$\begin{aligned}
\frac{\partial q_t^D}{\partial \pi_{-1,t}} &= \frac{\delta V_R(1+x_D)(\bar{\epsilon}-\underline{\epsilon})}{A\beta_q\cdot K^2}\left[(\bar{\epsilon}-\underline{\epsilon})(\pi_{x_D,t}+\pi_{0,t}+\pi_{x_R,t}+\pi_{1,t})-2\underline{c}\pi_{0,t}\right]\\
\frac{\partial q_t^D}{\partial \pi_{x_D,t}} &= \frac{\delta V_R(\bar{\epsilon}-\underline{\epsilon})}{A\beta_q\cdot K^2}\left[(\bar{\epsilon}-\underline{\epsilon}-2\underline{c})x_R\pi_{0,t}+(\bar{\epsilon}-\underline{\epsilon})\left((x_R-x_D)(\pi_{x_R,t}+\pi_{x_R,t}\sigma_2+\pi_{1,t})-(1+x_D)\pi_{-1,t}\right)\right]\\
\frac{\partial q_t^D}{\partial \pi_{0,t}} &= -\frac{\delta V_R(\bar{\epsilon}-\underline{\epsilon})}{A\beta_q\cdot K^2}(\bar{\epsilon}-\underline{\epsilon}-2\underline{c})\left[(1+x_D)\pi_{-1,t}+x_R\pi_{x_D,t}-((x_R-x_D)\sigma_2-x_D)\pi_{x_R,t}-(-x_D)\pi_{1,t}\right]\\
\frac{\partial q_t^D}{\partial \pi_{x_R,t}} &= -\frac{\delta V_R(\bar{\epsilon}-\underline{\epsilon})}{A\beta_q\cdot K^2}\left[(\bar{\epsilon}-\underline{\epsilon})\left((1+x_D)\pi_{-1,t}+(x_R-x_D)(1+\sigma_2)\pi_{x_D,t}+(x_R-x_D)\sigma_2\pi_{1,t}\right)\right.\\
&\quad\left.+(\bar{\epsilon}-\underline{\epsilon}-2\underline{c})((x_R-x_D)\sigma_2-x_D)\pi_{0,t}\right]\\
\frac{\partial q_t^D}{\partial \pi_{-1,t}} &= -\frac{\delta V_R(\bar{\epsilon}-\underline{\epsilon})}{A\beta_q\cdot K},
\end{aligned}$$

where

$$K = (\bar{\epsilon} - \underline{\epsilon})((1 + x_D)\pi_{-1,t} + x_R(\pi_{x_D,t} - \sigma_2\pi_{x_R,t}) - x_D(\pi_{x_D,t} + \pi_{0,t} - \sigma_2\pi_{x_R,t})) - 2\underline{c}x_D\pi_{0,t} > 0.$$

Since $\underline{c}, \underline{\epsilon}, x_D < 0$ and $\bar{c}, \bar{\epsilon}, x_R > 0$, the observations in Proposition 2 regarding the effects of $\pi_{-1,t}, \pi_{x_D,t}, \pi_{0,t}, \pi_{x_R,t}$ and $\pi_{1,t}$ follow immediately. Next, consider the effects of varying $\Delta x = x_R - x_D$. Again suppose $q_t^D > 0$, then we can express q_t^D as

$$q_t^D = \frac{1}{\beta_q}\left(1 - \frac{\delta V_R(\bar{\epsilon} - \underline{\epsilon} - 2\underline{c})\pi_{0,t} + (\bar{\epsilon} - \underline{\epsilon})(\pi_{x_D,t} + \pi_{x_R,t} + \pi_{1,t})}{A\left(-(\bar{\epsilon} - \underline{\epsilon} - 2\underline{c})x_D\pi_{0,t} + (\bar{\epsilon} - \underline{\epsilon})((1 + x_D)\pi_{-1,t} + (x_R - x_D)(\pi_{x_D,t} - \sigma_2\pi_{x_R,t}))\right)}\right)$$

Then,

$$\frac{\partial q_t^D}{\partial(x_R - x_D)} = \frac{(\pi_{x_D,t} - \sigma_2\pi_{x_R,t})\delta V_R(\bar{\epsilon} - \underline{\epsilon})\left[(\bar{\epsilon} - \underline{\epsilon})(\pi_{x_D,t} + \pi_{x_R,t} + \pi_{1,t}) + (\bar{\epsilon} - \underline{\epsilon} - 2\underline{c})\pi_{0,t}\right]}{A\beta_q\left(-x_D(\bar{\epsilon} - \underline{\epsilon} - 2\underline{c})\pi_{0,t} + (\bar{\epsilon} - \underline{\epsilon})((1 - x_D)\pi_{-1,t} + (x_R - x_D)(\pi_{x_D,t} - \sigma_2\pi_{x_R,t}))\right)^2}.$$

Thus, $\partial q_t^D/\partial(x_R - x_D) > 0$ if $\pi_{x_D,t} > \sigma_2\pi_{x_R,t}$. The rest of the effects are trivial to derive from (13). If $q_t^D = 0$ then each derivative is zero, hence the claim of increasing, but not strictly increasing. □

Proof of Proposition 3: Suppose $q_t^D > 0$. From (14),

$$\begin{aligned}
\frac{\partial p_t^D}{\partial \pi_{-1,t}} &= \frac{\delta V_R(\bar{\epsilon} - \underline{\epsilon})}{V_D\beta_p \cdot K^2}\left[(\bar{\epsilon} - \underline{\epsilon})(\pi_{x_D,t} + \pi_{0,t} + \pi_{x_R,t} + \pi_{1,t}) - 2\underline{c}\pi_{0,t}\right] \\
\frac{\partial p_t^D}{\partial \pi_{x_D,t}} &= \frac{\delta V_R(\bar{\epsilon} - \underline{\epsilon})^2}{V_D\beta_p \cdot K^2}(\pi_{1,t} - \pi_{-1,t}) \\
\frac{\partial q_t^D}{\partial \pi_{0,t}} &= \frac{\delta V_R(\bar{\epsilon} - \underline{\epsilon})}{A\beta_q \cdot K^2}(\bar{\epsilon} - \underline{\epsilon} - 2\underline{c})(\pi_{1,t} - \pi_{-1,t}) \\
\frac{\partial p_t^D}{\partial \pi_{x_R,t}} &= \frac{\delta V_R(\bar{\epsilon} - \underline{\epsilon})^2}{V_D\beta_p \cdot K^2}(\pi_{1,t} - \pi_{-1,t}) \\
\frac{\partial p_t^D}{\partial \pi_{x_R,t}} &= -\frac{\delta V_R(\bar{\epsilon} - \underline{\epsilon})}{V_D\beta_p \cdot K}
\end{aligned} \tag{15}$$

where

$$K = (\bar{\epsilon} - \underline{\epsilon})(\pi_{-1,t} + \pi_{x_D,t} + \pi_{0,t} + \pi_{x_R,t}) - 2\underline{c}\pi_{0,t} > 0 \tag{16}$$

Since $\underline{c}, \underline{\epsilon}, x_D < 0$ and $\bar{c}, \bar{\epsilon}, x_R > 0$, the observations in Proposition 3 regarding the effects of $\pi_{-1,t}, \pi_{x_D,t}, \pi_{0,t}, \pi_{x_R,t}$ and $\pi_{1,t}$ follow immediately. Similarly, the rest of the effects can be trivially derived. If $p_t^D = 0$ then each derivative is zero, hence the claim of increasing, but not strictly increasing. □

5.2 Appendix B - Empirical Results

Table 2: Example of Classifying an Ad

Order	Statement Text	Size	Topic	Tone	Position
1	with all our problems, why is john mccain talking about the sixties?	69	Leadership	Negative	
2	trying to link barack obama to radical bill ayers?	50	Lying Extremist	Negative	
3	mccain knows obama denounced ayer's crimes, committed when obama was just 8 years old.	86	Lying, Extremist	Negative	
4	let's talk about standing up for america today.	47	Leadership	Positive	
5	john mccain wants to spend $10 billion a month in iraq, tax breaks for corporations that ship jobs overseas, selling out american workers.	138	War-Iraq, Jobs-Outsource	Negative	Against, Against
6	john mccain, just more of the same.	35	Leadership	Negative	

Table 3: Policy Categories

Abortion	Bailout
Drilling	Education
Energy/Environment	Government (Budget/Debt/Deficit)
Gun Rights	Healthcare
Immigration	Jobs (Outsourcing)
Nuclear	Regulation
Social Security	Taxes
War	Women Issues

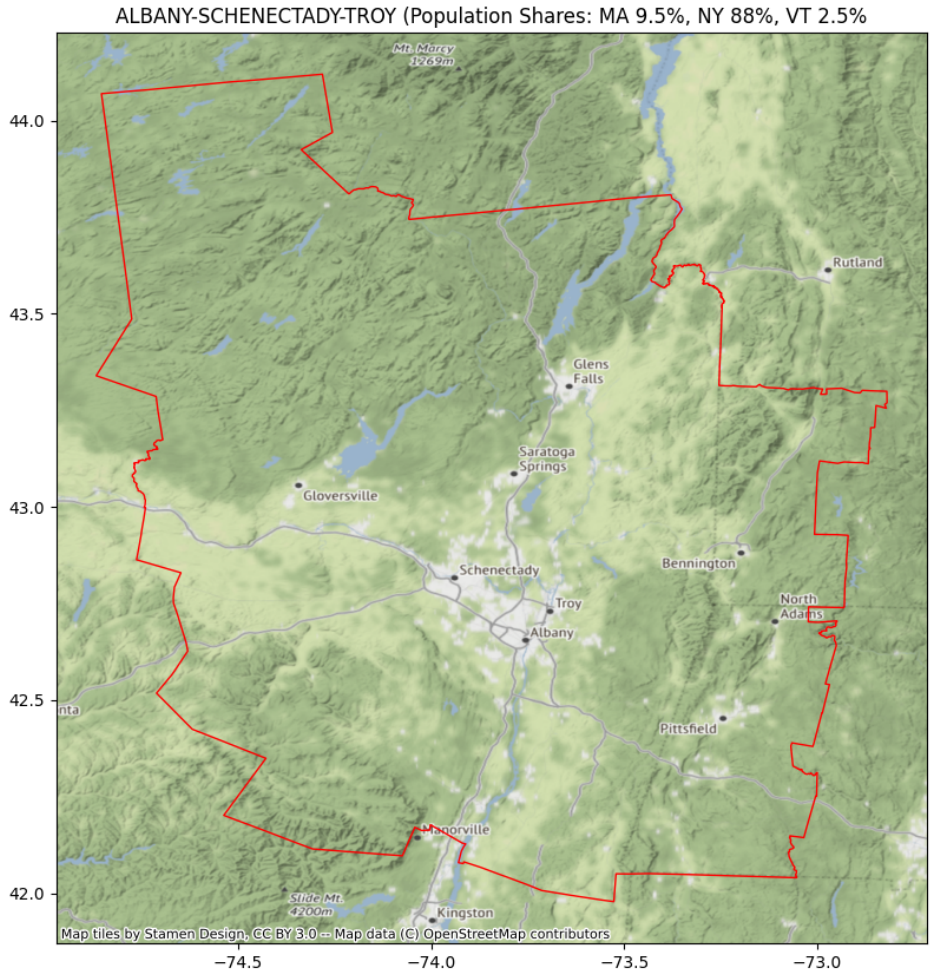

Figure 1: Mapping State Data to DMAs (Example: Albany, Schenectady, Troy)

Table 4: Statement Examples

Policy
1. *the biggest problem with american health-care system is that it costs too much*
2. *he wants us to keep spending $10 billion a month in iraq, just like bush.*
3. *senator obama support born-alive infant protections*
Positive Valence
4. *senator mccain, we are a frightened nation. times are tough, and you have the judgment we can believe in.*
5. *he understands the pressures families are under and what it takes to help families thrive*
Negative Valence
6. *"our economy, i think, the fundamentals of our economy are strong", so, so what senator mccain is saying is that the recession is not real.*
7. *on record, for and against*
8. *flip-floppers only hold one position at a time*

Table 5: Share of Types of Ads

Election	Party	Neg Valence	Policy	Pos Valence
Pres 2008	Democrat	0.37	0.38	0.25
	Republican	0.54	0.41	0.05
Pres 2012	Democrat	0.55	0.30	0.16
	Republican	0.67	0.18	0.14
Gub IN 2008	Democrat	0.8	0.00	0.20
	Republican	0.0	0.34	0.66
Gub MO 2008	Democrat	0.46	0.29	0.25
	Republican	0.32	0.26	0.42
Gub MT 2008	Democrat	0.00	0.55	0.45
	Republican	0.87	0.13	0.00
Gub NC 2008	Democrat	0.53	0.09	0.38
	Republican	0.57	0.06	0.37
Gub VT 2008	Democrat	0.55	0.18	0.27
	Republican	0.44	0.00	0.56
Gub WA 2008	Democrat	0.42	0.26	0.32
	Republican	0.63	0.09	0.29
Gub IN 2012	Democrat	0.65	0.08	0.27
	Republican	0.00	0.08	0.92
Gub MO 2012	Democrat	0.39	0.0	0.61
	Republican	0.67	0.2	0.13
Gub MT 2012	Democrat	0.19	0.54	0.27
	Republican	0.63	0.14	0.24
Gub NC 2012	Democrat	0.28	0.43	0.28
	Republican	0.10	0.53	0.37
Gub NH 2012	Democrat	0.40	0.54	0.05
	Republican	0.18	0.55	0.26
Gub UT 2012	Democrat	0.37	0.09	0.54
	Republican	0.00	0.80	0.20
Gub WA 2012	Democrat	0.64	0.14	0.22
	Republican	0.32	0.35	0.33
Gub WV 2012	Democrat	0.48	0.33	0.19
	Republican	0.46	0.14	0.40

5.2.1 Show Demographics

Table 6: Tv Show Demographics 2008

Demographics 2008	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Ideology: Cons - Liberal	14,530	0.173	0.213	-1.000	0.051	0.278	1.000
Ideology: Majority Middle of Road	14,530	0.074	0.262	0	0	0	1
Party: Republican - Democrat							
Party: Independent							
Very Conservative	14,530	0.116	0.095	0.000	0.054	0.155	1.000
Somewhat Conservative	14,530	0.218	0.136	0.000	0.143	0.266	1.000
Middle of the Road	14,530	0.325	0.144	0.000	0.250	0.391	1.000
Somewhat Liberal	14,530	0.122	0.093	0.000	0.064	0.161	1.000
Very Liberal	14,530	0.039	0.048	0.000	0.002	0.056	0.754
Republican							
Democrat							
Independent							
Male	14,530	0.465	0.194	0.000	0.345	0.590	1.000
Female	14,530	0.535	0.194	0.000	0.410	0.655	1.000
White	14,530	0.777	0.196	0.000	0.706	0.906	1.000
Black	14,530	0.139	0.145	0.000	0.036	0.190	1.000
Latino	14,530	0.075	0.117	0.000	0.002	0.104	1.000
Age 18 34	14,530	0.253	0.169	0.000	0.140	0.328	1.000
Age 35 54	14,530	0.379	0.147	0.000	0.308	0.458	1.000
Age over 55	14,530	0.353	0.182	0.000	0.239	0.458	1.000
Education Less High School	14,530	0.133	0.108	0.000	0.065	0.174	1.000
Education High School	14,530	0.341	0.146	0.000	0.270	0.408	1.000
Education No Degree College	14,530	0.276	0.130	0.000	0.215	0.328	1.000
Education College Graduate	14,530	0.236	0.137	0.000	0.151	0.306	1.000
Household Income less 20k	14,530	0.170	0.133	0.000	0.083	0.224	1.000
Household Income 20-40k	14,530	0.204	0.124	0.000	0.136	0.255	1.000
Household Income 40-60k	14,530	0.185	0.122	0.000	0.116	0.233	1.000
Household Income 60-75k	14,530	0.105	0.084	0.000	0.059	0.138	1.000
Household Income 75-150K	14,530	0.240	0.135	0.000	0.157	0.321	1.000
Household Income Over 150K	14,530	0.081	0.084	0.000	0.022	0.114	1.000
Home ownership	14,530	0.681	0.182	0.000	0.599	0.793	1.000
Home Value Less 50k	14,530	0.033	0.058	0.000	0.000	0.043	1.000
Home Value 50-100k	14,530	0.058	0.065	0.000	0.007	0.086	0.679
Home Value 100-200k	14,530	0.229	0.162	0.000	0.103	0.321	1.000
Home Value Over 200k	14,530	0.334	0.190	0.000	0.204	0.442	1.000

[32]Although fewer shows have matched demographics in 2012, the number of observations in 2012 with matched demographics is almost twice that in 2008.

Table 7: Tv Show Demographics 2012

Demographics 2012[32]	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Ideology: Cons - Liberal	14,354	0.151	0.195	-1.000	0.050	0.255	1.000
Ideology: Majority Middle of Road	14,354	0.032	0.176	0	0	0	1
Party: Republican - Democrat	14,354	-0.042	0.205	-1.000	-0.144	0.070	1.000
Party: Independent	14,354	0.200	0.120	0.000	0.125	0.265	1.000
Very Conservative	14,354	0.105	0.080	0.000	0.052	0.145	0.985
Somewhat Conservative	14,354	0.195	0.115	0.000	0.126	0.253	1.000
Middle of the Road	14,354	0.248	0.126	0.000	0.180	0.310	1.000
Somewhat Liberal	14,354	0.102	0.090	0.000	0.046	0.135	1.000
Very Liberal	14,354	0.048	0.068	0.000	0.004	0.064	1.000
Republican	14,354	0.215	0.130	0.000	0.132	0.291	1.000
Democrat	14,354	0.257	0.134	0.000	0.178	0.321	1.000
Independent	14,354	0.200	0.120	0.000	0.125	0.265	1.000
Male	14,354	0.455	0.194	0.000	0.328	0.607	1.000
Female	14,354	0.545	0.194	-0.000	0.393	0.672	1.000
White	14,354	0.765	0.208	0.000	0.696	0.902	1.000
Black	14,354	0.149	0.158	0.000	0.040	0.204	1.000
Latino	14,354	0.076	0.136	0.000	0.0001	0.089	1.000
Age 18 34	14,354	0.216	0.151	0.000	0.109	0.284	1.000
Age 35 54	14,354	0.347	0.146	0.000	0.275	0.420	1.000
Age over 55	14,354	0.413	0.190	0.000	0.303	0.532	1.000
Education Less High School	14,354	0.104	0.102	0.000	0.041	0.141	1.000
Education High School	14,354	0.334	0.148	0.000	0.248	0.421	1.000
Education No Degree College	14,354	0.287	0.128	0.000	0.220	0.348	1.000
Education College Graduate	14,354	0.252	0.138	0.000	0.163	0.336	1.000
Household Income less 20k	14,354	0.159	0.131	0.000	0.078	0.211	1.000
Household Income 20-40k	14,354	0.206	0.123	0.000	0.135	0.262	1.000
Household Income 40-60k	14,354	0.175	0.108	0.000	0.117	0.221	1.000
Household Income 60-75k	14,354	0.107	0.086	0.000	0.054	0.143	1.000
Household Income 75-150K	14,354	0.253	0.139	0.000	0.162	0.336	1.000
Household Income Over 150K	14,354	0.077	0.084	0.000	0.018	0.102	1.000
Home ownership	14,354	0.712	0.177	0.000	0.661	0.809	1.000
Home Value Less 50k	14,354	0.037	0.052	0.000	0.000	0.055	0.985
Home Value 50-100k	14,354	0.030	0.040	0.000	0.000	0.048	0.647
Home Value 100-200k	14,354	0.303	0.144	0.000	0.219	0.388	1.000
Home Value Over 200k	14,354	0.271	0.172	0.000	0.153	0.361	1.000

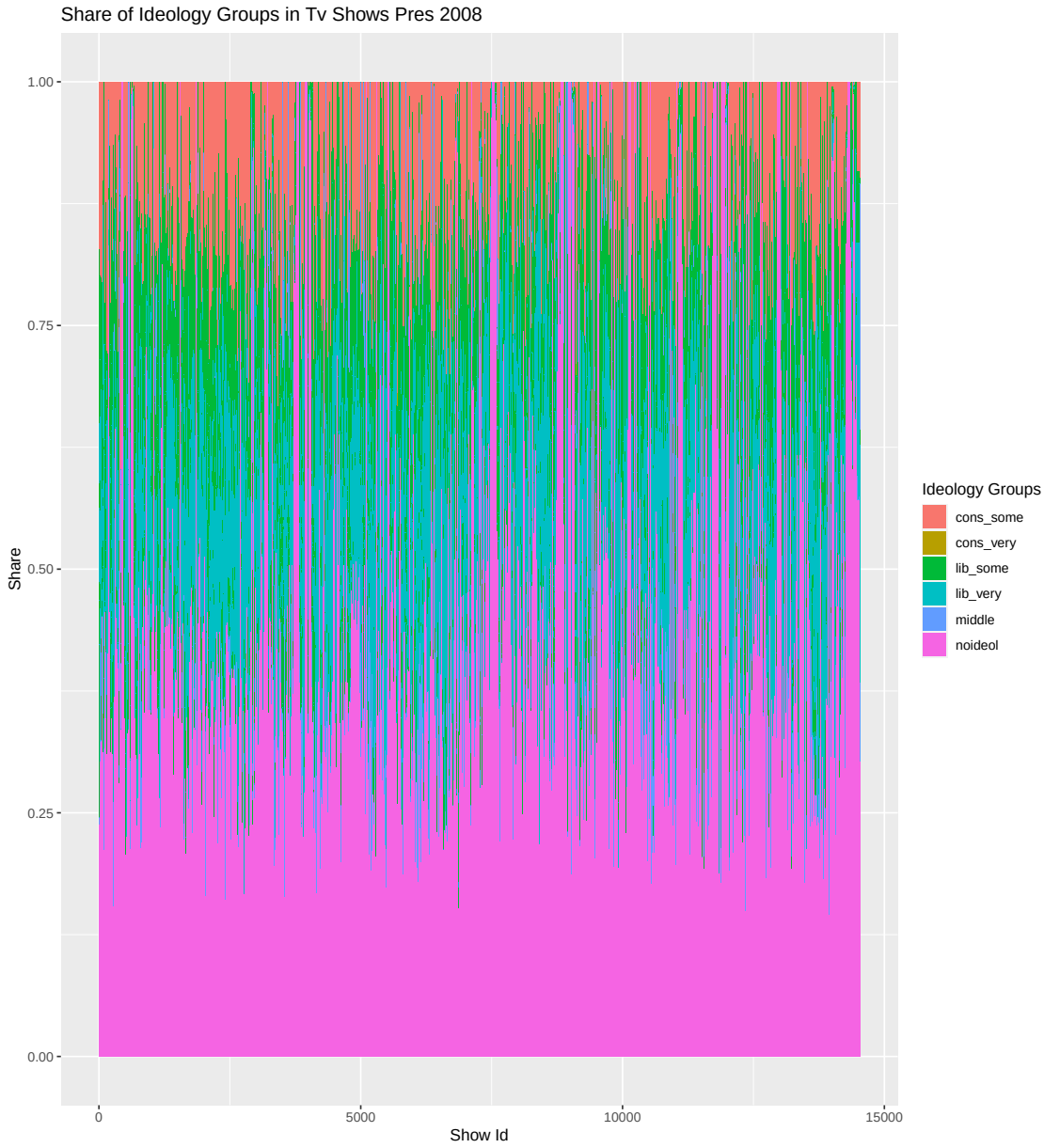

Figure 2: Tv Show Demographics 2008 - Ideology

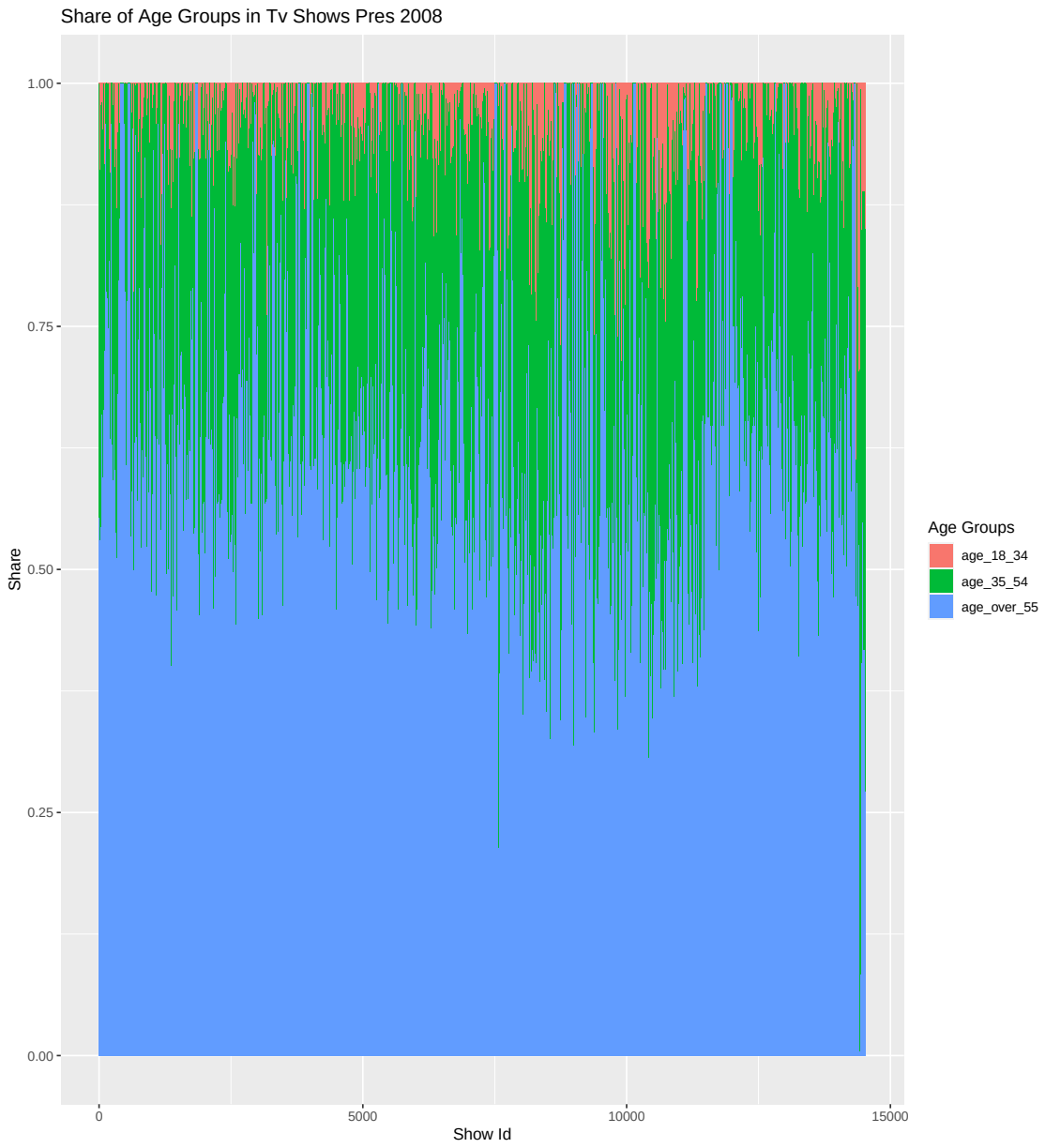

Figure 3: Tv Show Demographics 2008 - Age

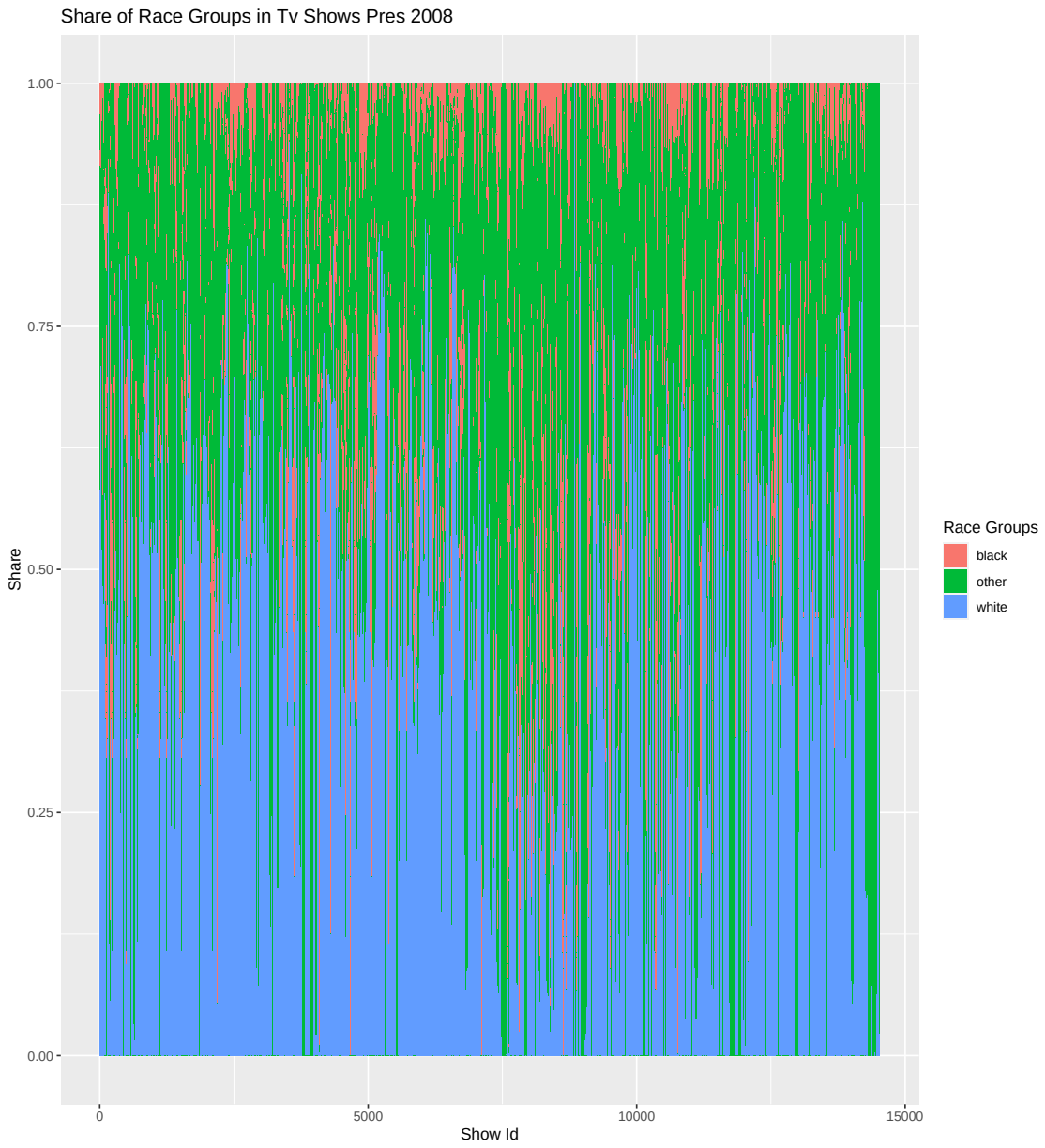

Figure 4: Tv Show Demographics 2008 - Race

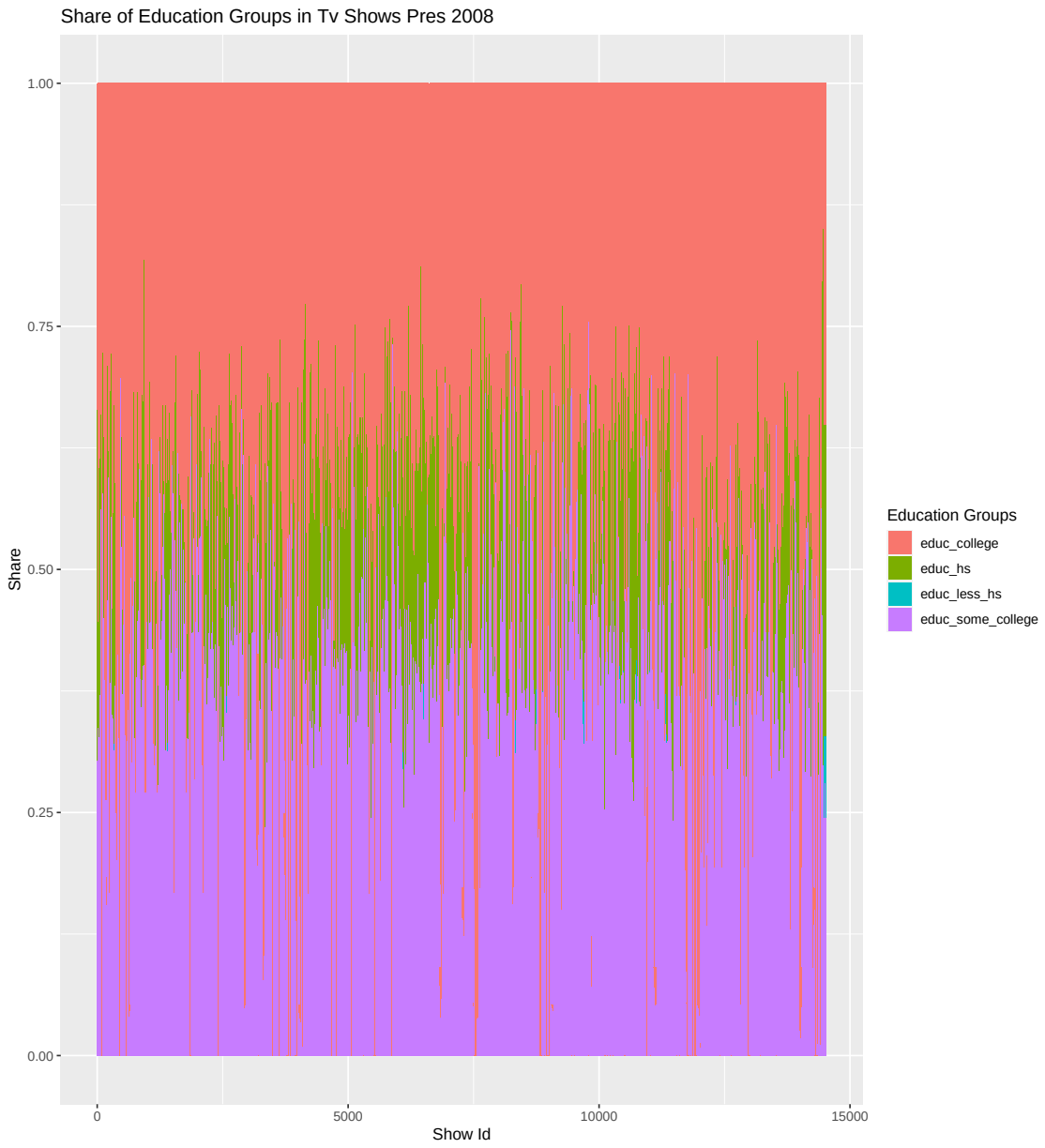

Figure 5: Tv Show Demographics 2008 - Education

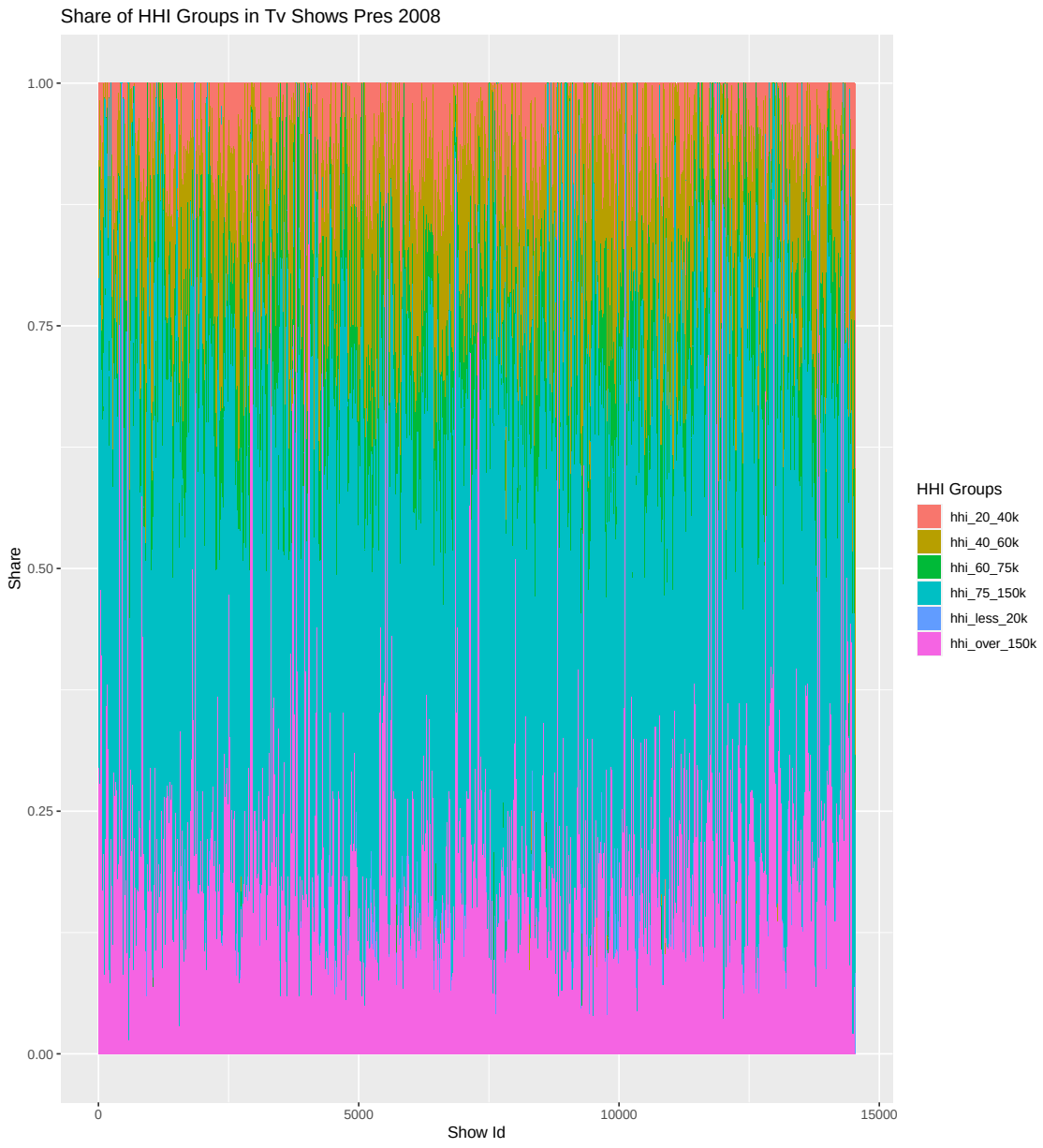

Figure 6: Tv Show Demographics 2008 - Household Income

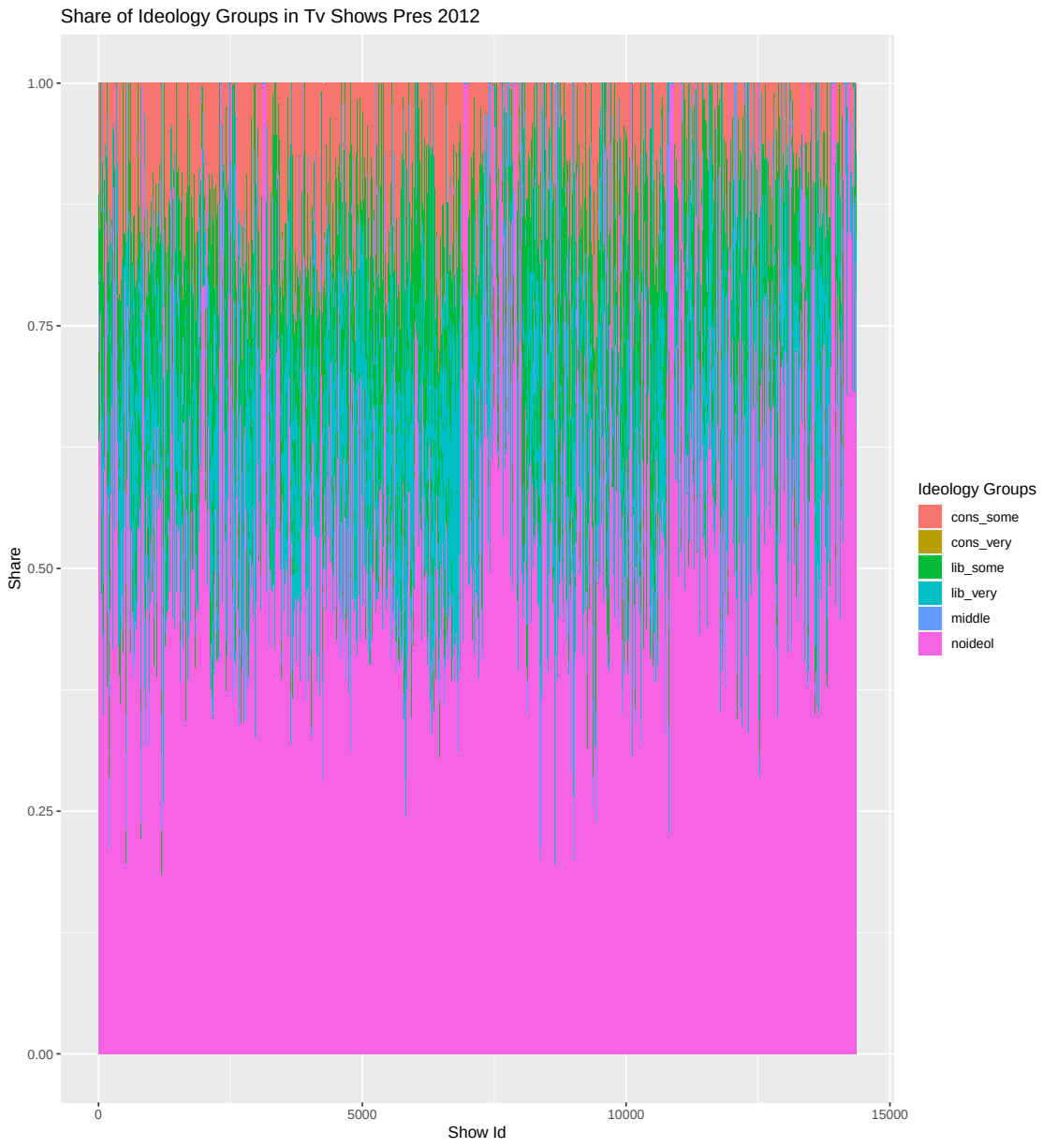

Figure 7: Tv Show Demographics 2012 - Ideology

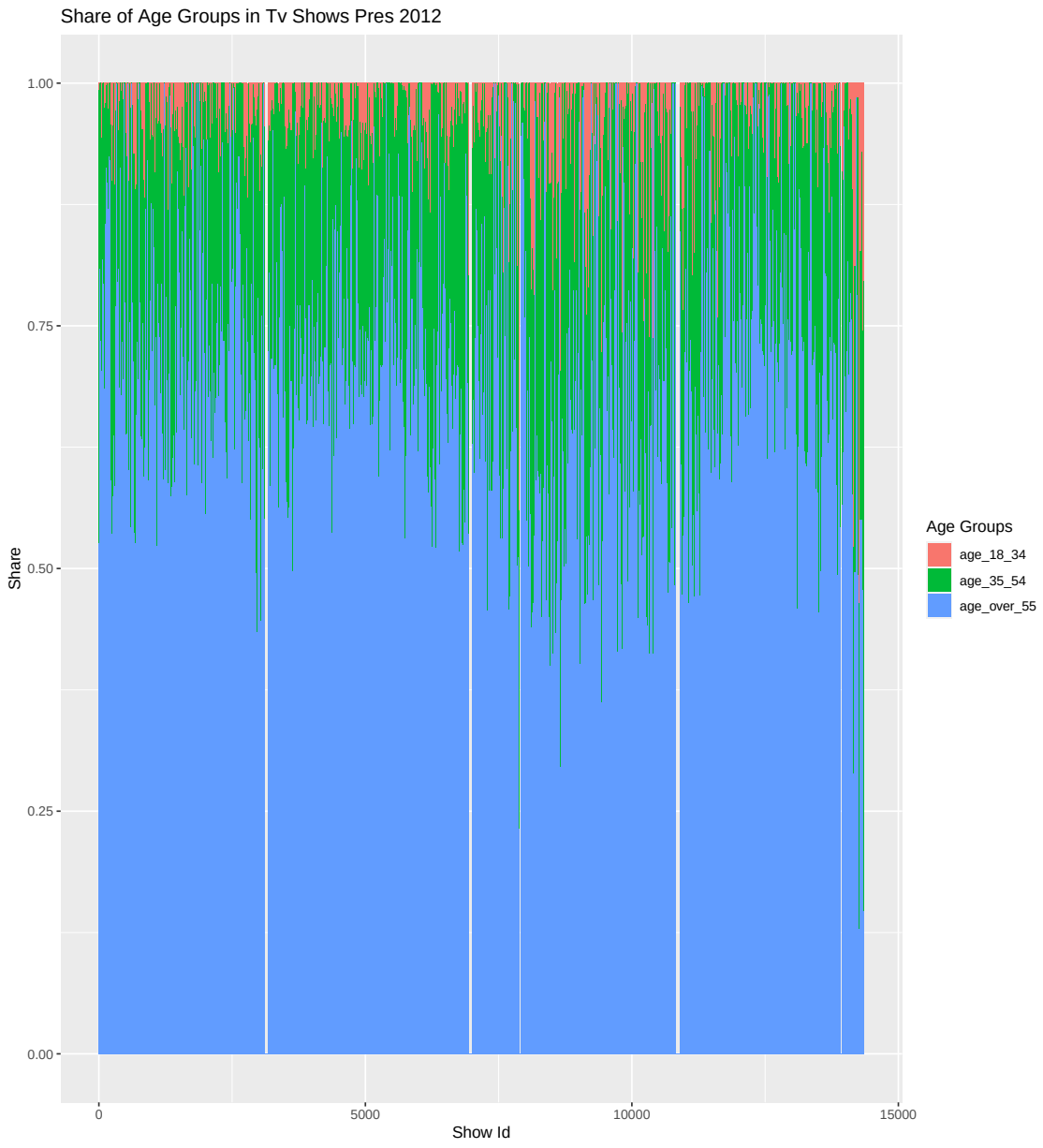

Figure 8: Tv Show Demographics 2012 - Age

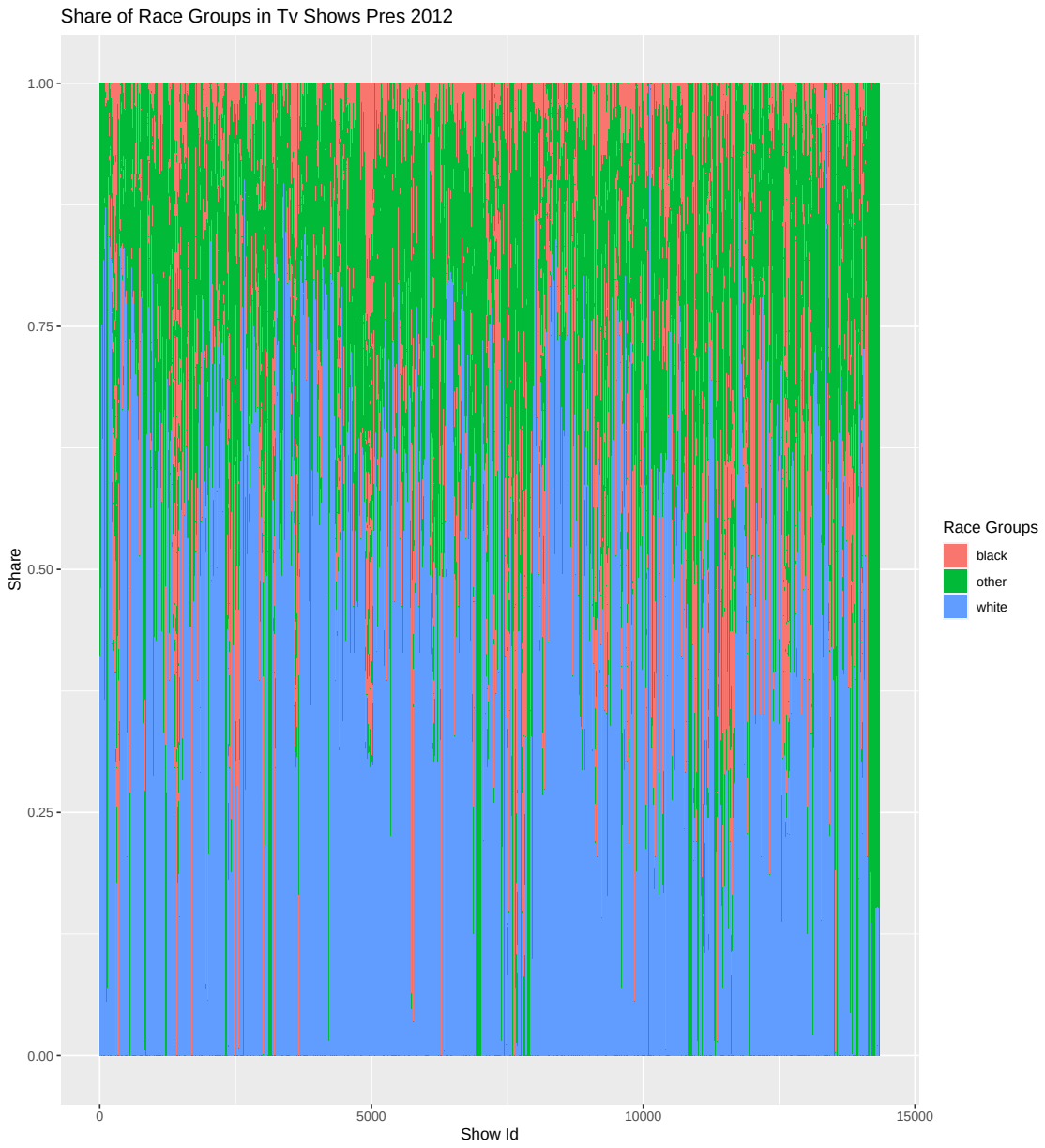

Figure 9: Tv Show Demographics 2012 - Race

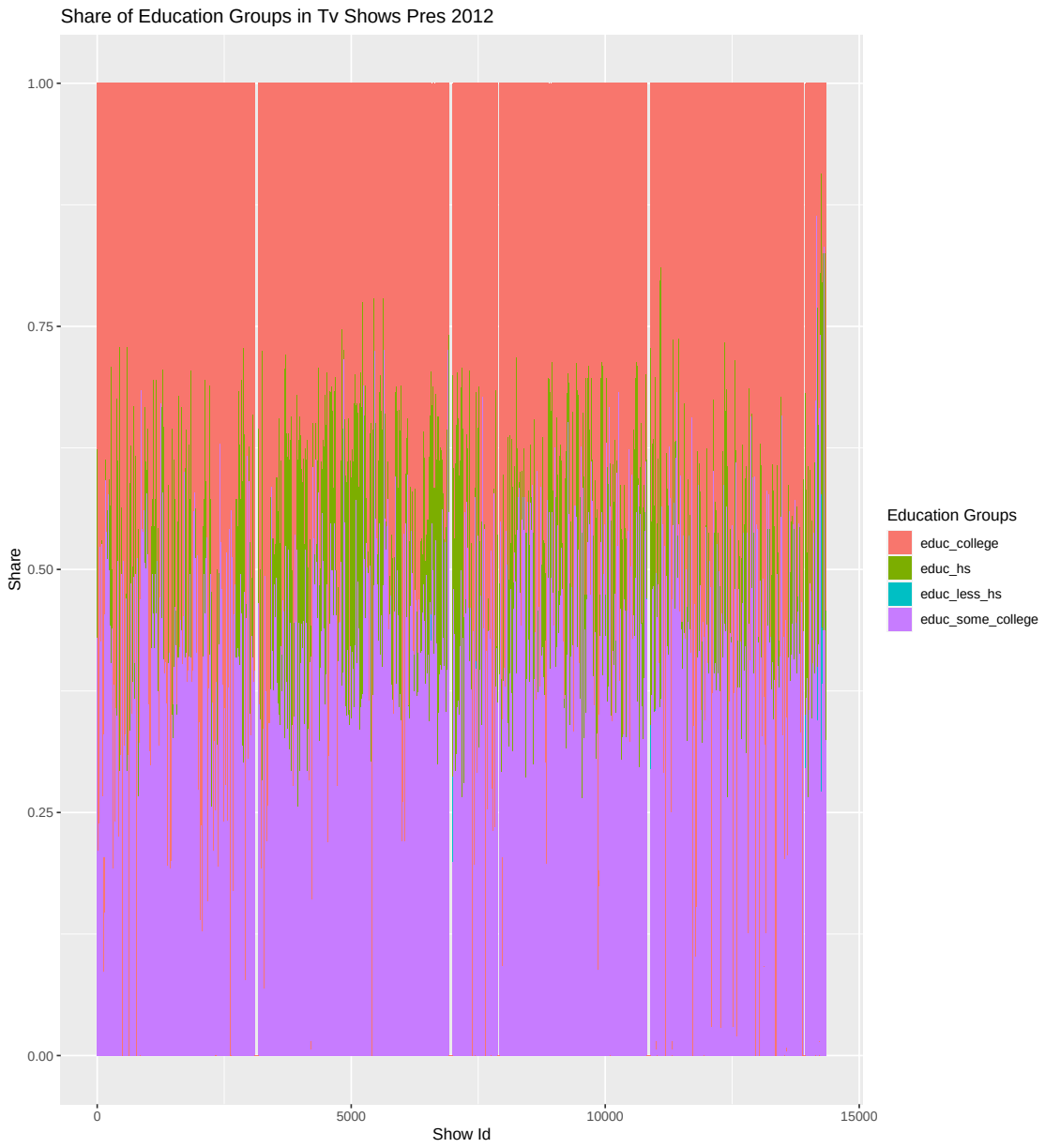

Figure 10: Tv Show Demographics 2012 - Education

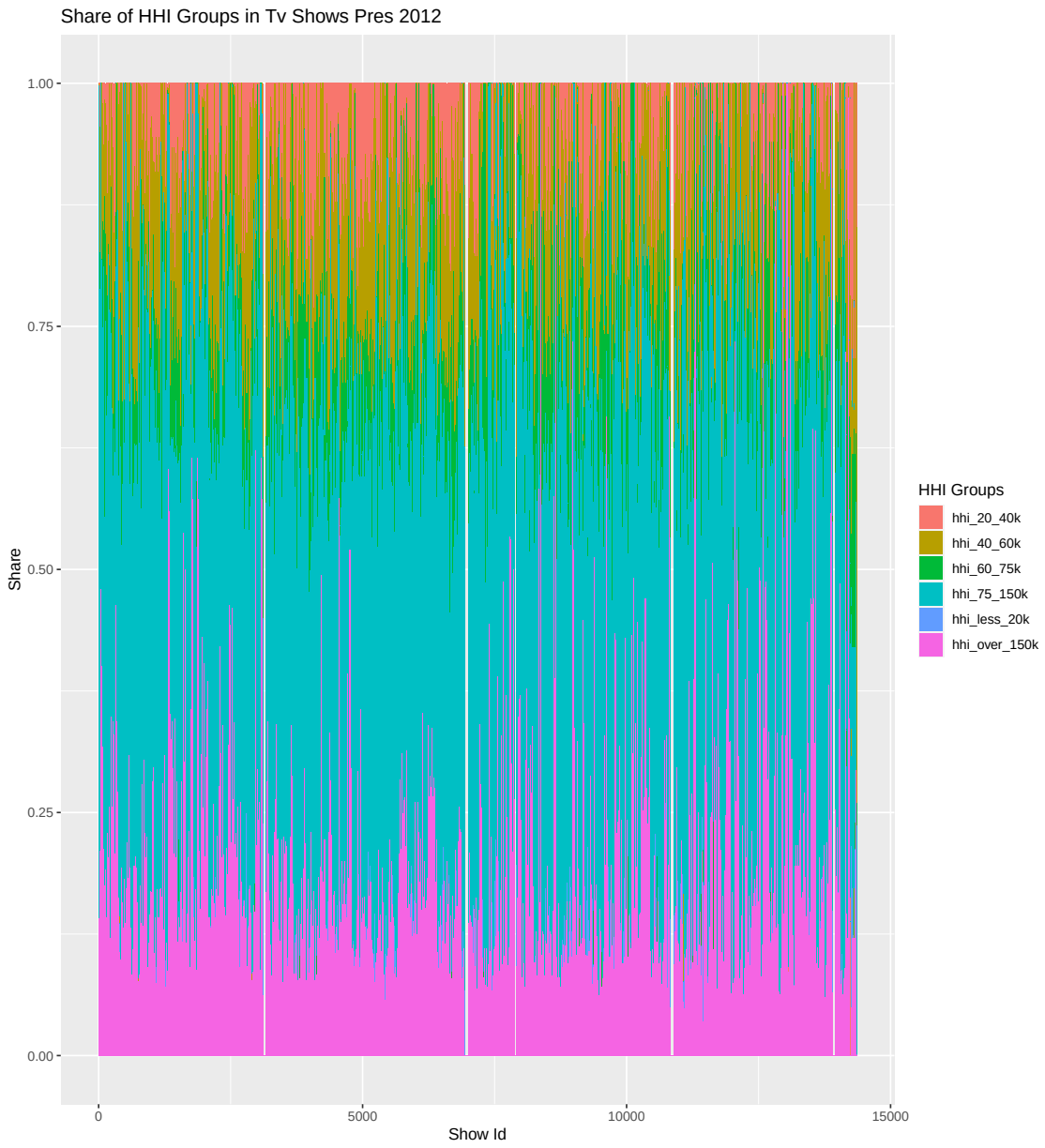

Figure 11: Tv Show Demographics 2012 - Household Income

5.2.2 Presidential

Table 8: Advertise in same show

Pres 2008	Show without Republican ads	Show with Republican Ads
Show without Democratic ads	0.00	0.13
Show with Democratic ads	0.40	0.47
Pres 2012		
Show without Democratic ads	0.00	0.17
Show with Democratic ads	0.29	0.53

Table 9: Advertise in same show adjusting for volume of ads

Pres 2008	Show without Republican ads	Show with Republican ads
Show without Democratic ads	0.00	0.04
Show with Democratic ads	0.17	0.79
Pres 2012		
Show without Democratic ads	0.00	0.04
Show with Democratic ads	0.09	0.86

In Tables 12, 13, 14 and 15, I present the estimates of the difference in the probability of reaching a specific demographic — overall and with each type of ad — between Democrats and Republicans. A positive value suggests that on average Democrats target that demographic with a specific type of ad more than Republicans. If candidates strategically vary ad placement and ad content in the way my theory predicts, then I should find evidence of demographics being targeted with policy, or positive valence, by one candidate and negative valence by the other.

Tables 12 and 13 consider the presidential election of 2008. In Table 12, I consider differential targeting of demographics for all the tv shows in the sample, and Table 13 focuses on tv shows in which both candidates advertise. Overall, candidates target different demographics with different ads in a way consistent with the predictions of my theory. Combining observations from both tables, I observe that Republicans target male voters with policy ads and female voters with negative valence ads. Equivalently, Democrats target female voters with policy ads and male voters with valence ads. Voter groups such as black voters, middle-aged voters, middle-class voters and non-college graduates (i.e., high school or less, and non college degree holders) are more likely to see ads emphasizing Democratic

Table 10: Targeting Individual Demographics Presidential 2008

Democrat - Republican	Policy (δ^q)	Positive Valence (δ^p)	Negative Valence (δ^n)
Male	−0.003(1)	−0.017***(0.005)	0.02**(0.039)
Female	0.003(1)	0.017***(0.005)	−0.02**(0.039)
White	−0.001(1)	−0.024***(0)	0.024***(0.002)
Black	0.138***(0)	0.013(0.92)	−0.151***(0)
Latino	−0.127***(0)	0.055***(0)	0.072***(0)
Age 18 34	−0.056***(0)	0.015*(0.053)	0.041***(0)
Age 35 54	0.062***(0)	0.011(1)	−0.073***(0)
Age over 55	0.017(0.182)	−0.021***(0)	0.004(1)
Hhi less 20k	0.049***(0)	−0.006(1)	−0.043***(0)
Hhi 20 40k	−0.06***(0)	−0.001(1)	0.062***(0)
Hhi 40 60k	−0.01(1)	−0.007(1)	0.017(1)
Hhi 60 75k	0.038(0.104)	−0.023(0.561)	−0.016(1)
Hhi 75 150k	0.026*(0.086)	0.013(1)	−0.038***(0)
Hhi over 150k	−0.021(1)	0.021(0.593)	0.001(1)
Educ less hs	0.013(1)	0.001(1)	−0.014(1)
Educ hs	−0.005(1)	−0.009(1)	0.014(1)
Educ some college	−0.005(1)	0.026***(0.002)	−0.021(0.513)
Educ college	0.013(1)	−0.015(0.488)	0.002(1)
Home own	0.013(0.896)	−0.026***(0)	0.012(1)
Home val less 50k	−0.093***(0)	−0.025(1)	0.119***(0)
Home val 50 100k	0.009(1)	0.012(1)	−0.021(1)
Home val 100 200k	−0.002(1)	−0.009(1)	0.011(1)
Home val over 200k	0.028***(0)	0.001(1)	−0.029***(0)

policy or positive candidate attributes. The same groups see Republican ads attacking the Democratic candidate's valence (i.e., negative valence ads). Conversely, younger voters, homeowners, and college graduates are targeted with more Republican policy and positive valence ads, while Democrats attack the Republican candidate with the same voters. Latino voters are targeted with Republican policy ads, and Democratic valence ads (both positive and negative). These are the unconditional probabilities, and thus could reflect the ideological variation among Latino voters in the U.S.; for example, Cuban-Americans lean Republican whereas Mexican-Americans lean Democratic. Hence, it is possible that Republican policy ads and Democratic negative valence ads are targeted to one sub-population, and the Democratic positive valence to another. In sum, I find evidence consistent with the theoretical predictions: opposing candidates deliver different type of ads to the same population in the systematic way discussed above.

Tables 14 and 15 present analogous estimates for the 2012 cycle. Again, I find evidence consistent with my theory. White voters experience more Republican policy and positive valence ads, and although statistically insignificant white voters receive more negative Democratic ads. Black and Latino voters are targeted with Democratic policy and positive valence ads,

Table 11: Targeting Individual Demographics Presidential 2012

Democrat-Republican	Policy (δ^q)	Positive Valence (δ^p)	Negative Valence (δ^n)
Male	0(1)	$0.029^{***}(0)$	$-0.029^{***}(0)$
Female	0(1)	$-0.029^{***}(0)$	$0.029^{***}(0)$
White	$-0.008(0.873)$	$-0.021^{***}(0)$	$0.029^{***}(0)$
Black	$0.012(0.277)$	$-0.003(1)$	$-0.009(1)$
Latino	$0.023^{***}(0)$	$0.079^{***}(0)$	$-0.103^{***}(0)$
Age 18 34	$0.017^{*}(0.054)$	$0.006(1)$	$-0.023^{***}(0.005)$
Age 35 54	$0.012(0.451)$	$0.041^{***}(0)$	$-0.053^{***}(0)$
Age over 55	$-0.004(1)$	$-0.025^{***}(0)$	$0.029^{***}(0)$
Hhi less 20k	$0.021^{**}(0.01)$	$-0.053^{***}(0)$	$0.032^{***}(0)$
Hhi 20 40k	$0.053^{***}(0)$	$-0.008(1)$	$-0.045^{***}(0)$
Hhi 40 60k	$-0.041^{***}(0)$	$-0.003(1)$	$0.044^{***}(0)$
Hhi 60 75k	$-0.016(1)$	$0.018(0.503)$	$-0.002(1)$
Hhi 75 150k	$-0.013(0.58)$	$0.035^{***}(0)$	$-0.022^{***}(0.01)$
Hhi over 150k	$-0.001(1)$	$0.062^{***}(0)$	$-0.061^{***}(0)$
Educ less hs	$0.045^{***}(0)$	$0.025^{***}(0.001)$	$-0.07^{***}(0)$
Educ hs	$0.01(1)$	$-0.058^{***}(0)$	$0.048^{***}(0)$
Educ some college	$-0.004(1)$	0(1)	$0.004(1)$
Educ college	$-0.009(1)$	$0.06^{***}(0)$	$-0.051^{***}(0)$
Home own	$0.01(0.623)$	$-0.001(1)$	$-0.009(1)$
Home val less 50k	$0.081^{***}(0)$	$0.02(1)$	$-0.101^{***}(0)$
Home val 50 100k	$0.081^{***}(0)$	$0.191^{***}(0)$	$-0.272^{***}(0)$
Home val 100 200k	$-0.04^{***}(0)$	$-0.049^{***}(0)$	$0.089^{***}(0)$
Home val over 200k	$0.024^{***}(0)$	$0.059^{***}(0)$	$-0.083^{***}(0)$

and negative ads by Republicans. Male voters see Democratic positive valence ads and Republican negative valence ads. Similarly, women voters see Republican positive valence ads and Democratic negative valence ads. The positive attributes of the Democratic candidate are highlighted to middle-aged voters, while Republicans attack the Democratic candidate with the same voters.

When I focus on the demographics that are equally targeted by the two candidates, the results are stronger. In 2008 this refers to Latino voters, male and female voters, younger voters and middle income voters. In 2012 this includes Latino voters, middle-aged voters and richer voters. For these demographics, I find the most consistent evidence with the theory — targeted with policy and positive valence ads by one candidate and negative valence by the other.

Table 12: Difference in Demographic Reach Presidential 2008

Democrat-Republican	Overall	Policy	Positive Valence	Negative Valence
White	$-0.023^{***}(0)$	$-0.024^{***}(0)$	$-0.032^{***}(0)$	$-0.016^{***}(0)$
Black	$0.028^{***}(0)$	$0.043^{***}(0)$	$0.025^{***}(0)$	$0.013^{***}(0)$
Latino	$0.001(1)$	$-0.01^{***}(0)$	$0.021^{***}(0)$	$0.005^{***}(0)$
Male	$0.002(1)$	$0.001(1)$	$0.004(1)$	$0.005 * *(0.013)$
Female	$-0.002(1)$	$-0.001(1)$	$-0.004(1)$	$-0.005 * *(0.013)$
Age 18 34	$0.002(1)$	$-0.008^{***}(0)$	$0.013^{***}(0.002)$	$0.005^{***}(0)$
Age 35 54	$0.007^{***}(0)$	$0.015^{***}(0)$	$0.01^{**}(0.021)$	$0(1)$
Age over 55	$-0.007^{***}(0)$	$-0.004(0.585)$	$-0.02^{***}(0)$	$-0.004^{*}(0.099)$
Education Less High School	$0.004^{***}(0)$	$0.005^{***}(0)$	$0.004(1)$	$0.004^{***}(0)$
Education High School	$0.002^{**}(0.038)$	$0.002(1)$	$-0.009^{*}(0.087)$	$0.004^{***}(0.006)$
Education No Degree College	$0.004^{***}(0)$	$0.003(0.135)$	$0.014^{***}(0)$	$0.002(0.336)$
Education College Graduate	$-0.008^{***}(0)$	$-0.007^{***}(0)$	$-0.006(0.522)$	$-0.008^{***}(0)$
Household Income less 20k	$0.014^{***}(0)$	$0.019^{***}(0)$	$0.016^{***}(0)$	$0.012^{***}(0)$
Household Income 20-40k	$-0.001(1)$	$-0.006^{***}(0)$	$-0.005(1)$	$0.004^{***}(0)$
Household Income 40-60k	$0.003^{***}(0)$	$0.002(1)$	$0.003(1)$	$0.004^{***}(0)$
Household Income 60-75k	$-0.004^{***}(0)$	$-0.002(0.137)$	$-0.004(0.676)$	$-0.004^{***}(0)$
Household Income 75-150K	$-0.005^{***}(0)$	$-0.002(1)$	$-0.006(0.378)$	$-0.007^{***}(0)$
Household Income Over 150K	$-0.005^{***}(0)$	$-0.007^{***}(0)$	$-0.003(1)$	$-0.006^{***}(0)$
Home ownership	$-0.017^{***}(0)$	$-0.014^{***}(0)$	$-0.037^{***}(0)$	$-0.014^{***}(0)$
Home Value Less 50k	$-0.001^{***}(0.004)$	$-0.003^{***}(0)$	$-0.003(0.318)$	$0.001(1)$
Home Value 50-100k	$-0.003^{***}(0)$	$-0.002^{***}(0)$	$0(1)$	$-0.003^{***}(0)$
Home Value 100-200k	$-0.017^{***}(0)$	$-0.018^{***}(0)$	$-0.027^{***}(0)$	$-0.016^{***}(0)$
Home Value Over 200k	$0.003^{**}(0.033)$	$0.008^{***}(0)$	$-0.001(1)$	$0.001(1)$

Table 13: Difference in Demographic Reach When Both Advertise Presidential 2008

Democrat-Republican	Overall	Policy	Positive Valence	Negative Valence
White	$-0.023^{***}(0)$	$0.009^{***}(0)$	$0(1)$	$0.003(1)$
Black	$0.028^{***}(0)$	$0.014^{***}(0)$	$-0.004(1)$	$-0.006^{***}(0)$
Latino	$0.001(1)$	$-0.015^{***}(0)$	$0.014^{***}(0)$	$0.004^{***}(0.008)$
Male	$0.002(1)$	$-0.006 * (0.073)$	$-0.004(1)$	$-0.002(1)$
Female	$-0.002(1)$	$0.006 * (0.073)$	$0.004(1)$	$0.002(1)$
Age 18 34	$0.002(1)$	$-0.014^{***}(0)$	$0.008(1)$	$0.004^{*}(0.096)$
Age 35 54	$0.007^{***}(0)$	$0.012^{***}(0)$	$0(1)$	$-0.003(0.536)$
Age over 55	$-0.007^{***}(0)$	$0.006^{*}(0.088)$	$-0.003(1)$	$0(1)$
Education Less High School	$0.004^{***}(0)$	$-0.005^{***}(0)$	$-0.005(0.948)$	$-0.002(0.649)$
Education High School	$0.002^{**}(0.038)$	$0(1)$	$-0.008(0.944)$	$-0.002(1)$
Education No Degree College	$0.004^{***}(0)$	$0.007^{***}(0)$	$0.014^{***}(0.001)$	$0.001(1)$
Education College Graduate	$-0.008^{***}(0)$	$0.002(1)$	$0.003(1)$	$0.004^{**}(0.034)$
Household Income less 20k	$0.014^{***}(0)$	$0.003(0.695)$	$0.004(1)$	$-0.002(1)$
Household Income 20-40k	$-0.001(1)$	$-0.011^{***}(0)$	$-0.004(1)$	$-0.003(0.351)$
Household Income 40-60k	$0.003^{***}(0)$	$0.007^{***}(0)$	$0.005(1)$	$0.003(0.174)$
Household Income 60-75k	$-0.004^{***}(0)$	$-0.002(1)$	$-0.001(1)$	$-0.002^{**}(0.04)$
Household Income 75-150K	$-0.005^{***}(0)$	$0.007^{***}(0)$	$0.001(1)$	$0.004^{***}(0.002)$
Household Income Over 150K	$-0.005^{***}(0)$	$0(1)$	$-0.002(1)$	$0.001(1)$
Home ownership	$-0.017^{***}(0)$	$0.005(0.116)$	$-0.009(0.84)$	$0(1)$
Home Value Less 50k	$-0.001^{***}(0.004)$	$-0.003^{***}(0)$	$-0.003(1)$	$0.001(1)$
Home Value 50-100k	$-0.003^{***}(0)$	$0.002^{*}(0.081)$	$0.001(1)$	$0.002^{*}(0.084)$
Home Value 100-200k	$-0.017^{***}(0)$	$-0.006^{**}(0.014)$	$-0.007(1)$	$-0.007^{***}(0)$
Home Value Over 200k	$0.003^{**}(0.033)$	$0.019^{***}(0)$	$0.005(1)$	$0.009^{***}(0)$

Table 14: Difference in Demographic Reach Presidential 2012

Democrat-Republican	Overall	Policy	Positive Valence	Negative Valence
White	$-0.016^{***}(0)$	$-0.021^{***}(0)$	$-0.028^{***}(0)$	$-0.013^{***}(0)$
Black	$0.01^{***}(0)$	$0.014^{***}(0)$	$0.007^{***}(0)$	$0.012^{***}(0)$
Latino	0.001(1)	$0.009^{***}(0)$	$0.022^{***}(0)$	$-0.007^{***}(0)$
Male	$-0.004***(0)$	$-0.003(1)$	$0.009***(0)$	$-0.007***(0)$
Female	$0.004***(0)$	0.003(1)	$-0.009***(0)$	$0.007***(0)$
Age 18 34	$0.019^{***}(0)$	$0.022^{***}(0)$	$0.02^{***}(0)$	$0.018^{***}(0)$
Age 35 54	0(1)	0.002(1)	$0.012^{***}(0)$	$-0.004^{***}(0)$
Age over 55	$-0.024^{***}(0)$	$-0.025^{***}(0)$	$-0.037^{***}(0)$	$-0.02^{***}(0)$
Education Less High School	$0.007^{***}(0)$	$0.012^{***}(0)$	$0.011^{***}(0)$	$0.005^{***}(0)$
Education High School	$-0.002^{***}(0.001)$	0.001(1)	$-0.021^{***}(0)$	0.002(0.834)
Education No Degree College	$0.004^{***}(0)$	$0.003^{**}(0.018)$	$0.004^{*}(0.06)$	$0.005^{***}(0)$
Education College Graduate	$-0.014^{***}(0)$	$-0.017^{***}(0)$	0.002(1)	$-0.018^{***}(0)$
Household Income less 20k	$0.012^{***}(0)$	$0.016^{***}(0)$	0(1)	$0.015^{***}(0)$
Household Income 20-40k	$-0.002^{**}(0.021)$	$0.009^{***}(0)$	$-0.003(0.488)$	$-0.004^{***}(0)$
Household Income 40-60k	$-0.003^{***}(0)$	$-0.008^{***}(0)$	$-0.003^{*}(0.052)$	$-0.001(0.742)$
Household Income 60-75k	0(1)	$-0.001(1)$	0.002(0.145)	0(1)
Household Income 75-150K	$-0.014^{***}(0)$	$-0.017^{***}(0)$	$-0.005^{***}(0.006)$	$-0.015^{***}(0)$
Household Income Over 150K	0(1)	0(1)	$0.005^{***}(0)$	$-0.001^{***}(0.009)$
Home ownership	$-0.025^{***}(0)$	$-0.022^{***}(0)$	$-0.026^{***}(0)$	$-0.026^{***}(0)$
Home Value Less 50k	$-0.002^{***}(0)$	$0.001^{**}(0.015)$	$-0.001(1)$	$-0.002^{***}(0)$
Home Value 50-100k	$-0.003^{***}(0)$	$-0.001^{***}(0.001)$	$0.003^{***}(0)$	$-0.004^{***}(0)$
Home Value 100-200k	$-0.005^{***}(0)$	$-0.013^{***}(0)$	$-0.018^{***}(0)$	0.001(1)
Home Value Over 200k	$-0.019^{***}(0)$	$-0.013^{***}(0)$	$0.005^{**}(0.018)$	$-0.027^{***}(0)$

Table 15: Difference in Demographic Reach When Both Advertise Presidential 2012

Democrat-Republican	Overall	Policy	Positive Valence	Negative Valence
White	$-0.016^{***}(0)$	$-0.011^{***}(0)$	$-0.019^{***}(0)$	$0.002(1)$
Black	$0.01^{***}(0)$	$0.005^{**}(0.019)$	$0.001(1)$	$-0.002(0.425)$
Latino	$0.001(1)$	$0.011^{***}(0)$	$0.021^{***}(0)$	$-0.007^{***}(0)$
Male	$-0.004***(0)$	$0.003(1)$	$0.009***(0)$	$-0.003***(0.003)$
Female	$0.004***(0)$	$-0.003(1)$	$-0.009***(0)$	$0.003***(0.003)$
Age 18 34	$0.019^{***}(0)$	$0.012^{***}(0)$	$0.01^{***}(0)$	$0.006^{***}(0)$
Age 35 54	$0(1)$	$0.002(1)$	$0.012^{***}(0)$	$-0.003^{***}(0)$
Age over 55	$-0.024^{***}(0)$	$-0.013^{***}(0)$	$-0.022^{***}(0)$	$-0.008^{***}(0)$
Education Less High School	$0.007^{***}(0)$	$0.009^{***}(0)$	$0.011^{***}(0)$	$-0.001(1)$
Education High School	$-0.002^{***}(0.001)$	$-0.003(1)$	$-0.02^{***}(0)$	$0.002(0.321)$
Education No Degree College	$0.004^{***}(0)$	$0.005^{***}(0)$	$0.005^{***}(0.003)$	$0.007^{***}(0)$
Education College Graduate	$-0.014^{***}(0)$	$-0.011^{***}(0)$	$0.004(0.104)$	$-0.014^{***}(0)$
Household Income less 20k	$0.012^{***}(0)$	$0.008^{***}(0)$	$-0.004^{**}(0.024)$	$0.006^{***}(0)$
Household Income 20-40k	$-0.002^{**}(0.021)$	$0.011^{***}(0)$	$0.003(0.77)$	$-0.004^{***}(0)$
Household Income 40-60k	$-0.003^{***}(0)$	$-0.007^{***}(0)$	$-0.003(0.432)$	$0.002^{**}(0.027)$
Household Income 60-75k	$0(1)$	$-0.002(0.302)$	$0(1)$	$0(1)$
Household Income 75-150K	$-0.014^{***}(0)$	$-0.012^{***}(0)$	$-0.002(1)$	$-0.01^{***}(0)$
Household Income Over 150K	$0(1)$	$0.002(0.154)$	$0.006^{***}(0)$	$0(1)$
Home ownership	$-0.025^{***}(0)$	$-0.009^{***}(0)$	$-0.014^{***}(0)$	$-0.013^{***}(0)$
Home Value Less 50k	$-0.002^{***}(0)$	$0.001(0.11)$	$0(1)$	$-0.003^{***}(0)$
Home Value 50-100k	$-0.003^{***}(0)$	$0(1)$	$0.004^{***}(0)$	$-0.003^{***}(0)$
Home Value 100-200k	$-0.005^{***}(0)$	$-0.008^{***}(0)$	$-0.014^{***}(0)$	$0.007^{***}(0)$
Home Value Over 200k	$-0.019^{***}(0)$	$-0.002(1)$	$0.012^{***}(0)$	$-0.019^{***}(0)$

Table 16: Ideology and Presidential Ads

Dependent Variable: Year 2008	Dem Policy	Rep Policy	Dem Pos Valence	Rep Pos Valence	Dem Neg Valence	Rep Neg Valence
Variables						
Ideol	-0.030	0.081**	0.010	0.002	0.021	-0.083**
	(0.153)	(0.003)	(0.601)	(0.864)	(0.345)	(0.003)
	[0.9]	[0.018]	[1]	[1]	[1]	[0.018]
No Ideol	-0.064	-0.055	0.031	0.003	0.034	0.053
	(0.000)	(0.028)	(0.054)	(0.831)	(0.058)	(0.040)
Middle	0.040	-0.037	0.046	0.023	-0.086	0.014
	(0.029)	(0.081)	(0.005)	(0.051)	(0.000)	(0.515)
Fit Statistics						
Observations	13345	8647	13345	8647	13345	8647
R^2	0.002	0.004	0.001	0.001	0.002	0.004
Year 2012						
Variables						
Ideol	-0.006	0.091***	-0.019*	0.150***	0.025	-0.241***
	(0.574)	(0.000)	(0.015)	(0.000)	(0.027)	(0.000)
	[1]	[0]	[0.09]	[0]	[0.162]	[0]
No Ideol	0.053	0.016	-0.039	0.102	-0.015	-0.118
	(0.000)	(0.288)	(0.000)	(0.000)	(0.256)	(0.000)
Middle	0.036	-0.033	-0.014	0.003	-0.022	0.030
	(0.000)	(0.000)	(0.057)	(0.659)	(0.032)	(0.007)
Fit Statistics						
Observations	40659	37445	40659	37445	40659	37445
R^2	0.001	0.022	0.001	0.031	0.000	0.013

Heteroskedasticity-robust p-values in () and Bonferroni corrected in []
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 17: Second Stage Ad Correlations Presidential 2008

Dem/Rep	Rep No Ads	Rep Neg Valence	Rep Policy	Rep Pos Valence
Dem No Ads	-0.24^{***}	0.16^{***}	0.12^{***}	0.10^{***}
Dem Neg Valence	0.19^{***}	-0.14^{***}	-0.10^{***}	-0.08^{***}
Dem Policy	0.26^{***}	-0.16^{***}	-0.13^{***}	-0.11^{***}
Dem Pos Valence	0.18^{***}	-0.13^{***}	-0.09^{***}	-0.08^{***}

Table 18: Second Stage Ad Correlations Presidential 2012

Dem/Rep	Rep No Ads	Rep Neg Valence	Rep Policy	Rep Pos Valence
Dem No Ads	-0.16^{***}	0.15^{***}	0.06^{***}	0.10^{***}
Dem Neg Valence	0.17^{***}	-0.16^{***}	-0.07^{***}	-0.10^{***}
Dem Policy	0.16^{***}	-0.15^{***}	-0.05^{***}	-0.10^{***}
Dem Pos Valence	0.12^{***}	-0.11^{***}	-0.03^{***}	-0.07^{***}

Table 19: Second Stage Ad Correlations Presidential 2008 (Aggregated Fall)

Dem/Rep	Rep No Ads	Rep Neg Valence	Rep Policy	Rep Pos Valence
Dem No Ads	0.03	-0.06^{**}	-0.05^{**}	0.09^{***}
Dem Neg Valence	-0.03	0.05^{**}	0.06^{***}	-0.10^{***}
Dem Policy	-0.03	0.04	0.01	0.00
Dem Pos Valence	-0.06^{**}	0.09^{***}	0.01	-0.05^{**}

Table 20: Second Stage Ad Correlations Presidential 2012 (Aggregated Fall)

Dem/Rep	Rep No Ads	Rep Neg Valence	Rep Policy	Rep Pos Valence
Dem No Ads	0.03	-0.09^{***}	0.05^{***}	0.10^{***}
Dem Neg Valence	-0.03	0.07^{***}	-0.01	-0.11^{***}
Dem Policy	-0.03	0.10^{***}	-0.05^{**}	-0.10^{***}
Dem Pos Valence	-0.05^{**}	0.14^{***}	-0.13^{***}	-0.05^{*}

5.2.3 Gubernatorial

Table 21: Gubernatorial Ad Correlations

Weekly	Opp No Ads	Opp Neg Valence	Opp Policy	Opp Pos Valence
Own No Ads	-0.395***	0.186***	0.215***	0.231***
Own Neg Valence	0.012***	-0.053***	-0.008***	0.045***
Own Policy	0.150**	-0.062	-0.069***	-0.108***
Own Pos Valence	0.237***	-0.072***	-0.139***	-0.173***
Fall	**Opp No Ads**	**Opp Neg Valence**	**Opp Policy**	**Opp Pos Valence**
Own No Ads	-0.180***	0.094***	0.106***	0.102***
Own Neg Valence	-0.086***	-0.068***	0.110***	0.129***
Own Policy	0.070***	0.046***	-0.068***	-0.114***
Own Pos Valence	0.147***	-0.028***	-0.126***	-0.105***

Table 22: Gubernatorial Effect of Ideological Difference on Own Strategy

Dependent Variables:	Negative Valence Share (1)	Policy Share (2)	Positive Valence Share (3)
Variables			
Dime Diff	−0.012***	0.008***	0.001
	(0.002)	(0.002)	(0.003)
Fit statistics			
Observations	55,448	51,308	51,494
R^2	0.001	0.0003	0.00000
Adjusted R^2	0.0005	0.0002	−0.00005

Heteroskedasticity-robust standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 23: Gubernatorial Ideological Difference and Probability Same Ad Type

Dependent Variables: Probability On Same Show	Negative Valence (1)	Policy (2)	Positive Valence (3)
Variables			
Dime Diff	0.037***	−0.052***	−0.005***
	(0.001)	(0.001)	(0.0004)
Fit statistics			
Observations	44,706	44,706	44,706
R^2	0.005	0.009	0.0005
Adjusted R^2	0.005	0.008	0.0002

Heteroskedasticity-robust standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 24: Gubernatorial Ideological Differences (DIME)

Dependent Variables:	No Ad (1)	Negative Valence (2)	Policy (3)	Positive Valence (4)
Variables				
High Dime Diff	−0.290***	0.071***	−0.005	−0.008
	(0.017)	(0.014)	(0.014)	(0.011)
Opp No Ads	−0.231***	−0.552***	0.259***	0.377***
	(0.031)	(0.026)	(0.025)	(0.021)
Opp Policy	0.154***	−0.121***	0.357***	−0.379***
	(0.039)	(0.033)	(0.034)	(0.028)
Opp Pos Val	0.274***	0.335***	−0.447***	0.066***
	(0.030)	(0.028)	(0.020)	(0.022)
High Dime Diff x Opp No Ads	0.641***	0.112***	0.207***	−0.450***
	(0.044)	(0.041)	(0.038)	(0.032)
High Dime Diff x Opp Policy	0.189***	0.409***	−0.709***	0.250***
	(0.055)	(0.048)	(0.043)	(0.038)
High Dime Diff x Opp Pos Val	−0.785***	0.203***	0.181***	−0.114***
	(0.050)	(0.050)	(0.035)	(0.038)
Constant	0.658***	0.505***	0.134***	0.266***
	(0.015)	(0.012)	(0.012)	(0.010)
Fit statistics				
Observations	43,564	43,564	43,564	43,564
R^2	−0.076	−0.632	−0.572	−0.074
Adjusted R^2	−0.076	−0.632	−0.572	−0.074

Standard errors adjusted for IV estimation
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 25: Gubernatorial Effect Own and Opponent Valence

Dependent Variables:	Negative Valence	Policy	Positive Valence
Model:	(1)	(2)	(3)
Variables			
Own valence	-1.115***	-0.3142	1.429*
	(0.3718)	(0.6521)	(0.7624)
Opp valence	1.668***	-0.2783	-1.390**
	(0.2222)	(0.5363)	(0.5759)
Favored	0.2738***	-0.0468	-0.2271**
	(0.0640)	(0.0826)	(0.1010)
Favored × Own valence	0.7568*	0.2585	-1.015
	(0.4144)	(0.7917)	(0.8977)
Favored × Opp valence	-2.115**	1.431	0.6845
	(0.8016)	(0.9279)	(0.9453)
Fixed-effects			
Candidate FE	Yes	Yes	Yes
Fit statistics			
Observations	35,752	35,752	35,752
R^2	0.32013	0.25704	0.22189
Within R^2	0.03699	0.01794	0.03820

Clustered (Candidate FE) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

5.3 Appendix C - Additional Data Details

5.3.1 Statement Categories

Table 26: Categories of Statements

Statement Categories		
911/Al Qaeda	Abortion	America
Animal Cruelty	Bailout	Children
Conservative Values	Corruption	Death Penalty
Defense Spending	Drilling	Economic Crisis
Education	Energy/Environment	Equal Opportunity
Extremist	Flip Flopping	Government
Gun Rights	Healthcare	Hunting/Fishing
Immigration	Iran	Islam
Israel	Jobs	LGBT
Latinos	Leadership	Liberal Values
Lying	Middle Class	Other
Race	Racist	Reform/Regulation
Relatable	Religion	Safety
Security	Sensitive	Small Business
Small BusinessVal	Social Security	Taxes
Terrorism	Trade	Troops/Veterans
Vote	War	Welfare
Women	WomenVal	Workers

5.3.2 MRI Demographics

Table 27 lists all the demographics included in the Gfk MRI Survey of the America Consumer. All variables are indicator variables equal to 1 if the respondent satisfies that demographics. Additionally, the population weight variable *wgtpop* provided which I use to weight the demographic variables. Variables related to frequency of voting and party identification are only available in the 2012 survey.

Table 27: Demographics in Gfk MRI Survey of the American Consumer

General Demographics		
Men	State: Delaware/Maryland/Washington, D.C./West Virginia	Ideology: Very Conservative
Women	State: Alabama/Mississippi	Ideology: Somewhat Conservative
Educ: did not graduate HS	State: Arkansas/Louisiana/Oklahoma	Ideology: Middle of the Road
Educ: attended college	State: California	Ideology: Somewhat Liberal
Educ: no college	State: Florida	Ideology: Very Liberal
Educ: graduated high school	State: Georgia	How Often Vote: National Elections: Always
Educ: post graduate	State: Illinois	How Often Vote: National Elections: Sometimes
Educ: graduated college plus	State: Indiana	How Often Vote: National Elections: Never
Age 18-24	State: Kentucky	How Often Vote: Statewide Elections: Always
Age 25-34	State: Maine/New Hampshire/Vermont	How Often Vote: Statewide Elections: Sometimes
Age 35-44	State: Massachusetts	How Often Vote: Statewide Elections: Never
Age 45-54	State: Michigan	How Often Vote: Local Elections: Always
Age 55-64	State: Minnesota/Iowa	How Often Vote: Local Elections: Sometimes
Age 65+	State: Missouri	How Often Vote: Local Elections: Never
Employment: working full time	State: Montana/Idaho/Wyoming/Colorado	Political Party, If Any, Affiliated With: Democratic
Employment: working part time	State: Nebraska/Kansas	Political Party, If Any, Affiliated With: Republican
Employment: not working	State: New Jersey	Political Party, If Any, Affiliated With: Other party
HHI <$20,000	State: New Mexico/Arizona/Utah/Nevada	Political Party, If Any, Affiliated With: Independent
HHI $20-29,999	State: New York	
HHI $30-39,999	State: North Carolina/South Carolina	
HHI $40-49,999	State: North Dakota/South Dakota	
HHI $50-59,999	State: Ohio	
HHI $60-74,999	State: Pennsylvania	
HHI $75-149,999	State: Rhode Island/Connecticut	
HHI $150,000+	State: Tennessee	
HH size: 1	State: Texas	
HH size: 2	State: Virginia	
HH size: 3-4	State: Washington/Oregon	
HH size: 5+	State: Wisconsin	
Home owned		
Home value: <$50,000		
Home value: $50-99,999		
Home value: $100,000-199,999		
Home value: $200-499,000		
Home value: $500,000+		
Race: White		
Race: Black/African American		
Race: American Indian or Alaska Native		
Race: Asian		
Race: Other		
Spanish spoken in home		

5.4 Appendix D - Alternative Theoretical Models

5.4.1 Two Populations of Voters

In this section, I briefly discuss an extension of the basic model that allows for two types of voters. The two groups differ in their source of utility. Share γ of voters are outcome orientated voters, and share $1-\gamma$ derive utility from the process of voting. The former abstain from indifference, whereas the latter abstain from alienation. The voter type is independent of ideology.

The two groups have the same utility functional form given in equation (1) in the main text. Imposing Assumptions 1-3 means that candidate D's receives

$$\begin{aligned} s_t(D) = \pi_{-1,t}\left(1-(1-\gamma)A_t(D;-1)\right) \\ + \pi_{x_D,t}\left(1-(1-\gamma)A_t(D;x_D)-\gamma I_t(D;x_D)\right) \\ + \pi_{0,t}\frac{\tilde{\epsilon}(0)-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}\left(1-(1-\gamma)A_t(D;0)-\gamma I_t(D;0)\right) \end{aligned}$$

votes from the viewers of show t. Similarly, R receives

$$\begin{aligned} s_t(R) = \pi_{0,t}\frac{\bar{\epsilon}-\tilde{\epsilon}(0)}{\bar{\epsilon}-\underline{\epsilon}}\left(1-(1-\gamma)A_t(R;0)-\gamma I_t(R;0)\right) \\ + \pi_{x_R,t}\left(1-(1-\gamma)A_t(R;x_R)-\gamma I_t(R;x_R)\right) \\ + \pi_{1,t}\left(1-(1-\gamma)A_t(R;1)\right). \end{aligned}$$

Abstention margins are defined in the main text. Denote $F = (\bar{\epsilon}-\tilde{\epsilon}(0))/(\bar{\epsilon}-\underline{\epsilon})$. Then, D candidate maximizes

$$\begin{aligned} s_t(D) - s_t(R) \propto \pi_{-1,t}(1-\gamma)U_t(D;-1) \\ + \pi_{x_D,t}\left((1-\gamma)U_t(D;x_D)-\gamma U_t(R;x_D)\right) \\ + \pi_{0,t}F(1-2\gamma)(U_t(D;0)-U_t(R;0)) \\ + \pi_{0,t}\left(\gamma U_t(D;0)-(1-\gamma)U_t(R;0)\right) \\ + \pi_{0,t}(2F-1)(\gamma\bar{c}-\underline{c}) \\ + \pi_{0,t}F(1-2\gamma)(\bar{\epsilon}+\underline{\epsilon}) \\ + \pi_{x_R,t}\left(\gamma U_t(D;x_D)-(1-\gamma)U_t(R;x_D)\right) \\ - \pi_{1,t}\gamma U_t(R;1) + K_1, \end{aligned}$$

where K is constant. The corresponding objective function in the main text can be expressed as

$$\begin{aligned} s_t(D) - s_t(R) \propto \pi_{-1,t} U_t(D;-1) \\ &+ \pi_{x_D,t}\left(U_t(D;x_D) - U_t(R;x_D)\right) \\ &+ \pi_{0,t}\left(U_t(D;0) - U_t(R;0)\right) \\ &+ \pi_{0,t}(2F-1)(\bar{c}-\underline{c}) \\ &+ \pi_{x_R,t}\left(U_t(D;x_D) - U_t(R;x_D)\right) \\ &- \pi_{1,t} U_t(R;1) \end{aligned}$$

The two are equivalent when $\gamma = 1/2$ and c_h, c_l are re-normalized.

5.4.2 Negative Voting

My model can readily be extended to allow for a form of negative voting. Specifically, the voter utility in equation (1) can be extended to

$$U_{h,t}(D;x_h) = \mathcal{U}_{h,t}(D;x_h) - \nu \cdot \mathcal{U}_{h,t}(R;x_h) \;\&\; U_{h,t}(R;x_h) = \mathcal{U}_{h,t}(R;x_h) - \nu \cdot \mathcal{U}_{h,t}(D;x_h) + \epsilon_h, \quad (17)$$

where $\mathcal{U}_{h,t}(k;x)$ is the direct utility voter h receives from voting for candidate k. The magnitude of negative voting is captured by $\nu \geq 0$ The direct utility is accordingly.

$$\mathcal{U}_{h,t}(k;x_h) = -a_{h,t,k}|x_h - x_k| + V_{h,t,k},$$

where the components are defined as in the main text.

At ideology x, equation (17) suggests these are voters with realized $\epsilon_{h,R}$ such that

$$\begin{aligned} \epsilon_h \leq \tilde{\epsilon}_t &= U_{h,t}(D;x_h) - U_{h,t}(R;x_h) \\ &= (1+\nu)(\mathcal{U}_{h,t}(D;x_h) - \mathcal{U}_{h,t}(R;x_h)). \end{aligned} \quad (18)$$

Assumptions 1 and 2 can be extended as follows.

Assumption 4. *$\sigma_2 > 0$ and $\bar{\epsilon} = -\underline{\epsilon} = \epsilon$ and*

Assumption 5. $\bar{\epsilon}/(1+v) - aA|x_R - x_D| < v(V_R - V_D) + (\delta V_D - V_R)/2\beta_q - \delta V_D \bar{B}$

Assumption 6. $\underline{\epsilon}/(1+v) + aA|x_R - x_D| > v(V_R - V_D) + (\delta V_D - V_R)/2\beta_p - \delta V_R \bar{B}$

Assumption 7. $\bar{\epsilon} < aA(1 + x_R - \nu(1 + x_D)) - vV_R + \nu(v - \delta B)V_D$ *and* $0 < aA(1 + x_D - \nu(1 + x_R)) - vV_D + \nu(v - \delta B)V_R$

Then, among the viewers of show t, candidate D receives

$$\begin{aligned} s_t(D) = {} & \pi_{-1,t}\left(1 - A_t(D;-1)\right) + \pi_{x_D,t}\left(1 - A_t(D;x_D) - I_t(D;x_D)\right) \\ & + \pi_{0,t}\frac{1+\nu+\epsilon}{2\epsilon}\left(\mathcal{U}_{h,t}(D;0) - \mathcal{U}_{h,t}(R;0)\right)\left(1 - A_t(D;0) - I_t(D;0)\right) \\ & + \left(\pi_{x_R,t} + \pi_{1,t}\right)\cdot 0. \end{aligned} \tag{19}$$

Analogously, the number votes receives from show t is

$$\begin{aligned} s_t(R) = {} & \left(\pi_{-1,t} + \pi_{x_D,t}\right)\cdot 0 \\ & + \pi_{0,t}\left(1 - \frac{1+\nu+\epsilon}{2\epsilon}\left(\mathcal{U}_{h,t}(D;0) - \mathcal{U}_{h,t}(R;0)\right)\right)\left(1 - A_t(R;0) - I_t(R;0)\right) \\ & + \pi_{x_R,t}\left(1 - A_t(R;x_R) - I_t(R;x_R)\right) + \pi_{1,t}\left(1 - A_t(R;1)\right). \end{aligned} \tag{20}$$

Within tv-show t candidate D chooses a bundle of ads $(q_{D,t}, p_{D,t}, n_{D,t})$ to maximize the votes they receive and minimize the votes R receives. Thus, D's solves

$$\max_{q_{D,t},p_{D,t},n_{D,t}} s_t(D) - s_t(R), \text{ subject to } q_{D,t} + p_{D,t} + n_{D,t} \leq \bar{B}_{D,t}. \tag{21}$$

The definitions of utility in equation (17) and abstention areas indicate that $s_t(D) - s_t(R)$ can be expressed as

$$\begin{aligned} s_t(D) - s_t(R) = {} & \pi_{-1,t}\left(\frac{\mathcal{U}_{h,t}(D;-1) - \nu\cdot\mathcal{U}_{h,t}(R;-1)}{\bar{c}-\underline{c}}\right) \\ & + \pi_{x_D,t}\left(\frac{1+\nu}{\bar{c}-\underline{c}}\right)\left(\frac{\mathcal{U}_{h,t}(D;x_D) - \mathcal{U}_{h,t}(R;x_D)}{\bar{c}-\underline{c}}\right) \\ & + \pi_{0,t}\left(\frac{\epsilon - \underline{c}(1+\nu+\epsilon)}{\epsilon}\right)\left(\frac{\mathcal{U}_{h,t}(D;0) - \mathcal{U}_{h,t}(R;0)}{\bar{c}-\underline{c}}\right) \\ & + \pi_{x_R,t}\left(\frac{1+\nu}{\bar{c}-\underline{c}}\right)\left(\frac{\mathcal{U}_{h,t}(D;x_R) - \mathcal{U}_{h,t}(R;x_R)}{\bar{c}-\underline{c}}\right) \\ & + \pi_{1,t}\left(\frac{\mathcal{U}_{h,t}(D;1) - \nu\cdot\mathcal{U}_{h,t}(R;1)}{\bar{c}-\underline{c}}\right) + K, \end{aligned}$$

where K is a constant independent of the candidates ads. To maximize the probability of winning, candidate D must increase the voters' direct utility from voting for them and minimize the direct utility voters derive by voting for the opponent.

The results from the main text extend. I omit the proofs since they are similar in nature with the proofs of the results in the main text.

Proposition 4. *A unique solution exists within show t.*

If $\pi_{-1,t}$ or $\pi_{x_D,t}$ are sufficiently high, then $q_t^D > 0$. Similarly, if $-A \cdot x_D > \delta \cdot V_R$ and $\pi_{0,t}$ is sufficiently high, then again $q_t^D > 0$. If $\pi_{x_R,t}$ or $\pi_{1,t}$ are sufficiently high, then $q_t^D = 0$.

If $\nu\delta < V_D/V_R$, then candidate D always uses positive valence ads, $p_t^D > 0$, in shows with sufficiently high $\pi_{-1,t}$. If $\delta < V_D/V_R$ then D also uses positive valence ads in shows with sufficiently high $\pi_{x_D,t}, \pi_{0,t}$ or π_{xR_t}. If $\nu\delta > V_R/V_D$ then candidate D use positive valence ads with sufficiently high $\pi_{1,t}$.

The number of negative valence ads is given by $B_t^D - q_t^D - p_t^D$.

Allowing for negative voting means that voters care about the utility from both candidates. Thus, candidate D can increase alienation among R's fringe base by using positive valence ads. In this way, D reduces the incentive to vote *against* D and thus increases R's abstention.

Proposition 5. *Suppose $0 < \sigma_2 \leq 1$ and ν is small enough. $q_{D,t}$ increases in $\pi_{-1,t}$ $q_{D,t}$ increases in $\pi_{x_D,t}$ if $\pi_{x\_1,t}$ is not too large. $q_{D,t}$ increases in $\pi_{0,t}$ if $\pi_{-1,t}$ and $\pi_{x_D,t}$ are small enough or if $\pi_{x_R,t}$ and $\pi_{1,t}$ are large enough. $q_{D,t}$ decreases in $\pi_{x_R,t}$ and $\pi_{1,t}$ unless $\pi_{x_R,t}$ is large enough.*

$q_{D,t}$ increase in $x_R - x_D$ if $\sigma 2 < \pi_{x_D,t}/\pi_{x_R,t}$ is. Moreover, $q_{D,t}$ it is unaffected by V_D, but decreases in V_R if positive number of ads. Moreover, $q_{D,t}$ decreases in $_2$ and δ, and increases in A when ads are already positive.

Optimal $q_{D,t}$ are independent of $B_{D,t}$.

Proposition 6. *Suppose $0 < \sigma_2 \leq 1$ and ν is small enough. $p_{D,t}$ increases in $\pi_{-1,t}$. $p_{D,t}$ increases in $\pi_{x_D,t}$, $\pi_{0,t}$ and $\pi_{x_R,t}$ if $\pi_{-1,t} < \pi_{1,t}$. $p_{D,t}$ decreases in $\pi_{1,t}$. The effects are proportional to $\delta V_R/V_D$.*

Positive valence ads $p_{D,t}$ are independent of $x_R - x_D$. They increase in V_D and decrease in V_R. Higher ν increases positive valence ads if $\pi_{-1,t} < \pi_{1,t}$. They also decrease in δ and they are independent of A and $B_{D,t}$.