Negative Advertising and Voter Choice

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Abstract

The topic of negative advertising in political campaigns has been especially timely in recent years, given the increased presence of negative ads with each successive U.S. election cycle. Using data sets containing detailed information from both voter surveys and automated ad monitoring, we model choices made by voters and campaigns in House, Senate, and Presidential elections in 2000. Our model framework contains both a voter turnout and choice (demand) model and a political candidate campaign advertising (supply) model. From our estimation results, we find negative ads run by a given candidate increase voter turnout, and attract more votes for the candidate. In addition to this "main" effect, we also show that voter sensitivity to negative ad amounts is in turn dependent on various election-specific factors (incumbency status, balance of character-focused negative ads) and individual-specific factors (voter demographics, goodwill, interest, media exposure, and partisanship). We also model the campaign's choice of ad orientation (negative or positive) for each individual ad, and how it is related to competition, demographics, timing, and vote responsiveness to various ad types.

Keywords: Voter Choice, Voter Turnout, Negative Advertising, Political Marketing, Empirical Choice Models

Negative Advertising and Voter Choice

1. Introduction

Negative advertising in political campaigns is a particularly important and timely issue in U.S. politics. The recent years have seen a marked increase in not only the amount of negative advertising but also in the intensity of the negative appeals at all levels of campaigning leading to adverse effects which keeps increasing number of voters away from polls (Ansolabehere and Iyengar 1995). The 2006 midterm Congressional election was marked by especially high amounts of negative advertising, as 90% of ads run in the final 60 days of all House and Senate campaign nationwide were negative (Page 2006). Despite increasing amount of political ads, voter turnout rates have been declining in the last decade. Compared to 39% in 1994, voter turnout rate dropped to 37% in the 2006 midterm Congressional election (McDonald 2006). Negative advertising can be defined as advertising used by a campaign which provides information about negative and adverse characteristics of either an opposing candidate's stand on issues or about the opponent's personal characteristics. In contrast to negative advertising, political campaigns may also use positive advertising which seeks to provide positive information about a candidate without mentioning anything adverse about opposing candidates.

The primary goal of this research is to investigate voter choices in House, Senate, and Presidential elections to measure the effects of negative advertising, and in turn to understand the effect of voter behavior on the advertising strategy of the campaign. In particular, we are interested in addressing the following questions:

- How does negative advertising affect voter turnout in an election?
- How does negative advertising affect the probability that a given voter will vote for the candidate? Does negative advertising help or hurt the candidate who shows negative ads?

- How do the voter responses to negative ads differ across voters with different demographic and social characteristics?
- What determines a campaign's decision to run a negative ad, as opposed to a positive or contrast ad?

These questions require us to analyze not only the individual voter behavior but also the choices of the campaign. We use data sets containing information about campaign ad airings and voter survey responses from the 2000 election to model the choice decisions of voters, the "demand" side, in a market where political campaigns, the "supply" side, compete for votes.

We find evidence that negative advertising *positively* affects both the turnout and the likelihood of voting for the featured candidate in House and Presidential elections. However, a decomposition of the effects of negative advertising on turnout and voter choice shows the effects are markedly different across elections. We further distinguish character-based ads from issue-based ads, and find similar effects remain in House and Presidential elections. We also investigate interactions between the amount of negative advertising and several candidate and voter characteristics such as incumbency status, pre-existing voter goodwill for the candidates, and individual-level measures of campaign interest, media exposure, and partisanship. We find that higher interest and media exposure lead to higher voter turnout, and positive reaction to negative ads. An important finding that emerges from the analysis is that the interaction between goodwill and negative ads has a positive in the House elections, while a negative effect on voter choice in the Presidential election. This may be explained by the disparity in the levels of voter involvement across these elections. Finally, we find showing negative ads in election actually hurts incumbent candidates.

Our analysis of advertising choice reveal that campaigns' decisions to air negative ads were in fact sensitive to demand elasticities in a direction that is intuitively appealing, thus providing validity for our voter choice model. In particular, we find advertising choices are sensitive to competitors' airing of negative and positive ads, and the amount of ads that air in prime time. Finally, perhaps most interestingly, we find as the election date draws closer, candidates go more negative in airing ads.

In presenting these findings, we contribute to literature on advertising strategy by providing an analysis of how negative advertising affects (voter) behavior using field data[1]. We also contribute to literature on the effects of negative advertising by studying its effects on both voter turnout and choice. Our analysis is able to throw light on issue of the underlying mechanism through which negative advertising affects voter turn out and choice. In addition to this substantive contribution, this research has practical implications for campaign managers seeking to optimize advertising expenditures.

The remainder of the paper progresses as follows. In Section 2 we briefly outline two relevant streams of literature in marketing and political science. We also discuss the factors we intend to investigate on both the demand (voter) and supply (campaign/ad) sides, as well as what effects we expect to see *a priori* based on previous research. Section 3 presents the models for the voting decisions, and the political candidates' ad choice decisions. Section 4 describes the data, and presents the results on the voter and ad sides. Section 5 concludes the paper.

2. Determinants of Voter and Campaign Behavior

The political science field features many studies about negative advertising and its various effects on political campaigns. Most studies in this literature have examined the effects of negative advertising on voter turnout (Finkel and Geer 1998, Ansolabehere et al. 1994, Freedman and Goldstein 1999, Kahn and Kenney 1998). These studies have proposed two opposing effects: a *demobilization* effect and a *stimulation* effect which correspond to negative and positive effects of negative advertising on voter turnout, respectively. The argument proposed in the literature for the demobilization effect are two fold: First, negative advertising may reduce an individual voter's belief about "political efficacy" – the belief that her individual vote can impact the outcome of the election. Second, negative advertising can create disillusionment leading to reduced turnout. This disillusionment is likely to be highest among independent voters in particular. The arguments for a stimulation effect include the raised perception of stakes,

[1] Currently, most studies on the effects of negative advertising in the marketing literature use lab data which are obtained through experiments.

and increased knowledge, both of which are indicated in the literature to encourage participation.

In the marketing literature, some experimental studies consider the effects of negative advertising in consumer brand choice decisions. James and Hensel (1991) suggest an explanation for a negative main effect of negative advertising on brand choice. Other papers conduct analysis of the interaction of factors, just as we aim to do for the voter choice problem; most notably Shiv et al. (1997) suggest that negative information from advertisements has a stronger and positive effect on product choice if the purchase decision is characterized by low involvement levels (Shiv et al. 1997). Recent analytical work on advertising strategy is also relevant to our study. In the context of product advertising, Chen, Joshi, Raju, and Zhang (2007) discuss combative advertising which involves the use of advertising in changing voters' ideal preferences. Soberman and Sadoulet (2007) analyze the effect of campaign spending limits on the advertising strategies of candidates and find that tight spending limits evoke aggressive advertising by the parties while generous budgets make parties focus on their base leading to greater polarization wherein parties advertise more to their partisan base. Our analysis will shed light on whether the negative content of the advertising affects partisan voters differently from uncommitted voters.

Our study extends the "stimulation" vs. "demobilization" debate from the political science literature to the question of whether negative ads have a positive or negative effect on not only voter turnout, but also on voter choice. By estimating a discrete choice model which includes both turnout and choice decisions, we are able to analyze this question at the level of an individual voter, rather than at the aggregate level as in other political science studies. In the remainder of this section, we discuss the likely effects of negative advertising and various proposed interacting factors on voter choice behavior, as well as various determinants of a campaign's decision to run negative or positive ads.

On the voter side, we investigate whether there exists a "main effect" of the amounts of negative ad amounts on voters' *"response"* to negative advertising (a term used throughout this paper to represent the effect that a campaign's airing of negative ads has on a voter's probability of turnout (vote or not) and choice (voting for the candidate that campaign sponsors)). We test whether the effects of negative advertising are consistent

with the stimulation effect in increasing voter turnout and choice, or with the converse backlash/demobilization effect. We then test for the presence of interacting factors. There are five factors in our study, and they can be divided into two groups: election-specific and individual-specific variables. The election-specific variables consist of the incumbency status of the candidate, and voter's pre-existing goodwill for the candidates, while the individual-specific variables consist of voter interest in the campaign, voter media exposure, and strength of partisanship. We discuss each of the five factors below.

- *Voter interest and media exposure*

  A voter's interest in the political process can be an important determinant of the voter's involvement and consequently the voter choice. In addition, the degree of media exposure and the extent the voter seeks out political news is related to the voter interest and involvement in politics. Voters with higher interests and media exposure levels are more likely to vote since they are more likely to be involved and participate in the election process. Furthermore, a voter's interest and media exposure can affect that voter's response sensitivity to negative ads. When interest and media exposure levels start at low levels, negative ads are unlikely to be effective since voters might find these ads disturbing and generate negative feelings towards politicians and election in general. While when voters' interest and media exposure levels increase and become more involved in the election process, they are more likely to respond strongly to negative ads.

- *Voters' goodwill for the candidate*

  A voter's pre-existing goodwill for a candidate is likely to affect that voter's response to negative advertising from the candidate. A higher level of goodwill indicates that the voter already has a favorable preference for the candidate. Negative advertising by a candidate to such a voter is therefore less likely to produce information which will increase the degree of favorable goodwill towards the candidate. Rather the perception that such advertising was unnecessary might make the voter reconsider the goodwill for the candidate. This argument indicates that an interaction of the goodwill with the use of negative advertising might be another source of the backlash effect.

- *Incumbency status of candidate*

  In any given election, one of the competing candidates may be an incumbent. Incumbent candidates traditionally enjoy an advantage because voters have more information about them. It can be argued that negative ads could have a backlash effect when run specifically by incumbents because while the marginal effects of advertising in increasing awareness and knowledge of the incumbent can be small, the incumbent's ads can significantly increase the challenger's name recognition. This effect has been documented in studies from both the marketing literature (James and Hensel 1991, Pechmann and Stewart 1990) and the political science literature (Tinkham and Weaver 1996).

- *Amount of character-specific negative advertising*

  There are two types of negative political ads: those which attack the opponent's stance on the issues, and those which attack the opponent's personal character. The latter is especially newsworthy in today's political climate, as voters particularly cite ads of a vicious personal nature when expressing their frustration with rising levels of negative ads. Attacks on an opponent's character may be seen by voters as not relevant to the "issues" at stake in the election. Ansolabehere and Iyengar (1995) present the overall finding that character based negative ads are more likely to lead to backlash from voters than issue based ads. In light of this, we anticipate that more character-focused negative ads for a candidate will lead to fewer votes. However, it is worth noting that previous studies on character-focused negative ads have reached conflicting conclusions as to whether these ads have the demobilization effects or the stimulation effects. (Kahn, Fridkin, and Geer 1994, Homer and Batra 1994)

- *Strength of individual voter partisanship*

  To understand the effects of individual partisanship on response to negative ads, we need to separate two effects: the effects on response to negative ads from one's preferred party and from one's non-preferred party. Ansolabehere, Iyengar, Simon, and Valentino (1994) find that independent voters, i.e., those for whom partisanship levels are low, respond negatively to negative ads from both parties. As partisanship increases, voter response to negative ads run by one's own party

grows less negative and may even become positive, while voter response to negative ads run by one's non-preferred party approaches zero. This is because the voter will grow more entrenched in his beliefs about his own party's candidate, so the opponent's negative ads about this candidate will have little effect. When combined, these effects yield a hypothesis that stronger partisanship will lead to a more favorable response to negative ads as a whole.

In addition to the above factors associated with voter behavior in response to negative ads, we also consider the "supply" side of this market, i.e. the decision made by advertisers to run a positive or negative ad. We consider several factors that may influence this decision, the most important ones being the competing campaigns' levels of advertising, and the elasticity of vote choices to the amount of negative ads run by the campaign. By including this elasticity as a determining factor, we are able to model the way that campaigns may incorporate anticipated voter response to negative ads into their advertising decisions. These factors, and the modeling approach, will be discussed further in Sections 3 and 4.

3. The Model

In this section, we develop a model of individual voter's decision in a Congressional district (for House elections) or media market (for Senate and Presidential elections), where two campaigns try to influence voters through political advertising. For each voter i ($i=1,\ldots,I$), we observe a binary outcome variable y_i that takes the value 1 if the voter votes in the election and 0 otherwise. For those voters who decide to vote (i.e. $y_i=1$), they could choose to vote for one of J ($j=1,\ldots,J$) alternatives, which corresponds to Democratic, Republican or Independent available candidates. This vote outcome is a multinomial choice denoted by y_i^*. Our goal is to model to outcome variables (y_i , y_i^*) on the basis of observed levels of negative and positive advertising run by the campaigns. We develop the joint model of voter turnout and choice below.

Voter Turnout

In order to develop a model of the binary outcome $y_{i,}$ let u_i denote the deterministic part of the (indirect) utility of voter *i* for voting in the election. This utility is modeled as a function of the following variables: the attractiveness of the candidates in the election to the voter, measures of the voter's income, education, election, other demographic and social-economic characteristics and an inclusive value variable CA_i. More specifically,

$$u_i = \gamma_{i0} + \gamma_{i1} CA_i + \gamma_{i2} X_i$$

where CA_i is an inclusive value measures that captures the attractiveness of voting in the election using the voter's indirect utilities for all candidates in the election and is given by $CA_i = \ln\left(\sum_{j=1}^{J} \exp(v_{ij})\right)$. v_{ij} stands for the deterministic component of voter *i*'s indirect utility for candidate *j* and will be explained in the next choice part of the voter model. Our use of the inclusive value measure to represent CA_i is in the same spirit as the nested logit model (Ben-Akiva and Lerman 1985), and we expect γ_{i1} to be positive. X_i include demographic variables (e.g. minority status (1 = voter is non-white, 0 = voter is white), years of education, and income), as well as attitudinal variables such as interest, media exposure, and partisanship measures.

When $u_i > 0$, the vote turnout outcome y_i=1. in other words, voters vote when the current utility of voting in the election exceed the reservation utility (normalized to zero for identification purpose). Under the assumption of error terms being Type-I extreme value distribution with scale parameter 1, the probability of voting in the election for voter *i* is

$$\Pr(y_i = 1) = \frac{\exp(u_i)}{1 + \exp(u_i)} \tag{1}$$

where $\gamma_i = (\gamma_{0i}, \gamma_{1i}, \gamma_{2i})$ are voter specific coefficients.

Voter Choice

We model voter choice decision using a voter-level conditional multinomial logit model. In this specification, the dependent variable is the voter's decision as to whom to vote for. This is modeled as a simple choice between three options:

- Voting for the Democratic candidate
- Voting for the Republican candidate
- Voting for an independent (third-party) candidate

The probability of a voter i ($i=1,...,I$) voting for one of J available candidates (denoted by $j=1,...,J$. which corresponds to Democratic, Republican or independent candidates) is given by:

$$\theta_{ij} = \frac{\exp(v_{ij})}{\sum_{k=1}^{J} \exp(v_{ij})} \tag{2}$$

where v_{ij} is given by

$$v_{ij} = \alpha_{ij} + \beta_{1i} NEG\_AD_j + \beta_{2i} POS\_AD_j + \beta_{3i} X_j + \xi_j$$

for Democratic and Republican candidates, $v_{iI} = \alpha_{iI}$ for independent candidates, and we normalize α_{iI} to 0 for identification purpose. α_{ij} denotes voter i's intrinsic preference for candidate j in the current election. NEG_AD_j and POS_AD_j are the amounts of negative and positive ads shown by candidate j and observed by voter i, while β_{1i} and β_{2i} denotes the corresponding set of response coefficients. X_j represents other candidate-specific variables which affect voter preference for the candidate, and ξ_j denotes a composite (stochastic) measure of unobserved (to the econometrician) characteristics of candidate j , which is common across all voters. It refers to common demand shocks that affect all voters (such as candidates' personal appearances in the election district, macro-economic conditions etc. that are not recorded in the data and unobservable to researchers, but observable by the voters and candidates). Finally, the voting outcome y_i^*, i.e. voter i voting for candidate j, $y_i^*=j$, is determined by the principle of maximum utility.

In addition to testing the effects of the amounts of negative and positive advertising[2] on voter choice, we also test additional factors described in Section 2: whether or not pre-existing goodwill for the candidate will interact with negative advertising and affect voter decisions, and whether or not incumbency status will interact with negative ad amounts to help or hurt a candidate. In addition, will the character-based negative ads have a

[2] Positive ad amounts are included alongside negative ad amounts for the sake of comparison.

different effect on voter decision from the issue-based ads? We present the results of these coefficient estimates and different model specifications in Section 4.

The voter-specific model coefficients follow a random distribution whose mean is a function of the voter-specific demographics and attitudinal variables as discussed in Section 2 (Nevo 2000). This allows us to capture the effects of voter heterogeneity on response to negative ads. The specification of the random coefficients' distribution is as shown below:

$$\begin{pmatrix} \alpha_{Di} \\ \alpha_{Ri} \\ \beta_i \\ \gamma_i \end{pmatrix} = \begin{pmatrix} \alpha_D \\ \alpha_R \\ \beta \\ \gamma \end{pmatrix} + \pi \begin{pmatrix} D_i \\ AV_i \end{pmatrix} + \sum \bullet \upsilon_i \tag{3}$$

In this specification, D_i is a vector of demographics variables, and AV_i is a vector of attitudinal variables observed in the voter survey. υ_i represents unobserved voter-specific characteristics, which are assumed to follow a standard multivariate normal distribution. π and $\sum$ are coefficients to be estimated. For the demographics and attitudinal variables, again we include minority status, education, income as well as interest, media exposure, and partisanship measures. By including these variables again in the heterogeneity specifications, we can test for the influence of demographics and attitudinal factors on the β coefficients that represent response to negative and positive ads[3].

We also address the issue of endogeneity (Villas-Boas and Winer 1999), specifically in the negative and positive ad amount regressors shown above. Since there exists a distinct possibility that these amounts are determined by the candidates based on *common* voter characteristics, we use the control function approach proposed by Petrin and Train (1994) to correct for endogeneity. We first run the following regression, in which negative (or positive) ad counts for a particular party and district are the dependent variable, and the corresponding count from a different election year is the regressor.

$$NEG\_AD_{ij} = \psi_0 + \psi_1 NEG\_AD_{ALT\_Year\_ij} + \eta_j \tag{4}$$

[3] In the actual estimation, we only include demographics and attitudinal variables in the β coefficient for negative ads, due to the cross sectional nature of the datasets and subsequently the small number of observations.

We then include the residuals from this regression as an additional regressor in the main multinomial logit regression shown earlier.

Ad Choice

Here we present a simple model of advertising choice by the campaigns[4]. To model the choice made by Democratic and Republican campaigns to run a particular type of ad (negative or positive), we again use a multinomial logit choice model specification.

The probability of a candidate j (j = Democrat or Republican) choosing one of m available ad orientation types (m = negative or positive) is given by:

$$\theta_{jm} = \frac{\exp(v_{jm})}{\sum_{k \in M} \exp(v_{jk})} \tag{5}$$

where v_{jm} is given by:

$$\begin{aligned} v_{jmt} = {} & \alpha_{jm} + \beta_1 \text{Own\_Elasticity}_{jm} + \beta_2 \text{Cross\_Elasticity}_{jm} \\ & + \beta_3 \text{CompetitorPositiveAdAmounts}_{j,t-1} + \beta_4 \text{CompetitorNegativeAdAmounts}_{j,t-1} \\ & + \beta_m \text{Race\&VoterVariables}_{jt} \end{aligned} \tag{6}$$

for a negative or positive ad chosen by candidate j. Here, Race&VoterVariables represents district averages of the demographic and attitudinal variables faced by candidate j, as well as the election-specific variables for candidate j at time t (e.g. the number of days before the election). Notice that these variables are the same for the two choice alternatives (since voters are not surveyed on their different reactions to negative and positive ads), therefore we allow two separate coefficients for positive and negative ads. CompetitorPositiveAdAmounts and CompetitorNegativeAdAmounts are included in the ad choice regression to investigate the effects of competitors' amount of negative ads in the last week on the campaign's ad choice. To further capture the influence of voter decisions on the candidate's ad type choice, we include two elasticity terms in the utility functions. They are defined as:

- **Own elasticity**: the elasticity of the probability of voting for the featured candidate to the amount of negative or positive ads run by the candidate;

[4] The focus of this paper is on investigating the effects of negative advertising on voter turnout and choices. We include the ad choice model here as a robustness check of the validity of our voter choice model estimates. For this reason, and combined with the fact that we do not have a lot of crucial information on ad campaign decisions, we do not intend to model the advertising decisions in a more structural fashion.

- **Cross elasticity**: the elasticity of the probability of voting for the *opposing* candidate to the amount of negative or positive ads run by the candidate.

As an example, individual *i*'s elasticities of "demand" for candidate *j* to negative ad amounts are represented as follows (in which $P_{i,j}$ represents the probability that individual *i* votes for candidate *j)* (Train 2003).

$$\begin{aligned} \text{Own\_Elasticity}_{i,j,NEG\_AD} &= \beta_{i,NEG\_AD} \bullet NEG\_AD_j \bullet (1-\theta_{ij}) \\ \text{Cross\_Elasticity}_{i,j,NEG\_AD} &= -\beta_{i,NEG\_AD} \bullet NEG\_AD_j \bullet \theta_{ij} \end{aligned} \tag{6}$$

When the effects of negative advertising on voter choice are positive, the utility of running a given ad type will be a positive function of own elasticity and a negative function of cross elasticity. The intuition is that higher own elasticity makes a certain ad type more favorable, as more of those ads help demand for one's own candidate, while higher cross elasticity makes a certain ad type less favorable because ads of that type help the other candidate. By estimating and verifying these coefficients, we can ultimately validate the legitimacy of the predictions made on the demand side. This is because the elasticity for each district is a function of the negative ad response parameter β for that district, which in turn is a function of demographic averages for that district as well the coefficients estimated in the voter model.

4. Data and Results

4.1. Data and Estimation Methods

We use individual-level voter survey data, as opposed to aggregate data, from the American National Election Studies (ANES) project to study the effects of negative advertising on voter turnout and choice. This data contains questions asked of a cross-section of 1807 voters in 48 states both before and after the 2000 elections. Each observation corresponds to a distinct voter and contains that voter's response to pre- and post-survey questions; summary statistics for this data are included in Table 1.

~Table 1 about Here~

From the survey, we obtain the following information for each individual voter:

- Voter turnout (vote or not) and choice (i.e. candidate voted for) in the 2000 House, Senate, and Presidential elections
- Individual-specific attitudinal variables (interest, media exposure, partisanship)
- Voter demographics such as income, age, family size, and etc.

The summary statistics of the voter survey data shows that the Presidential election has the highest voter turnout, while the House election has the lowest. The voters in the three elections have somewhat similar interests, knowledge and racial profiles, although the interests and knowledge levels go up slightly from the House to the Presidential election. This is not surprising since the survey does not ask respondents to provide separate answers on interests for different elections. However, we do see a significant difference among the voter reported candidate goodwill ratings in the three elections. In the House and Senate elections, the proportions of voters who do not have any opinions on the candidate credibility are significantly higher than that in the Presidential election. Since the stated goodwill rating is a very important measure that reflects the voter involvement in the election, we conclude that there is a significant higher level of voter involvement (interests, media exposure and knowledge) in the Presidential election than the other two elections.

To model the effects on negative ads on voter turnout and choices, we need detailed information on different types of ads run in different types of elections in different election districts. We obtain advertising data tracked by a major media research consulting firm. The dataset contains information on all political ads shown in different election districts or media markets by different candidates during the 2000 House, Senate and Presidential elections. Each observation corresponds to a unique airing of a campaign ad on one of the broadcast or cable networks; summary statistics for this data are included in Table 2.

~Table 2 about Here~

By analyzing the satellite-captured audio and video storyboards, researchers coded for each ad a set of 25 traits including the positive, negative, or contrast orientation of the ad. To simplify the voter and ad models, all contrast ads were reclassified by an

independent researcher as either positive or negative ads[5]. Note that in the data there are a small proportion of the ads (10~20% across elections) which are classified as "contrast" ads. While all ads originally classified as contrast ads devote some airtime to the opposing candidate, they can be classified into three distinct groups based on the nature of content; i) for some ads, this content involves significantly and primarily negative content, ii) for a second group this content simply consists of defending the candidates by asserting that the opposing candidate's negative attack about the favored candidate are untrue, and iii) the final group of contrast ads were those in which the favored candidate explicitly claimed that that he/she would not respond negatively even though the opponent had used attack ads Contrast ads that fit the descriptions (i) were reclassified as negative, while the ones in (ii) and (iii) were reclassified as positive.

To join the ad data to the voter data for use in the voter model regressions, we aggregated the counts of negative and positive ads run by each party in each "market". For the House elections, a market is defined as a congressional district; while for the Senate and Presidential elections, a market is defined as a media market. This distinction is important, as House ads are only relevant to voters in a given congressional district, while a Senate or Presidential ad aired in a media market can reach voters across several congressional districts within that media market, all of whom vote in the same election. By joining ad counts to each individual voter in a market, we have an augmented voter data set containing information on how many ads of each type and party to which each voter may theoretically have been exposed.

We use the maximum likelihood method in both voter and ad regressions. For our voter model, a continuous random coefficient multinomial logit model, we obtain the individual-level coefficient estimates through simulated maximum likelihood. To correct for endogeneity, we apply the control function approach as described in the voter choice model, and use 2002 advertising data in the House and Senate elections as instruments for the quantity of ads in the 2000 elections.

[5] In political science studies, contrast ads are classified into negative ads in estimation. This classification method might be somewhat crude for our analysis and we therefore develop a finer classification based on the actual content of the ads.

4.2. Results

We report the results of the empirical analysis in two parts: Tables 3~6 report the voter-side results, and Tables 7 reports the ad choice model results.

Voter Turnout and Choice Model Results

- Effects of Negative Ads on Voter Turnout and Choice

Results for the effects of negative and positive ad amounts on House, Senate and Presidential elections are shown in Table 3~5.

~Table 3~5 about Here~

As described earlier, a positive coefficient for the negative ad regressor indicates that the probability of voting for candidate X is a positive function of amount of that type of ad, validating the stimulation effect. Conversely, a negative coefficient validates the so-called backlash effect in the political science studies.

From the voter turnout model, we find the intercept terms across three elections are all negative and significant. Americans prefer not to vote in general, which is consistent with current trend of voter turnout. The coefficient estimates for the inclusive values are all positive, while it is only significant for the Presidential election. This finding suggests that when election candidates are more "attractive" to the voters, they are more likely to vote, and this is especially true in the 2000 Presidential election. Higher income people are more likely to vote, while minorities are less likely to vote. We also find higher interests and stronger party identification in elections lead to higher voter turnout, while higher media exposure actually leads to lower voter turnout, although this last effect is not significant in House or Presidential elections.

In the voter choice model, as expected, we find voters prefer democrat and republican candidates to independent candidate in all three elections. More interestingly, we find that negative advertising has a positive effect on voter choice in House and Presidential elections, while a roughly zero (and insignificant) effect in Senate elections. In other words, we find the stimulation effect of negative ads dominate the backlash effect.

To test whether or not the above results are robust across different ad variable definitions, we substitute the "negative ad" and "positive ad" with counts of negative and positive ads that are specifically character-focused, using a question from the ad data that

classified ads as character-focused, issue-focused, both, or neither. Counts of negative and positive character-focused ads were obtained using a weighting rule in which strictly character-focused ads counted as one, while ads that are both character- and issue-focused count as one-half. Our estimation results show that character-focused negative and positive ads have similar effects as negative and positive ads[6].

We also add two regressors related to incumbency status. The first regressor is incumbency status, a dummy set to 1 for all incumbent candidates (regardless of number of terms) and 0 or others. The second regressor is an interaction term, set to the product of the incumbency term and the amount of negative ads[7]. The coefficients for incumbency are positive. Greater familiarity and name recognition give the incumbent a positive effect. The interaction term shows a negative interaction effect between incumbency status and negative ads. This is interesting, given that this result indicates negative ads have an additional negative impact on the candidate running them when that candidate is an incumbent. This confirms the backlash effect, which says running such ads gives name recognition to a challenger who might otherwise not have it.

Voter demographics can affect not only turnout, but also response to negative advertising, therefore we add them as regressors in the heterogeneity specification for the negative ad parameter as shown in equation (3). We find higher income voters respond more positively to negative ads, while being a minority voter means being less responsive to negative ads. Our findings suggest more highly educated and high income Caucasian voters are also more informed and involved in the election process and react more strongly to the negative ads.

Next we investigate the effects of voter interests, informed (media exposure) and partisanship on responses to negative ads. We measure interest using a single question from the ANES survey, in which respondents are asked to rate their level of interest in the current year's political campaigns on a 3-point scale. We find parameter estimates on interest are negative (and marginally significant) for the House and Senate elections, while it is positive for the Presidential election, which suggests higher interests lead to stronger and positive reactions to negative ads.

[6] These results are available upon request from the authors.
[7] There was no incumbent in the 2000 Presidential race.

Combining the voter involvement data as well as the results from both voter turnout and choice, we find despite the differences in the interest/media exposure levels across the three elections, increasing interest levels always encourage higher voter turnout. However, the marginal effect of an additional unit of interest on the effectiveness of negative ads is negative when involvement is low as in the House election; while it is positive when involvement is high as in the Presidential election.

We test the effect of media exposure levels on negative ad response using three questions from the ANES survey, which ask respondents the number of days per week that they watch national news and local news on TV. The answers are summed and averaged, with a higher value indicating higher media exposure for elections[8]. The coefficients on voter media exposure in response to negative ads are positive and significant for the House and the Presidential elections. As in the case of the marginal effects of interests, the effects of more media exposure and higher levels of being informed mean stronger and positive reaction to the negative ads.

Next we study the effects of individual partisanship, the degree to which an individual identifies with a given political party, on response to negative and positive ads. We measure partisanship with a simple modification to a question from the ANES survey that asked respondents to report their party identification on a 7 point scale; we then collapsed this to a 4-point scale in which a rating of 1 (strong Democrat) or 7 (strong Republican) mapped to a 3 (strong partisan ID), a 2 or 6 mapped to a 2, and so forth for other ratings.

The expected positive effect of partisanship on response to negative ads is seen for the House elections, and insignificant for the Senate and Presidential elections. This reflects expectations that individuals respond more strongly both to their chosen party's negative ads and those run by the opposing party as they grow more partisan, as explained in Section 2.

To further investigate how the levels of voter involvement in these campaigns interact with voter feelings and hence affect turnout and choices, we estimate a model, which include an interaction term between negative ads and voter stated candidate goodwill. Recall that this measure has the largest differences among the House, Senate and

[8] We also tested another two measures: number of days the respondents read newspapers, and whether or not the respondents can recall any specific politicians. We find the estimates are not sensitive to the choice of these other variables. The results are upon request from the respondents.

Presidential elections. It is also election-specific, therefore we can directly add the interaction terms as regressors in the choice model.

We find significant estimates of this coefficient for all three elections. Interestingly, the results are once again different between the House and the Presidential elections. Goodwill and negative ads have a positive and significant interaction effect in the House election, while they have a negative and significant interaction effect in the Presidential election. Because this variable has the most information about voter involvement and affect in these three different elections, we need to provide a good interpretation of these different results. Voter involvement is lower in House elections than in Presidential election. Thus, one unit of negative ad is likely to be more carefully investigated by a voter in a Presidential election, given higher level of involvement. This would tend to make any negative message which is contrary to voter expectation to have a negative effect. Further, because voters in Presidential election (i.e. the ones with higher goodwill) are also better informed, the potential upside of negative ads in providing relevant new information is also diminished. This can explain the negative and significant interaction effect between goodwill and negative ads in the Presidential election, and conversely in the House election. This result and our estimates are also consistent with the results reported in the experimental work done by Shiv, Edell and Payne (1997).

Based on the parameter estimates, we report the elasticity estimates of negative ads on voter turnout and choices for the democrat and republican parties in Table 6.

~Table 6 about Here~

These elasticity estimates are computed using the parameter estimates from our voter turnout and choice model. We find that while negative ads have positive effects on both voter turnout and choice in the House and Presidential elections, while they have negative (and insignificant) effects on voter choice in the Senate election. This indicates that negative ads have positive primary demand effect on voter turnout for both elections, and also positive secondary demand effects on candidate choice for these two elections. To see which effect is stronger, we carry out a decomposition exercise (Gupta 1993). Interestingly, we find the effects of negative ads in the House election have very little effect on increasing voter turnout, but have most effects on voter choice of candidates

once they decide to vote. In the Presidential elections, however, the effects of negative ads are more on increasing the turnout, while less on voters' candidate choice.

Ad Choice Model Results

Next we discuss the findings from models that describe campaign's decision whether to run a positive or negative ad. The estimation results are shown in Table 7.

~Table 7 about Here~

As mentioned earlier, we expect the coefficients for the own- and cross- voter choice elasticity terms to be positive and negative, respectively. The results shown in Table 7 demonstrate that we get the expected signs for 5 out of 6 cross-elasticity terms. For the own-elasticity terms, we get the expected (positive) signs for the House and Presidential election, but the signs for the Senate elections are negative. This is not surprising given that our estimate for the negative ads in the Senate elections is negative (and insignificant). Overall, our results show strong evidence that the coefficient estimates from the voter regressions are accurate, and suggest campaigns take demand elasticity estimates into account in the ad-orientation choice decision.

We include the amount of negative and positive ads run by the opponent in the last week as regressors in the choice model, to see whether there is a "tit-for-tat" effects on the campaign's ad choices. We find all coefficients for the competitors' negative ads are positive and significant, while all coefficients for the competitors' positive ads are negative and significant. Since we are studying the campaigns' choice of negative ads (with the positive ad as the default option in the binary logit model), these estimates are of expected signs. They provide evidence that the competitive reaction to different ads influences campaigns' choice of negative ads.

We also include several additional regressors in the ad choice regression, to measure the influence that these factors have on whether a campaign will prefer to run a positive or negative ad. The regressors we include can be grouped as: campaign-specific factors (incumbency, days before the election), ads-specific factors (primetime showing and costs of showing each ad), and market-specific factors (income, minority, partisanship, education, and voter partisanship). We did not have consistent findings for the market-

specific factors (other than the voter choice elasticities as discussed above), but we find some interesting results for the campaign- and ad-specific factors.

First, we find that as the number of days before the election decreases, i.e. approaching the election date, negative ads are more favored. This suggests that campaigns tend to go more negative as the election draws closer, which is consistent with the observations in Ansolabehere and Iyengar (1995), who find that as the election date draws closer, the candidates in House election started showing more negative ads. Interestingly, in the Presidential election, as the date approaches the election, the Republican candidate (George W. Bush) and campaign preferred strongly to show negative ads, while the Democrat candidate (Al Gore) and campaign preferred to show positive ads. Although there was no incumbency in the 2000 Presidential election, Gore was the vice president for Bill Clinton, who was the US president for the previous 8 years and his tenure was widely considered to be successful. It seems plausible that Gore behaved like an incumbent and was more inclined to focus on these positive messages instead of attacking Bush, which could only increase awareness for the challenger. Additionally, our findings are also consistent with another observation in Ansolabehere and Iyengar (1995), more liberal voters react relatively more positively to positive ads, while conservative voters react more positively to negative ads in the Presidential elections.

Second, we find that as the costs for running negative ads increases, there is a higher chance that a negative ad is chosen in House elections, and a lesser chance that it is chosen in Senate and Presidential elections (although they are insignificant). This suggests higher spending is more associated with negative ads for the House elections.

Lastly, we find that as incumbency status has a negative effect on negative ads for the House and Senate elections. This suggests that incumbents are more likely to run positive ads in House and Senate elections, which are consistent with our findings in the voter choice models: incumbents' negative ads will only increase voter awareness of the challengers and hurt the incumbents in terms of votes.

The results from the advertising choice model further provide some interesting evidence on the campaigns' decisions of choosing negative ads, and we also find some support for the dependency of negative ad choices on voter choice.

5. Conclusion and Future Research

The results presented here provide compelling evidence for effects of negative advertising on voter choice, as well as for interacting effects of election-specific and individual-specific factors on the degree of sensitivity to negative ads. By modeling the decision made on the campaign side as well, we discover evidence of factors that influence campaigns' choices of positive and negative ads, and provide an additional degree of validation for the entire demand- and supply-side model.

The main result is negative advertising *positively* affects both the turnout and the likelihood of voting for the featured candidate in House and Presidential elections. However, the effect of negative advertising on turnout is larger in the Presidential election, while the effect on vote choice is larger in the House election. Character-based ads have similar effects. We find negative advertising interacts with candidate and voter characteristic. Higher interest and media exposure lead to higher voter turnout, and positive response to negative ads. Since voter involvement is different across elections, interaction effect between goodwill and negative ads is positive in the House elections, while negative in the Presidential election. Negative ads hurt the incumbent candidates and increase name recognition of the challenger. The advertising choice model reveals that campaigns' decisions to air negative ads are responsive to demand elasticities, and sensitive to competitors' airing of negative and positive ads. Interestingly, we also find the likelihood of airing negative ads increases as the election date draws closer.

There are several opportunities to extend this research. First, it is worthwhile to further examine the effects of positive advertising on voter choice, both in terms of main and interacting effects. It would be interesting to examine whether some explanations presented here for negative ads are applicable in the case of positive ads, and what the effects of positive ads on voter turnout and choice. Second, it is interesting to collect data from multiple elections, which would allow one to test for potential interacting factors that vary between election cycles. Time series data of voter and campaigns would also allow us to look at the dynamics of voter turnout and choices over time, and how they are affected by negative advertising from campaigns. Third, it would be instructive to use

other data points from the advertising data set to find additional election-specific interacting factors based on ad traits, such as the percentage of negative ads aired during prime time, specific issues mentioned in ads, and cost. Last but not least, we think some findings in our research are worth further investigation, and thus it warrants more analytical work on negative advertising. For example, it would be interesting to understand, in a game theoretical framework, under certain conditions (voter characteristics and competitive interactions), negative advertising can actually hurt candidates. It is also interesting to understand what the reasons (voters, competitors) are for a campaign to decide to go negative.

Table 1: Summary Statistics of Voter Data

	House	Senate	Presidential
Total # of obs (voters):	669	456	380
Vote choice:			
Democrat	0.28	0.39	0.44
Republican	0.35	0.31	0.32
Other (3rd party)	0.02	0.02	0.01
None	0.35	0.29	0.23
Attitudinal variables			
Interest: mean (stdev)			
Not Interested	0.21 (0.01)		
Somewhat Interested	0.50 (0.01)		
Extremely Interested	0.29 (0.01)		
Informed: mean (stdev)			
TV News (days/week)	3.10 (0.02)		
Newspaper (days/week)	3.67 (0.14)		
Recall (1 or 0)	0.79 (0.01)		
Partisanship	0.44 (.337)		
mean (stdev):			
Goodwill			
Unfavorable (0~50)	0.31	0.26	0.46
Favorable (50~100)	0.34	0.35	0.53
Cannot judge	0.35	0.39	0.01
Demographic variables			
Election:			
White	564	375	313
Minority	105	81	67
Years of education	.808 (.141)	.808 (.140)	.805 (.136)
mean (stdev):			
Income score	.219 (.126)	.215 (.129)	.223 (.137)
mean (stdev):			

* - 0-1 scale: 0 = strong Democrat, 0.5 = neutral, 1 = strong Republican.

Table 2: Summary Statistics of Ad Data

	House	Senate	Presidential
Democratic campaigns			
Total # of obs (ads):	87,917	33,604	45,147
Orientation:			
Negative	47,706	16,724	27,669
Positive	40,211	16,880	17,478
Timing:			
Primetime	81867	27701	37665
Non-primetime	6050	5903	7482
Ad cost mean (st dev):	729.44	713.42	823.1
	(1332.79)	(1030.25)	(1128.03)
Total # of character-focused ads	34,319	12,608	12,364
Orientation:			
Negative	13,155	3,821	5,570
Positive	21,164	8,787	6,794
Republican campaigns			
Total # of obs (ads):	81,892	35,165	46,808
Orientation:			
Negative	42,019	17,643	23,989
Positive	39,873	17,522	22,819
Timing:			
Primetime	70654	29814	39209
Non-primetime	11238	5351	7599
Ad cost mean (st dev):	687.75	741.51	807.73
	(1073.02)	(1050.84)	(1165.78)
Total # of character-focused ads	36,328	13,498	16,964
Orientation:			
Negative	17,995	4,514	9,548
Positive	18,333	8,984	7,416

Table 3: Voter Choice Regression Results

House Election

			Coefficient	t-statistics
Candidate Choice	**Democrat**	mean	**1.98**	5.23
		s.d	***1.70***	1.55
	Republican	mean	**2.21**	5.89
		s.d	0.79	1.01
	Neg Ads	mean	***0.03***	1.68
		s.d	0.01	0.23
		Income	-0.17	-1.35
		Minority	-0.06	-1.06
		Interest	-0.11	-1.34
		Informed	***0.02***	1.53
		Partisanship	***0.20***	1.82
	Pos Ads	mean	0.02	1.13
		s.d	***-0.03***	-1.47
	Incumbancy	mean	**1.22**	2.04
		s.d	-1.03	-0.96
	Incumbancy*NegAd	mean	***-0.06***	-1.72
		s.d	-0.12	-1.75
	Goodwill *NegAds	mean	**0.86**	2.74
		s.d	-0.22	-1.40
Turnout	**Intercept**	mean	**-2.16**	-4.33
		s.d	0.15	0.42
	Inclusive Value	mean	0.01	0.19
		s.d	-0.01	-0.14
	Income	mean	**5.13**	3.60
		s.d.	-1.63	-0.87
	Minority	mean	**-0.69**	-2.41
		s.d	-0.60	-0.86
	Interest	mean	**2.63**	6.65
		s.d	0.06	0.08
	Informed	mean	-0.02	-0.34
		s.d.	0.12	0.75
	Partisanship	mean	**1.10**	3.38
		s.d	0.29	0.43
	# of parameters			33
	# of observations			669
	Likelihood			-638.12

***bold: 95% significance level;**

***bold and italic: 90% significance level;**

Table 4: Voter Choice Regression Results

Senate Election

			Coefficient	t-statistics
Candidate Choice	**Democrat**	mean	**2.50**	3.22
		s.d	1.84	1.45
	Republican	mean	***1.34***	1.59
		s.d	***-2.70***	-1.55
	Neg Ads	mean	-0.06	-0.70
		s.d	0.02	0.54
		Income	***0.93***	1.72
		Minority	-0.10	1.21
		Interest	-0.03	-0.43
		Informed	0.00	0.18
		Partisanship	0.09	0.88
	Pos Ads	mean	0.02	0.77
		s.d	-0.02	-0.69
	Incumbancy	mean	***2.03***	1.81
		s.d	0.40	0.52
	Incumbancy*NegAd	mean	**-0.17**	-1.96
		s.d	0.27	2.00
	Goodwill *NegAds	mean	**0.84**	2.25
		s.d	**-0.45**	-2.10
Turnout	**Intercept**	mean	**-1.76**	-2.06
		s.d	0.72	0.95
	Inclusive Value	mean	0.10	1.02
		s.d	-0.05	-0.50
	Income	mean	**3.74**	2.36
		s.d.	1.78	0.60
	Minority	mean	-0.27	-0.54
		s.d	2.06	0.94
	Interest	mean	**3.03**	3.13
		s.d	0.24	0.12
	Informed	mean	-0.14	-1.48
		s.d.	-0.23	-0.50
	Partisanship	mean	-0.03	-0.06
		s.d	0.97	0.41
	# of parameters			33
	# of observations			456
	Likelihood			-431.91

***bold: 95% significance level;**

***bold and italic: 90% significance level;**

Table 5: Voter Choice Regression Results

Presidential Election

			Coefficient	t-statistics
Candidate Choice	**Democrat**	mean	**2.87**	5.04
		s.d	0.00	0.02
	Republican	mean	**2.22**	4.22
		s.d	-0.83	-0.82
	Neg Ads	mean	**0.08**	3.65
		s.d	***-0.02***	-1.88
		Income	**0.11**	2.02
		Minority	0.00	0.07
		Interest	**0.02**	4.51
		Informed	***0.01***	1.64
		Partisanship	-0.02	-1.04
	Pos Ads	mean	0.00	-0.12
		s.d	**-0.02**	-2.03
	Goodwill *NegAds	mean	**-0.17**	-2.48
		s.d	**0.16**	4.81
Turnout	**Intercept**	mean	**-9.77**	-9.29
		s.d	0.22	0.36
	Inclusive Value	mean	**2.07**	8.95
		s.d	-0.17	-1.22
	Income	mean	**6.27**	1.57
		s.d.	-0.71	-0.38
	Minority	mean	-0.20	-0.19
		s.d	-1.46	-1.25
	Interest	mean	**3.36**	2.18
		s.d	**-1.44**	2.58
	Informed	mean	-0.29	-1.18
		s.d.	-0.03	-0.15
	Partisanship	mean	1.05	0.98
		s.d	**1.73**	1.99
	# of parameters			29
	# of observations			380
	Likelihood			-335.96

***bold: 95% significance level;**

***bold and italic: 90% significance level;**

Table 6:
Decomposition of Effects of Negative Ads in Voter Turnout and Choice

Using the following two formulas, we could calculate the turnout and candidate choice elasticities to the amount of negative advertising.

The turnout elasticity is computed using the formula,

$$\frac{d\Pr(y=1)}{dNeg\_Ad_j}\frac{Neg\_Ad_j}{\Pr(y=1)} = \frac{Neg\_Ad_j}{1+\exp(u)}\frac{\exp(v_j)}{\sum_{j=1}^{J}\exp(v_j)}\gamma_1\beta_1$$

while the candidate choice elasticity is computed using the formula,

$$\frac{d\theta_j}{dNeg\_Ad_j}\frac{Neg\_Ad_j}{\theta_j} = \left[1-\frac{\exp(v_j)}{\sum_{j=1}^{J}\exp(v_j)}\right]Neg\_Ad_j\beta_1$$

Turnout

	House		Senate		Presidential	
	Turnout		Turnout		Turnout	
	D	R	D	R	D	R
Negative Ads	0.010	0.012	-0.044	-0.041	3.571	2.220
Positive Ads	0.012	0.013	0.4099	0.3174	-0.663	-0.526

Candidate Choice

	House		Senate		Presidential	
	Choice		Choice		Choice	
	D	R	D	R	D	R
Negative Ads	0.138	0.141	-0.021	-0.017	0.9269	1.6796
Positive Ads	0.114	0.119	0.197	0.254	-0.162	-0.399

Decomposition Between Turnout and Choice (%)

		House		Senate		Presidential	
		D	R	D	R	D	R
Negative Ads	**Turnout**	7%	8%	68%	71%	79%	57%
	Choice	93%	92%	32%	29%	21%	43%
Positive Ads	**Turnout**	10%	10%	68%	56%	80%	57%
	Choice	90%	90%	32%	44%	20%	43%

Table 7: Advertising Choice Model Results

Coefficients	House		Senate		Presidential	
	Democrat	Republican	Democrat	Republican	Democrat	Republican
Intercept	**2.23**	**-1.63**	**-1.10**	**-1.65**	-0.01	-0.09
Own Elasticity	**1.44**	**3.01**	**-0.77**	**-0.29**	**0.21**	0.02
Cross Elasticity	**-2.74**	**-1.90**	**0.18**	**-0.29**	**-0.22**	**-0.05**
Minority	**0.19**	**0.23**	**-1.21**	**1.47**	**-0.32**	-0.12
Education	**-6.64**	**-0.84**	-0.86	-0.01	0.42	-0.07
Income	**7.50**	0.50	-0.03	0.24	1.04	0.66
Days Before Election	**-0.02**	**-0.02**	-0.00	**-0.10**	**0.01**	**-0.06**
Incumbency	**-0.02**	**-0.05**	**-0.17**	**-0.19**	n/a	n/a
Primetime	**0.17**	**-0.24**	**-0.05**	**0.12**	0.04	0.05
Ad Cost	**0.05**	**0.22**	0.00	**-0.15**	-0.10	-0.14
Party ID	0.33	0.25	**1.33**	**2.37**	0.43	0.15
Competitor Last Week Positive Ads	**-0.10**	**-0.08**	**-0.07**	**-0.06**	**-0.04**	**-0.05**
Competitor Last Week Negative Ads	**0.07**	**0.07**	**0.09**	**0.20**	**0.18**	**0.16**
# of parameters	13	13	13	13	12	12
# of observations	87917	81892	33604	35165	45147	46808
Likelihood	-43746	-44132	-19501	-17364	-24414	-27976

***bold: 95% significance level**

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