All Style and No Substance?
The Strategic Calculus of Campaign Advertising*

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Abstract: We contend that the closer (further) incumbents’ policy choices in office are to the preferences of their voters the more (less) likely incumbents (challengers) are to advertise verifiable information about incumbent policy choices and the more likely incumbents (challengers) are to advertise messages without verifiable substance. We estimate a structural model of candidate advertising content choices using data from the 2000 Congressional elections based on a simple partial equilibrium model of the strategic choice of campaign advertising content in a two-candidate election with an incumbent. Our results largely support our predictions. We argue that our results show that formal models which either assume all advertising content is informative or uninformative miss an important empirically relevant strategic element of campaigns. Our analysis also suggests that limits on challenger campaign spending can decrease voter information and that public funding of challenger campaigns can increase voter information.

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Introduction

Understanding what is conveyed in campaign advertising to voters is fundamental to understanding the role of election campaigns in the political process and how campaign advertising affects voters’ choices. Without such an understanding, we can only speculate on the effects on voters and society in general of regulations on campaign finance such as limiting spending or public funding of campaigns. Existing theoretical research either ignores the issue or makes distinctly different assumptions about the content of campaign advertising and, as a consequence, generally draws starkly different conclusions about the effects of limiting campaign spending or public financing of campaigns. Specifically, formal models of campaign advertising’s content take two approaches: 1) the content provides voters with direct information about a candidate’s policy positions [Austen-Smith (1987), Hinich and Munger (1989), Bailey (2002), Coate (2003a), Ashworth (2003)]; or 2) the content does not provide voters with policy information but either directly adds some small utility to voters independent of policy by presenting the candidate visually, i.e. voters are impressionable or persuadable [Morton and Myerson (2003), Grossman and Helpman (1996)], or the expenditures or endorsements behind the ads are signals to voters on information about the candidates either policy or nonpolicy related, see Coate (2003b), Gerber (1996), Potters, Sloof, and van Winden (1997), Prat (2002), Wittman (2004a,b)).

The rationale for assuming that campaign advertisements’ content is not informative about policy rests on two contentions: 1) casual empirical observation suggests that many ads are mostly vague on issues and issues are often not mentioned and 2) since candidates’ speech is protected constitutionally and they cannot be prosecuted for broken promises, then campaign messages are not credible [Prat (2002), p. 100]. On the other hand, theorists who assume that ads’ content is informative about policy make

1 Many formal theoretical models of campaign advertising black-box the effect it has on voters and focus instead on the strategic game between candidates and contributors, assuming that more money spent in campaigns leads to more votes without explicitly modeling how that influence works [see Morton and Cameron (1992) and Austen-Smith (1997) for reviews].
opposite arguments: 1) empirical analysis of campaign ads shows that policy issues are discussed in a large number of ads [Jamieson (1996), West (2000), Vavreck (2001), and Spillotes and Vavreck (2002)] and 2) interested third parties such as the news media have an incentive to “police” campaign ads for truthfulness, allowing for them to be credible [Coate (2002), pages 5-6].

Whether campaign advertising’s content is informative to voters about candidate policy positions has implications for the social welfare consequences of campaign finance reform. Most theoretical models that assume the content is uninformative about policy find that limiting contributions can increase social welfare, while analyses that assume the content is informative about policy suggest that limits can reduce social welfare. Part of the reason has to do with what contributors gain from contributions in these models; models where advertising’s content is informative on policy typically assume that contributors give to elect while those which assume advertising’s content is not informative on policy issues assume that contributions are given for special non-policy private favors or services. These results make intuitive sense – when campaign advertising’s content is informative about policy and contributors are giving to elect candidates based on policy then limiting how much candidates can spend can reduce the

2 For a recent example of such policing, see Jim Rutenberg, “Campaign Ads Are Under Fire for Inaccuracy,” The New York Times, Tuesday, May 25, 2004. Others theorize that simple campaign ads that appear not that directly informative convey cues or shortcuts that voters use to infer candidate policy positions from what appear to be low information messages [Downs (1957), Popkin (1991), Riker (1998)].

3 Wittman (2004a,b) and Ashworth (2003) are exceptions. Wittman (2004a,b) models advertising with uninformative content as financed by contributors giving for policy motivations and contends that voters infer the motives behind advertising with uninformative content and thus are able to update on policy so that the advertising improves social welfare. Ashworth (2003) assumes that advertising with informative content is paid for with private services or favors and finds that public financing of campaigns can have both positive and negative effects on social welfare.
information that voters have about candidate policy positions and makes it more difficult for voters to choose the candidate they most prefer. When campaign advertising’s content is uninformative about policy and at best provides voters information indirectly and contributions are generated by giving out special private favors, then limiting contributions reduces how many private favors candidates give out which are seen as costly to society without affecting voter information about candidate policy positions significantly, therefore not affecting much the likelihood voters choose candidates close to them ideologically.

In this paper we make a number of contributions to the theoretical and empirical debate over how campaign ads affect voters. First we note that campaign advertising’s content varies by the degree of policy information provided and the number of appeals to non-policy aspects of voter utility, what we call “style” messages. Style messages can take various forms, as often noted, many campaign ads emphasize candidate qualities or abilities that all voters’ generally value such as honesty, integrity, intelligence, etc., (typically called valence issues) or they may emphasize an area that all voters care about while not explicitly taking a position on the issues, e.g. “I support better education for our children.”

Using extremely simple and straightforward assumptions about voter utility and candidate competition, we point out what is fairly obvious – that if we assume that candidates can send credible policy messages about the incumbents’ and challengers’ records that are constrained to be truthful, i.e. advertise substance, (as is assumed in models where campaign advertising’s content is informative) as well as messages that contain non-policy elements that voters also value, i.e. style, incumbents will strategically choose whether to emphasize substance or style depending on how close their policy positions are to the median voters in their electorates and the degree of competition they face. Specifically, we contend that incumbents who have chosen policy positions close to their median voters are more likely to convey informative messages about their positions that are verifiable and that those who have chosen policy positions far from their median voters are more likely to emphasize style. Challengers have the opposite incentives.
We then estimate a structural model based on the theory using data from campaign advertising decisions made by incumbents and challengers in the 2000 Congressional elections. We find that as predicted, incumbents’ whose past policy positions are far from the ideal points of their respective median voters are significantly less likely to advertise verifiable policy positions and more likely to advertise style. We find that challengers are more likely to advertise verifiable information about the incumbents’ past policy choices the further those choices are from their voters’ preferences.

The next section reviews the relevant previous formal theoretical and empirical literatures, section three presents the model that serves as the foundation of our empirical analysis, data and estimation issues are discussed in section four, section five contains the empirical results, and section six concludes.

**Relevant Literature**

**The Formal Literature on Campaign Advertising and Voters**

Many models of campaign advertising black box how the advertising affects voters [see for example Snyder (1989), Baron (1989)]. The first attempt to get inside the black box formally assumed that campaign advertising’s content provided voters with information about a candidate’s true policy position by reducing voter uncertainty [see Austen-Smith (1987), Hinich and Munger (1989), Bailey (2002)]. However, since voters were assumed to know *a priori* the expected policy position of the candidates (i.e. they know the distribution of possible positions), which was assumed equal to the true position, voters could figure out the true positions based on that knowledge without the campaign ads. Coate (2003a) and Ashworth (2003) provide models with informative campaign advertising content that avoid this difficulty. In the equilibria in Coate’s model parties mix in choosing between candidates who are moderate and extreme on policy and Ashworth assumes an exogenous draw between moderate and extremist candidates. Thus campaign advertising that conveys truthful information on actual candidate policy positions can increase voter knowledge and utility.

An alternative approach to campaign advertising has assumed that such ads’ content is largely uninformative – either campaign advertising of the winning candidate is assumed to add some small
utility to the voter independent of policy, i.e. voters are impressionable [see Morton and Myerson (2003), Grossman and Helpman (1996)]; or the amount of money spent on campaign advertising provides voters with a signal of candidate abilities (a valence issue) which voters value independent of policy and is generally unknown to voters [see Gerber (1996), Potters, Sloof, and van Winden (1997), Prat (2002)]. Simon (2002) is an exception, he assumes that campaign advertising’s content affects the weights that voters place on different policy issues such that candidates can increase voters’ likelihood of supporting them by emphasizing in ads those policy issues where they are closest to voters. Another hybrid model is Coate (2003b) where candidates use advertising content to directly provide valence information on abilities (candidate quality). To our knowledge, no previous formal work exists which endogenizes how much and what type of information candidates reveal in their advertising.

The Empirical Literature on Policy in Campaign Ads

While the formal literature on whether advertising’s content is informative to voters about policy positions of candidates is a bit agnostic, the empirical literature is more suggestive of policy-oriented than non-policy advertising content. Jamieson (1996) analyzes prominent ads from presidential elections 1952 to 2000 and finds that policy issues are more prevalent than messages relating to a candidate’s personal qualities (e.g. leadership, trustworthiness, compassion). West (2000), in a study of the 2000 election, found that 60% of ads contained messages pertaining to domestic policy matters and only 31% mentioned a candidate’s personal qualities. Spillotes and Vavreck (2002) in a study of over 1,000 ads by 290 candidates in 153 elections in 37 states in 1998 find that in 92% of the ads candidates mentioned issues and 52% of the ads were predominantly issue driven. Although most of the discussion of issues was vague according to their analysis, a significant minority, 32%, of the candidates made at least one ad that could be classified as adopting a specific position on an issue.

With all the talk about policy in campaign ads, is there evidence that these ads actually inform voters? Early work by Atkin, et al (1973) and Atkin and Heald (1976) found that voters were more likely to be informed about candidates if they had seen television ads. Brains and Wattenberg (1996) find that survey respondents who recall campaign advertisements are more likely to know a candidate’s issue
positions, relative to those who read newspapers or watch television news. Given that campaign ads do sometimes contain policy information and that some evidence exists that voters gain information from these ads, the presumption that campaign advertising is all style by some formal modelers is problematic. However, since ads do sometimes focus more on style than substance, the assumption that all ads are informative on policy is also suspect. The evidence that ads vary in their substantive and stylistic content suggests that candidates make a strategic choice in choosing how much substance to place in their ads.

To our knowledge little previous empirical research has examined the strategic choices candidates make in advertising. Vavreck (2001) using data on 1998 elections focuses on the strategic choices candidates make in conveying simple party or ideological cues to voters in campaign ads – under the assumption that voters use these cues to infer policy positions as discussed in Downs (1957), Popkin (1991), and Riker (1988). She finds surprisingly that only approximately one-third of candidates use a party label in any of their ads, although challengers are slightly more likely to, which makes sense if we consider that voters are less likely to have knowledge about challengers prior to a campaign, so party labels may be more meaningful for them and challengers don’t have as extensive a policy record to serve as a basis for advertisements. She determines that incumbents are 12% more likely than challengers to use specific issue rhetoric, which seems to suggest more discussion of substance by incumbents. Interestingly, Vavreck also discovers some evidence that all candidates use party labels strategically in that candidates are less likely to use them in open primaries where voters do not need to be affiliated with a party to participate and the candidates want to reach voters whose preferences may be at variance with the average party member. While suggestive that candidates are using information strategically, Vavreck

\[4\] Snyder and Ting (2002) formalize how party labels may serve as an information shortcut to voters in elections. Sillioites and Vavreck (20002) use the same data to consider how party influences which issues candidates discuss in their ads and the positions they take. They find evidence that candidates from different parties do choose to emphasize different issues and policy positions in campaign advertising. Simon (2002) provides similar evidence of issue emphasis divergence.
does not consider the determinants of when candidates choose to provide more informative, verifiable messages, versus messages that are all style.

**A Simple Model of Advertising Style and Substance**

**Assumptions**

Our purpose in theorizing about candidate strategy in advertising is to provide a simple partial equilibrium model that we can use straightforwardly in an empirical analysis of candidate advertising choices in the 2000 Congressional election. Our analysis is partial equilibrium in that instead of deriving explicitly voter expectation formation, we instead make assumptions about how these expectations are a function of candidate advertising which we argue are general and reasonable. We see our empirical analysis as providing basic information that can inform future, more theoretically satisfying, general equilibrium modeling on campaign advertising and as such worth the cost of taking a simplistic, partial approach. Our belief is that such an approach has value in that it allows us to move directly to our empirical analysis, which is, we contend, our main contribution.

**Candidates and Policy**

We assume that there are two candidates in a winner-take-all election, $D$ and $R$, who are distinguished by their respective policy positions, $x_D$ and $x_R$, in a unidimensional policy space. The two candidates are from different political parties and can be of two types, extremists or moderates.\(^5\) The extremist position for the $D$ candidate is given by $-1$ and the extremist position for the $R$ candidate is 1. The moderate position for both candidates is equal to 0. We will focus our theoretical and empirical analysis on non-openseat races, i.e. where one of the candidates, specifically $D$, is an incumbent. *Ex ante* the probability that $R$ is moderate or extreme is $.5$. Reflecting the fact that the incumbent has already been through a prior election process, we expect that she may be perceived by voters as more likely to be moderate, thus the probability $D$ is moderate is assumed to be given by $\pi$, $.5 < \pi < 1$.\(^6\)

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\(^5\) This is similar to the assumption in Ashworth (2003) and the equilibrium prediction in Coate (2003a).

\(^6\) See Ashworth (2003) for theoretical justifications for this assumption.
Candidates know their own types. We assume that nature provides two signals, \( \theta_D \) and \( \theta_R \), about the candidates’ true types. Both candidates are assumed to observe both signals. We assume that the signal is a function of the candidate true type, her political experience, and whether she is an incumbent i.e. \( \theta_j = h(x_j, q_j, I) \), where \( q_j \) represents the political experience of candidate \( j \), \( 0 \leq q_j \leq 1 \) (we use female pronouns for candidates and male pronouns for voters), and \( I = 1 \) if the candidate is the incumbent, 0 otherwise. It is possible for a challenger to have political experience equal to an incumbent, for example in the elections of 2000 former Congressman Scott Baesler faced incumbent Ernie Fletcher, having earlier resigned his seat to run for the Senate. However we assume that \( q_D \geq q_R > 0 \) or \( q_D > q_R = 0 \). We assume that voters know the political experience of the candidates. We assume that if the challenger has no political experience her signal is 0.5 and that the likelihood of receiving a signal of zero (one) if a candidate is a moderate (extremist) is increasing at a decreasing rate in her political experience. These assumptions are summarized below:

\[
\begin{align*}
h(0,0,0) &= .5 \\
\text{If } 0 < q_j \leq 1, \ h(0,q_j,:) &= 0 \text{ and } h(1,q_j,:) = 1 \text{ with probability } p(q_j) \\
h(0,q_j,:) &= 1 \text{ and } h(1,q_j,:) = 0 \text{ with probability } 1 - p(q_j) \\
p(0) &= 0.5, 0.5 \leq p(q_R) < 1, .5 < \pi < p(q_D) < 1, \ \frac{\partial p}{\partial q_j} > 0, \ \frac{\partial^2 p}{\partial q_j^2} < 0
\end{align*}
\]

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7 A possible generalization of the model is to assume that candidates must pay a cost to acquire the signals on their opponents and that cost.

8 Obviously, if voters do not know a candidates’ political experience, then a candidate may need to advertise this as part of her advertisements providing verifiable information on her policy type if the candidate wishes to reveal her signal and may have an incentive to hide such experience as well if she wishes to hide verifiable information on her policy type.
Campaign Advertisements

Before the election candidates choose whether to advertise the $\theta_j$’s, or what we call substance. If candidate $j$ advertises $\theta_j$, we call this advertising “positive substance” about her record and if candidate $j$ advertises $\theta_k$, we call this advertising “negative substance” about her opponent’s record. We assume that the candidates will not provide false information about the $\theta_j$’s since it is verifiable and the cost of lying about the signal is immediate loss of the election. If candidate $j$ is the incumbent in Congress we can think about the signal as how she voted in Congress on certain bills or information about legislation that he or she supported. The signal is imperfect because voters do not know precisely how the incumbent’s vote translates into an actual policy outcome. If candidate $j$ is not an incumbent, we can think of the signal as choices she has made in lower level elected office or in life prior to running for office, which provides some verifiable information on her record on policy issues in the past. For example, candidate $j$ may have previously served in the state legislature and voted on a bill increasing public school teacher salaries, which she or her opponent may mention in an ad, depending on whether education funding increases are considered desirable by voters or not. Or candidate $j$ might advertise that she has previously held a position as a public elementary school teacher and in that capacity lobbied for higher public school teacher salaries. Clearly, the less political experience a candidate has the less likely her signal will be very informative. Thus, we assume that the probability of a signal being informative (i.e. $p(q_j)$ either close to 0 or close to 1) is increasing in a candidate’s political experience at a decreasing rate.\footnote{It may be that political experience for legislators and some other elected officials decreases the quality of the signal since as the number of years that a legislator has served in office may lead to more conflicting evidence about her type due to strategic voting and other strategic behavior in office. We capture this possibility by assuming that the effect of experience on the quality of the signal is increasing at a decreasing rate.}
Each candidate also chooses whether to advertise stylistic messages without substance emphasizing either non-policy valence issues by showing her family or people who verify that they “trust” her “honesty” or discussing ways in which she has demonstrated “courage” or “compassion.” Stylistic advertisements might also contain non-verifiable policy statements that are designed to show empathy with voters without providing particular instances of past policy choices such as “I support helping educate our students” without mentioning a particular bill or type of educational measure or any verifiable actions she has taken in the past to prove such support. That is, she could mean “helping educate” by funding a voucher program that school teachers dislike or by raising public school teacher salaries, the voter is uncertain, yet gets some utility from the statement in support of education in a general sense. These advertisements are designed to appeal to psychological attachments that voters may have for candidates that are independent of their policy positions. We denote the number of ads candidate $j$ broadcasts with positive substance as $S_{jj}$, the number of ads she broadcasts with negative substance as $S_{kj}$, and the number of ads she broadcasts with only style as $V_j$. We assume that the price of all ads is equal to 1.

A candidate cannot be certain that the voter will see the signal or stylistic message if she advertises. That is, candidates have only probabilistic information about when the voter watches television and is likely to see an ad. We assume that the probability that a voter sees an ad with substance about candidate $j$’s record broadcast by candidate $j$ is given by $f(S_{jj})$, similarly the probability that a voter sees an ad with substance about candidate $j$’s record broadcast by candidate $k$ is given by $f(S_{jk})$. We assume that $f'>0$, $f''<0$, $f(0)=0$, $f(\infty)=1$. Correspondingly, we assume that the probability that a voter sees an ad with style about candidate $j$ is given by $f(V_j)$.

Advertising Budgets

We assume that candidate $R$ has an advertising budget net of the fixed costs of advertising which is a function of her political experience as follows: $B_R(Y_R,q_R) = Y_R + g(q_R)$. We can think of the available
monies based on political experience, $g(q_R)$ as arising from contributions from individuals receiving private, non-policy, favors or services as in Grossman and Helpman (1996), Prat (2002), Morton and Myerson (2003), which are independent of the candidates’ signals. The budget increases in challenger political experience as challengers with experience are more able to provide favors to contributors during the election campaign (i.e. the services or favors are not contingent on winning). We thus assume that these contributors do not give for anticipated services since there is it is not possible for the candidates to credibly commit to such promises in the future, thus they are independent of the probability that $R$ wins.

$Y_R$ is the amount of advertising money that $R$ has due to her personal wealth and connections (i.e. money she can raise from family and friends both business and otherwise due to her non-political connections) and contributions she receives from her political party both national and state. We assume that the contributions that $R$ receives from the political party may be related to the signals the candidates have received, but that that relationship is not distinguishable by the voter since it is largely determined by factors in other races and other jurisdictions unknown to the voter, and thus for the purposes of our analysis is independent of the candidates’ signals. That is, while the party may see $R$ as more electable if she has a moderate signal and $D$ has an extremist one, the party may also prefer to spend more resources on extremist candidates in other races because the party prefers extremists to moderates. Or for reasons independent of the candidate’s type, the party may choose to allocate more or less money to her because she has not supported the party in nonpolicy ways. For example, in 1990 the Democratic party refused to give challenger David Worley the same level of support given to other viable candidates because he attacked Republican incumbent Georgia Congress member Newt Gingrich for voting for a Congressional pay raise and Democratic party leaders had signed a pact with Republicans agreeing not to make the pay raise a campaign issue [Worley received only $5,000 in the last week before the election from the Democratic party although he had received $50,000 when he ran in 1988]. Worley was unable to run any television ads, yet came very close to winning (lost by 983 votes), and experts argued that a campaign ad
might have made a difference.\textsuperscript{10} Thus even challengers who might appear to be electable can be constrained by an advertising budget independent of that electability.

We assume that the incumbent, in contrast, has an advertising budget that is for the purpose of our analysis unlimited because she can always provide favors and services while in office and her party is willing to give her resources sufficient to win if necessary reflecting the fact that the party organization is largely controlled by incumbent elected officials.\textsuperscript{11}

\textit{Voter Preferences}

We encapsulate the electorate by assuming a representative voter who cares primarily about policy and whose ideal point over policy is 0. Thus, the representative voter prefers moderate candidates to extremists and views all extremists as equally bad (his preferences are symmetric). We assume that the voter receives some additional utility from seeing campaign advertising that is stylistic. Finally we assume that the representative voter’s utility is reduced by seeing any ad by a candidate because the voter perceives that candidate advertising indicates that the candidate may be providing contributors with private favors or services to contributors and the voter is assumed to perceive these are “bads” or simply

\footnote{Dahl, David, “Democrats’ alliance with Gingrich was costly,” \textit{St. Petersburg Times}, Friday, November 9, 1990. One might argue that the closer the partisan divide within the country the more likely the voter will perceive that the size of these monies could reflect electability and thus the candidates’ signals and as such the voter could update based on the size of candidate spending the voter observes.}

\footnote{Basically we assume that incumbents always have access to enough resources to make a contest competitive. Our results are supported by the reality that incumbents typically win general elections and if they lose, do so in close races. In the 399 non-openseat races in 2000 we examine in the empirical section only six incumbents were defeated and on average the defeated incumbent received 47\% of the vote (the lowest percentage received was 44\% by California Republican incumbent James Rogan to 53\% received by the challenger).}
the voter dislikes the fact that money is being spent on the electoral process in general. The representative voter’s utility function is thus given by:

\[ U(x_j, V_j, A_j) = -x_j + wV_j - zA_j \]  

(1)

where \( V_j \) is equal to 1 if a voter observes a stylistic ad by candidate \( j \), 0 otherwise; \( A_j \) is equal to 1 if a voter observes any ad by candidate \( j \) (whether stylistic or providing positive on candidate \( j \) or negative substance on candidate \( k \)), 0 otherwise; \( w \) is the additional utility that the representative voter receives from seeing a stylistic message about the winning candidate, and \( z \) is the reduction to voter utility from the fact that the candidate has given private favors or services to pay for her advertising. We assume that \( 1 > w > z > 0 \).

Note that we assume that the voter only receives positive utility from campaign advertising directly if it is non-substantive in order to capture the idea that such messages are designed to appeal to voters’ psychological attachments or empathy for candidates. Our assumption is that campaign advertisements, due to constraints on their lengths, cannot provide both types of messages at the same time. Obviously, sometimes candidates do combine both types of messages, providing some substance as well as style. One way to think of our assumption is that such combined messages are actually divisible into two messages, one style only and one substance only, which are broadcast simultaneously.

We assume that the representative voter will choose the candidate who provides him with the highest expected utility and if the voter is indifferent, he will vote for the incumbent. That is, the representative voter will choose as follows:

Vote for \( D \) if:

\[ -\Pr(x_D = -1|\theta_D^o) + wV_D^o - zA_D^o \geq -\Pr(x_R = 1|\theta_R^o) + wV_R^o - zA_R^o \]

Vote for \( R \) if:

\[ \Pr(x_R = 1|\theta_R^o) - \Pr(x_D = -1|\theta_D^o) + w(V_D^o - V_R^o) - z(A_D^o - A_R^o) \leq 0 \]  \( 0 \)

(2)
Where $\theta_j^o$ is a measure of whether candidate $j$’s signal is observed by the voter, if $\theta_j$ is unobserved,

$\theta_j^o = \emptyset$, if observed $\theta_j^o = \theta_j$.

**Voter Expectations**

Much of the voter’s choice and consequently the candidates’ advertising strategies depend on the voter’s expectations of the candidates’ types given these strategies. Our emphasis in the model is on candidate advertising choices where we allow for voters to be influenced by such advertising. Given our focus in this paper on candidate choices and the desire to present a simple, partial equilibrium model that can be used as a basis for empirical analysis of candidate advertising choices, as noted above, voter expectations are not derived explicitly using fully rational voters with common knowledge of the model, but assumed to respond in reasonable ways to political advertising by candidates. Our assumptions are general (permit a wide range of voter beliefs) and allow us to move directly to our empirical analysis, which we see as our main contribution. We formally present these assumptions about voter expectations in the Appendix and summarize them below.

The voter is assumed to use Bayes Rule to update new information. As shown in the appendix, because the voter believes there is a greater than 50% chance that an incumbent is a moderate, when the incumbent’s signal is revealed as moderate (extremist) the voter’s posterior probability that the incumbent is a moderate (extremist) is higher than the voter’s posterior probability that the challenger is a moderate (extremist) if the challenger’s signal is revealed as moderate (extremist) even if both the incumbent and challenger have equal levels of political experience. We assume that although candidates know their own type and the type of their opponent, they do not condition their signal revelation decisions based on their type.

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12 For an example of other recent theoretical work where voters are less than fully rational and their behavior is summarized by assumptions see Bendor, Diermeier, and Ting (2003).
type or their opponent’s type.\textsuperscript{13} That is, a true extremist who receives a moderate signal is assumed to be as likely to reveal that signal as a true moderate and a candidate who knows her opponent is a true moderate but has received an extremist signal about her opponent is as likely to reveal her opponent’s extremist signal as she would if she faced a true extremist opponent. Therefore, the choice to reveal a signal does not reveal more information about a candidate’s true type than is contained in the signal itself.\textsuperscript{14} Obviously, if candidate $R$ has no political experience the signal is uninformative and the voter’s posterior probability that she is a moderate is equivalent to his prior probability, i.e. 0.5.

Since candidates may strategically choose not to reveal their signals, then the voter’s posterior probability that a candidate is a moderate or extremist if a signal is not observed, $\Pr(x_j|\Theta^*_j = \emptyset)$, is a function of the other advertising voters observe. We assume that these probabilities are such that: 1) if the voter sees a style ad from a candidate he perceives the probability that the candidate is an extremist is greater than or equal to the probability she is an extremist if the ad is not observed, ceteris paribus, and this perception is not decreasing in the candidate’s political experience reflecting the fact that the signal is more informative as political experience increases; 2) if the voter sees a style ad from a candidate’s opponent he perceives the probability that the candidate is an extremist is less than or equal to the probability she is an extremist if the ad is not observed, ceteris paribus, which is not increasing in political experience; 3) if the voter sees a positive substance ad from candidate $j$, he perceives the probability that candidate $k$ is an extremist is less than or equal to the probability $k$ is an extremist if the ad is not observed, ceteris paribus, also not increasing in political experience; and 4) if the voter sees a negative substance ad from the candidate $j$, he perceives the probability that $j$ is an extremist is greater than or

\textsuperscript{13} This is equivalent to allowing them to condition on their type but restricting our analysis to babbling equilibria only.

\textsuperscript{14} Essentially the assumption is that there is no way for a candidate to reveal more information about his or her true type than is possible through revelation of the signal.
equal to the probability $j$ is an extremist if the ad is not observed, ceteris paribus, also not decreasing in political experience. Finally, we assume that voters perceive that positive substance by an incumbent and negative substance by a challenger are more likely than positive substance by a challenger and negative substance by an incumbent (because information on an incumbent is more informative given that voters know the incumbent is more likely to be a moderate than a challenger).

**Challenger’s Optimization Problem**

In order to explore the candidates’ optimization problems, we define:

$$
E(NU) = \Delta + w \left( E(V_D^w) - E(V_R^w) \right) - z \left( E(A_D^w) - E(A_R^w) \right),
$$

where $\Delta = E \left[ \Pr(x_R = 1|\theta_R^w) - \Pr(x_D = -1|\theta_D^w) \right],

E(V_j^w) = f(V_j), \text{ and } E(A_j^w) = f(V_j) + \left[ 1 - f(V_j) \right] \left[ f(S_{jj}) + f(S_{kj}) - f(S_{jj})f(S_{kj}) \right]$. $\Delta$ is the expected difference in the voter’s posterior probabilities which depends on advertising strategies (see Appendix), which we will call the “expected relative extremism,” and $E(NU)$ stands for the “expected net utility” the voter receives from the election of $D$. Define: $\Delta_j = \frac{\partial \Delta}{\partial f(V_j)}$, $\Delta_{jj} = \frac{\partial \Delta}{\partial f(S_{jj})}$, and $\Delta_{jk} = \frac{\partial \Delta}{\partial f(S_{jk})}$. We show in the appendix that from our assumptions about voter expectations that these marginal effects on the expected difference have the following signs:

$$
\begin{align*}
\Delta_D &\leq 0 \text{ and } \Delta_R \geq 0 \\
\Delta_{DD} &\geq 0 \text{ and } \Delta_{DR} \geq 0 \text{ if } \theta_D = 0, \Delta_{DD} \leq 0 \text{ and } \Delta_{DR} \leq 0 \text{ if } \theta_D = 1 \\
\Delta_{RD} &\leq 0 \text{ if } \theta_R = 0, \Delta_{RR} \geq 0 \text{ if } \theta_R = 1 \\
\Delta_{DD} &> \Delta_{RD} \text{ if } \theta_D = 0 \text{ and } \theta_R = 1, \text{ } \Delta_{DR} < \Delta_{RR} \text{ if } \theta_D = 1 \text{ and } \theta_R = 0
\end{align*}
$$

These signs mean that revealing signals have reasonable effects on expected relative extremism. We also show in the appendix that these effects of changes in the probabilities of seeing an ad of a particular type on expected relative extremism are constants, i.e. $\frac{\partial^2 \Delta}{\partial f()}^2 = 0$.

We assume that if the challenger, $R$, has a sufficient budget to cover her fixed costs of advertising, then she chooses $S_{RR}$, $S_{DR}$, and $V_R$ to minimize $E(NU)$, subject to $B_R$. In effect our assumption is that $R$’s only priority is for the voter to receive the most net utility from $R$’s winning as
possible. Interestingly, it may not be optimal for the challenger to use all her potential advertising budget. For example, suppose that the voter knows that given the challenger’s political experience and the weight the voter places on style in his utility function that if the challenger had a moderate signal, she would prefer to advertise that signal over advertising only style (i.e. the weight on style is relatively low for the voter compared to voter utility from policy). If the challenger has an extremist signal, however, then the challenger would not want to advertise her signal, but if she advertises style instead of the signal and the voter sees the ad, the voter updates regardless that the challenger has an extremist signal since the voter knows the challenger would have advertised a moderate signal if the challenger had one, and given that the probability of the voter seeing an ad is a function of the number of ads of that type run, the voter knows that the challenger is likely to have aired more style ads than substance ads when she sees the style ad. The optimal strategy for the challenger may be not to advertise at all rather than to advertise either style or substance since not observing an ad is possible even when the challenger has a moderate signal and while the voter may think it is likely the challenger has an extremist signal if she doesn’t see an ad, she cannot be sure that is the case. The challenger with the extremist signal can pool by not advertising. Thus challengers may not always spend all of their budgets, yet are constrained by their budgets. We formally represent the challenger’s optimization problem in the appendix.

**Incumbent’s Optimization Problem**

Since the incumbent is already in office, she must balance out being re-elected with other goals that she would like to meet. That is, in order to campaign she would have to gather resources and otherwise take time away from other activities related to her position as an incumbent. Moreover, she knows that without a campaign the voter will choose her since she knows the voter knows that the probability that she is a moderate is greater than the challenger’s probability of being a moderate with no campaign. Thus, we assume that the incumbent wishes to minimize $B_D = S_{DD} + S_{RD} + V_D$ subject to the
constraint that the she wins $E(NU) \geq 0$.\footnote{The qualitative results of our analysis remain the same if we assume that the constraint is that $E(NU)$ is greater than or equal to some positive constant if the incumbent’s goal is to win by a given percentage.} We formally represent the incumbent’s optimization problem in the appendix.

Of course, since the two candidates are choosing simultaneously, the optimal strategies for each candidate are functions of the strategies of her opponent, and an equilibrium exists when each candidate is choosing optimally given the choices of her opponent and voters are forming expectations about candidate types rationally according to the assumptions given above.

**Theoretical Predictions**

Now that we have set up the model, we provide some general findings about the types of campaign advertising decisions we expect candidates to make if they advertise (see appendix for proofs).

**Result 1:** Candidate $j$ will never advertise $\theta_j = 1$ or $\theta_k = 0$. Therefore, if both candidates receive moderate signals, all substantive advertising will be positive, if both candidates receive extremist signals, all substantive advertising will be negative.

**Result 2:** If candidate R has sufficient campaign funds to satisfy the fixed costs of advertising, R will advertise style if the utility benefits from seeing a style ad for the voter, $w - z$, exceeds the possible effect seeing such an ad may have on expected relative extremism, $\Delta_{RR}$.\footnote{Recall that greater relative extremism means that the voter thinks the probability is greater that R is an extremist than the probability that D is an extremist, so increases in relative extremism hurts R and benefits D.} R will advertise positive substance if she has political experience, a moderate signal, and the beneficial effect for R of the voter seeing such an ad on expected relative extremism, $-\Delta_{RR}$, exceeds $z$. R will advertise negative substance if D has an extremist signal and the beneficial effect of seeing such an ad on expected relative extremism, $-\Delta_{DR}$, exceeds $z$. R will advertise more style than positive (negative) substance if the direct utility benefits of
seeing a style ad minus the effect on expected relative extremism of seeing a style ad exceeds the effect of seeing a positive (negative) substance ad on expected relative extremism, i.e. $-\Delta_{RR} < w - \Delta_{R} (-\Delta_{DR} < w - \Delta_{R})$. R advertises more negative than positive substance (if advertising both is optimal).

**Result 3**: If candidate R advertises, candidate D will respond if, given R’s optimal advertising strategies, $E(NU) < 0$ and D does not advertise. If D does advertise, D will choose advertising strategies such that $E(NU) = 0$ given R’s optimal advertising strategies. D will advertise more style than positive (negative) substance if the direct utility benefits of seeing a style ad minus the effect on expected relative probability of extremism exceeds the effect of seeing a positive (negative) substance ad on expected relative extremism. $\Delta_{DD} < w + \Delta_{D} (\Delta_{RD} < w + \Delta_{D})$. D advertises more positive than negative substance (if advertising both is optimal).

The logic behind the first result is that candidates can only benefit from advertising a signal that either decreases (increases) the probability the voter thinks she (her opponent) is an extremist. As a consequence, only one candidate will advertise a given signal (although one candidate may advertise more than one signal). The second and third results follow from solving for the optimal strategies of the candidates as shown in the appendix. Essentially, since advertising can both directly reveal a signal and/or possibly indirectly reveal to voters information on signals unseen, candidates need to weigh the positive benefits from advertising either style or substance with the possible negative effects such an advertisement might have on voter beliefs about what has not been revealed to them. If the positive benefits from advertising exceed the negative ones, then candidates will choose to advertise. When candidates have a choice between style and substance (i.e. when it benefits them to reveal either their own signal and/or their opponents), they will balance their advertising strategies such that the marginal effects across advertising choices are equivalent. Table 1 summarizes the optimal candidate strategies from Results 1-3 if advertising is an equilibrium strategy for both candidates.
Our simple model suggests that limiting campaign spending of challengers can reduce the voter’s utility if it means a reduction in the number of substantive campaign ads. This follows because if the voter is more informed, able to discern the values of the signals, then he is better able to choose the moderate candidate if one candidate is moderate and the other extremist, leading to greater voter utility after the election. If challengers are limited in their spending they are less likely to advertise signals and advertise less, thus the probability that a voter sees a challenger ad is lower. This can reduce the voter’s ability to discern when an incumbent has an extremist signal and result in a greater probability that the voter will mistakenly vote for an incumbent who is an extremist instead of a moderate challenger. Campaign spending limits then can reduce voter information and consequently voter utility if candidates do strategically reveal information about their record or their opponent’s and limiting spending reduces the number of substantive ads they broadcast. Similarly, public financing of challenger campaigns can have the opposite effect. Thus, whether campaign finance limits and public financing are good for voters depends on whether there is empirical evidence that candidates strategically convey substantive information about policy records in campaign advertising. If we find evidence that candidates do convey information strategically, then limiting their ability to convey information can leave voters less informed and helping them finance conveying information can make voters more informed. In the next section we consider whether such evidence exists.

Data and Estimation Issues

Advertising Data

In order to empirically test the predictions from our model, we examine the advertising strategies of incumbents and challenges in non-openseat races in the 2000 congressional elections in the continental United States. The data containing the broadcast and content information of an ad is from the Campaign Media Analysis Group (CMAG). The information for this data set was gathered by Competitive Media Reporting (CMR), and more specifically, the company’s “Ad Detector” product. In 2000, this system monitored the satellite transmissions of the national networks (ABC, CBS, NBC, and FOX), as well as 25
national cable networks such as CNN, TBS, and ESPN. The advertisements were monitored in the top 75 media markets. The data set records each time the ad was broadcasted, as well as the station, length of ad, cost of broadcasting an ad, and show that it was aired on. Each observation in the data set denotes each time an ad was broadcasted. While there are over 200 media markets in the U.S., the 75 media markets selected cover more than 80% of the U.S. population.17

Using the original ad story boards (still shots with scripts), we coded the ads for whether they contained policy information that could be verified, e.g. a candidate stating that she or her opponent voted for a particular bill, etc., in keeping with our definition of substance in our theoretical section. We then determined whether the information in the ad was positive or negative substance. Four variables were created for each Congressional election: 1) total positive substance ads broadcast on the incumbent (labeled Positive Substance Incumbent) 2) total negative substance ads broadcast on the incumbent (Negative Substance Incumbent); 2) total positive substance ads broadcast on the challenger (Positive Substance Challenger); 4) total negative substance ads broadcast on the challenger (Negative Substance Challenger). Ads broadcast that did not have verifiable substance were labeled style ads. Two variables measure the numbers of these ads: 5) total style ads broadcast on the incumbent (Style Incumbent) and 6) total style ads broadcast on the challenger (Style Challenger). Thus, we have six dependent variables in our analysis – the number of ads of each of the three types run by each candidate. Note that we use as our dependent variables the total number of ads broadcast of each type rather than just the number of distinct ads created, so that our dependent variables matched our theoretical formulation. We also included in our

17 These materials are based on work supported by the Pew Charitable Trusts under a grant to the Brennan Center for Justice at New York University and a subsequent sub-contract to the Department of Political Science at the University of Wisconsin-Madison. For more information regarding the data, please refer to: Ridout, Travis N., Michael Franz, Kenneth Goldstein and Paul Freedman, 2002. "Measuring Exposure to Campaign Advertising" http://www.polisci.wisc.edu/~tvadvertising/reliability.pdf.
analysis ads paid for by interest groups or political parties as well as those financed directly by the candidate.\textsuperscript{18}

**Estimation Issues**

*Dealing with the Simultaneity*

The advertising decisions of the candidates are made simultaneously. We predict the relationships between candidate strategies to follow Table 1. Specifically, we expect *Positive Substance Incumbent* to be associated with both *Positive Substance Challenger* and *Style Challenger* and *Negative Substance Incumbent* to be associated with both *Negative Substance Challenger* and *Style Incumbent*. Correspondingly, we expect *Positive Substance Challenger* to be associated with both *Positive Substance Incumbent* and *Style Incumbent* and *Negative Substance Challenger* to be associated with both *Negative Substance Incumbent* and *Style Challenger*. Moreover, we expect that the sum of challenger ads across equations are constrained by the total number of ads ran by the challenger since we contend that the challenger is constrained by her advertising budget (although we do not expect incumbent ad totals to be so constrained). Therefore we estimate the system of six structural equations using three-stage least squares constraining the challenger advertising ad numbers to be constrained by the totals in each election.\textsuperscript{19}

\textsuperscript{18} If we restrict the analysis to only those ads known to be broadcast by the candidates themselves we find similar results to those presented here, although with less significance.

\textsuperscript{19} See Greene (2000), pp 693-696. Because the disturbance term is correlated with the endogenous variables, it violates the OLS assumptions. Moreover, because some of the right-hand side variables are dependent variables of other equations in the system, it is expected that the error terms among the equations are also correlated with one another. The estimation procedure requires that there are at least as many exogenous explanatory variables omitted from each equation as endogenous explanatory variables are included (order condition). Note that we also implicitly assume that although candidates and voters know the relationships between the variables we are estimating, we do not know these relationships – i.e.
Measuring the Dependent Variables

An alternative specification would have used the percentage of ads of each type run by each candidate, reducing the analysis to four dependent variables. There are three problems with this approach. First, as explained below, in almost half the contests with advertising only the incumbent or only the challenger advertised. The dependent variables for the candidate not advertising at all, if represented as shares of advertisements rather than as the total numbers, would be undefined in those observations and it would not be possible to run a simultaneous equation analysis including these observations. Our procedure thus allows us to use all the observations in our empirical analysis. Second, our theory is that the total number of incumbent ads is unconstrained while challenger ads are constrained and using the percent constrains both types of ads. Third, as noted by Vavreck (2002), using percentages of ads is problematic because the greater the number of ads a candidate runs the greater the possibilities of the variation in the percentage meaning more possible choices for candidates who run greater numbers of ads (i.e. the distributional percentage choices for a candidate who runs 10 total ads are smaller than the distributional percentage choices for a candidate who runs 100 total ads). For these reasons, and because it better fits our theoretical specification, we use the raw numbers of ads rather than the percentages.

Candidates Who Do Not Advertise

Theoretically we do not expect all candidates in these races to advertise – challengers are unlikely to mount an advertising campaign if they have little experience or the fixed costs of running a campaign are high. Furthermore, if benefits to the voter in terms of utility do not exceed the costs (as summarized above), then candidates may not advertise. Importantly, the relative cost of television advertising is likely to be higher for challengers than for incumbents. That is, most challengers have lower opportunity costs to personal labor intensive campaigning like door-to-door visits, talks to small groups, or calling voters directly, whereas incumbents’ personal time is more constrained by their current position. The Ad we observe them with measurement error – thus our error terms in our estimated equations are viewed as independent of the strategic choices faced by the candidates.
Detector found ads by either incumbents or challengers in only a third (131) of the 399 non-openseat Congressional races in the continental United States. While in 11 of these contests only the challenger advertised, in 53 only the incumbent advertised, reflecting the fact that challengers are less likely to campaign using television as compared to incumbents because of the opportunity cost differential. Although the challengers in these races are not choosing to advertise on television, they are no doubt engaging in serious enough campaigns using other means such that the incumbents are responding with television ads.

One way to think about the cases where there are zero ads in a race is that we have “missing data” on television advertising strategies in these districts and estimate a probit selection equation which is then used to control for the possible selection effect in the estimation of the ad equations using maximum likelihood as discussed in Maddala (1983). We performed such an estimation with the selection equation dependent variable whether television advertising occurs or not and as independent variables a number of factors that affect the degree of competition in congressional races that we then excluded as independent variables in our structural equations such as signature requirements for running for office, etc. We found no evidence of selection bias using this procedure and no qualitative differences from the results presented here. More, we believe that the selection estimation approach is not appropriate since the observations where television ads are zero are not “missing,” as is the case for wages for women who choose not to work, but our empirical observation of them is as accurate as our empirical observation of the nonzero values. Furthermore, since sometimes only one candidate advertises, or other times a candidate advertises only one type of ad, to omit observations with zero ads in itself is selection on the

20 The Inverse Mills ratio was insignificant in all of the structural equations. We used Limdep and two-stage least squares for this estimation and corrected standard errors.
dependent variable and can bias the results. Thus in our empirical analysis we use all 399 observations.\footnote{Not surprisingly, if we limit our observations to only those races with positive advertising the coefficients are generally much larger and more significant than those presented here, reflecting the bias inherent in using only those observations where television advertising occurred.}

Note that another possible estimation method is to assume that the dependent variables have a Poisson distribution (or more generally negative binomial). We also performed single equation estimates for each of our six dependent variables using this approach with similar results to those presented here.

**Independent Variables**

*Ideological Extremism*

We expect that an incumbent (challenger) is less (more) likely to advertise substance about the incumbent’s record when the incumbent is ideologically distant from her voters’ ideal point. To measure incumbents’ ideology, we use their 2000 DW-Nominate scores. In order to measure the incumbent’s ideological distance from her district, it was necessary to create a scale for district ideology based on the DW-nominate scores. We therefore estimated a predicted nominate score for each district as a function of the Democratic vote share of the two party vote in the 1996 Presidential elections, the household median income of the district, the percentage of the district with a high school degree, and whether the district is in a southern state using data from the other Congressional districts.\footnote{Data for districts’ median household income and percent with a high school degree are from the Census web site: \url{http://fastfacts.census.gov/home/cws/main.html}. In estimating the predicted ideology for each district, we excluded the particular district that was being estimated. We thus ran 399 separate regressions. This was done to ensure that characteristics of that district were not skewing the predicted values. We also allowed for the Democratic vote share variable to have a nonlinear effect on the predicted nominate score (i.e. we included as independent variables this term squared and cubed) since a nonlinear relationship between the vote share and nominate scores may result in the distance variable picking up whether a candidate is extreme across all members of Congress, not just in her district.} We then took the absolute value of

\[ \text{distance} = \text{absolute value of predicted nominate score} \]
the predicted value of each estimate subtracted from the candidate’s actual DW-Nominate score. This gives us our variable *Distance*.

One way to think of the distance variable is as a measure of whether an incumbent is an extremist. Although the theory assumes that candidates are either moderate or extreme, empirically candidates vary in the degree of extremism and thus we expect that as distance increases, incumbents will provide fewer positive substance ads and challengers will provide more negative substance ads. Our distance measure also can be thought of as a measure of the signal on the incumbent’s record that the candidates have observed and are choosing whether to reveal since it is based on the votes actually cast by the incumbent.

*Political Experience*

Our other principal independent variables we expect to affect the nature and quantity of campaign advertising are measures of the political experience of the candidates. We expect more substance advertising on candidates with political experience since there is a greater amount of verifiable information about the candidate’s previous policy choices and the signal is more informative to voters. For incumbents we measure this variable as the number of years in office as of 2000 labeled *Tenure*. For challengers we use as independent variables whether she has served as a *Local Official, Party Official, State Legislator, State Official*, or *Former Congress Member*. Each was coded as a dichotomous variable (we code a challenger as only one type, with the most recent type chosen if the challenger has served as both a state legislator and a mayor for example). We expect there also to be a greater amount of verifiable substantive information on a challenger if the state government is more “professional,” like the federal government. We thus include a measure of *Legislative Professionalism* as an independent variable.  

---

Determinants of Challenger Budgets

As discussed in the theory section we expect that challengers will have more resources to pay for campaign ads if they have personal wealth or a position of influence within her district (e.g., a prominent local business owner), although without direct political experience.\textsuperscript{24} We also included variables that may affect the willingness of party leaders to provide resources for challengers such as the incumbent’s vote share in the previous election, 1998, \textit{Incumbent Vote}, that vote share squared, \textit{Incumbent Vote}\textsuperscript{2}, and the closeness of the 1996 presidential election in the congressional district measured as the absolute value of \((0.5 - \text{percentage of votes received by the Clinton in 1996})\), labeled \textit{Presidential Closeness}. We expect that parties are more likely to give resources to challengers who face incumbents who have had closer races in previous elections or where the two party competition is high and thus the challenger is as likely to win as the incumbent if voters vote purely on partisan lines.

We also include as independent variables a number of factors that measure the costs, which determine whether a challenger will mount a campaign. In particular, we measure those factors that are barriers to entry such as the number of signatures that challengers must provide for ballot access by type of candidacy: \textit{Major Party Sig.}, \textit{Minor Party Sig.}, \textit{Independent Sig.} Other barriers to candidate entry we include are: \textit{Convention} which measures if candidates need to be nominated first by a convention to receive a major party nomination, \textit{Endorse} if candidates need party endorsements to run for office, and \textit{Runoff} which measures whether a state has majority requirements. We also use as independent dichotomous variables institutional differences across states in who can participate in congressional primaries, which then can affect whether challengers choose to run. That is, \textit{Semiclosed} is coded 1 if a independent and new voters can participate in primaries, \textit{Semiopen} is coded 1 if primaries are open to members of another political party who publicly declare their participation, \textit{Pureopen} is coded 1 if primaries are open to members of another political party without a public declaration of participation, \textit{Pureopen}.

\textsuperscript{24} Challenger political experience and position of influence within the district was coded by an examination of newspaper reports in the district during the campaign.
Blanket is coded 1 if voters can vote in different parties’ primaries for different races on the same primary ballot and Nonpartisan is coded 1 if the congressional elections are nonpartisan (see Gerber and Morton (2003). Finally, we included two dichotomous variables measuring the candidates’ gender, Female Incumbent and Female Challenger, coded 1 if the respective candidate was a woman, in case there are some gender biases in the ability of candidates to provide resources for television ads.

Empirical Results

Descriptive Statistics

We present basic descriptive statistics in Table 2. As noted above, there were 513 ads created by House incumbents and they were broadcasted 70,658 times. The average value for distance from district ideology is .337. We also breakdown the means and standard deviations of our dependent variables. In terms of the challenger’s previous political experience, being a local official was the most prevalent whereas serving as a member of Congress and as a state official was the least.

Table 2 here

Ideological Distance and Advertising Strategies

Tables 3 and 4 present the constrained three-stage least square estimates (3SLS). Turning first to the estimates on incumbent advertising strategy choices presented in Table 3 we find that the empirical estimates lend considerable support for the theoretical predictions. The distance coefficient is statistically significant and signed in the expected direction in the equations predicting the number of positive substance ads on the incumbent and the number of incumbent style ads. When the incumbent advertises positive substance ads, the distance coefficient is negative; indicating that a 0.1 unit change in distance decreases the number of positive substance ads advertised by approximately 9 (remember that the modal ad choice is 0). When the incumbent chooses to advertise ads containing no substance or style, the distance coefficient is positive and statistically significant; a 0.1 unit change in distance increases the number of style ads being advertised by approximately 25. This finding suggests that incumbents may choose to advertise style ads, e.g. their background or personal characteristics, when she does not share his district’s ideological position.
Table 4 presents the estimates on the challenger advertising strategy choices. As predicted, challengers are significantly more likely to advertise negative substance on the incumbent as distance increases, for every 0.1 unit increase in Distance the challenger increases negative substance ads on the incumbent by approximately 6 (again the modal number is 0). We find that Distance has an insignificant effect on challenger style advertising.

Table 4

Political Experience and Advertising Strategies

While Tenure is an insignificant predictor of when incumbents advertise positive substance on themselves, incumbents are significantly more likely to advertise negative substance on the challenger if the challenger is a former member of congress (315 more ads) or a state legislator (121 more ads). Similarly, the factors that influence a challenger’s advertising strategy are also guided by her previous experience. A challenger who has served as a state legislator increases the number of positive substance ads that she runs by approximately 58 and the more professional the state government the greater the number of ads a challenger will run with positive substance.

Other Results

Unexpectedly, challengers advertise more style ads when the incumbent’s vote total in the previous election was greater, but at a decreasing rate, which is contrary to our prediction. Most of the institutional variables that we use to control for factors that potentially affect challenger entry are insignificant. We also find no gender differences in campaign advertising. Somewhat surprisingly, we find that the cross effects of different advertising strategies are generally always significant which shows that the simultaneity we hypothesize although the relationships are not always as predicted. For example, we find a negative relationship between negative substance on the incumbent and negative substance on the challenger and negative relationships between style advertising and negative substance as well, which do not agree with the predictions of Table 1. We suspect this reflects the fact that challengers are more likely to campaign using labor intensive, non-television methods, than incumbents. We do find that
positive substance on the incumbent and positive substance on the challenger are positive related as Table 1 predicts and incumbent and challenger style have the predicted positive relationships.

**Concluding Remarks**

In this paper we have provided a simple formal model of the choice calculus for candidates in making advertising decisions from which we have derived theoretical predictions about how candidates choose to advertise either substance or purely style. Based on the theory, we argue that candidates will strategically reveal substance on their records (or their opponents’) depending on how close their (or their opponents’) positions are to the preferences of their voters. We have evaluated this prediction using advertising data from the 2000 Congressional elections and found considerable support. Our empirical results show that campaign advertising content is a strategic choice by candidates and should be considered so in future models of campaign advertising.

Our results have a number of important implications for the study of campaign advertising. First, the relationship between the likelihood of advertising policy positions and the distance between the incumbents and their median voters suggests that candidates perceive some cost to lying about policy records in campaign ads and that freedom of speech in elections does not necessarily imply that candidates’ advertising content will be uninformative. Hence, our results show that a common assumption made in some formal models of campaign advertising, that these messages’ content is always uninformative, is false. Second, our results also suggest that “style” messages, advertising without verifiable content, are used by candidates strategically when they wish to “hide” their records and appeal to voters’ utility from seeing such an ad. In our simple model voters update based on not seeing substantive ads and value them for the additional utility the voter receives directly from such advertising. It could be that style messages also indirectly provide voters with the type of valence information that models such as Prat (2002) assume. But it is clear that this comes at a trade-off, incumbents who advertise more style do have policy records further from their voters’ ideologically.

Finally, our results suggest that limiting challenger campaign spending can reduce voter information about incumbents’ records since challengers are more likely to convey negative substance on
an incumbent who has taken positions more distant from her voters’ wishes. If campaign finance limits hurt challengers’ ability to convey these messages, then voters can have less access to information on the incumbent’s record. Correspondingly, our results suggest that public financing of challengers can increase voter information if challengers use campaign funds strategically to provide voters with information about incumbent’s records.

Our simple partial equilibrium model does clearly have drawbacks. That is, rather than explicitly deriving voter expectations about candidates’ policy positions we make fairly general assumptions that voters form these expectations in a manner such that campaign advertising can influence them in reasonable ways. We take this route because our desired contribution is primarily empirical. We hope our empirical results will lead to the building of more fully developed formal models where advertising content is a strategic choice by candidates as our empirical evidence shows and voter expectations given these strategic choices are explicitly derived as well.
Appendix

**Explication of $\Delta$ and Formalization of Assumptions about Voter Expectations**

Using Bayes Rule, if a voter observes $\theta_j$ and $q_j > 0$, the voter’s posterior probability about candidate $j$’s policy position and $\Delta$ are as follows:

$$
\Delta = \Pr(x_R = 1|\theta_j)[f(S_{RR}) + f(S_{RD}) - f(S_{RR})f(S_{RD})] + \Pr(x_R = 1|\emptyset)[1 - f(S_{RR}) - f(S_{RD}) + f(S_{RR})f(S_{RD})]
$$

$$
- \Pr(x_D = -1|\theta_D)[f(S_{DD}) + f(S_{DR}) - f(S_{DD})f(S_{DR})] - \Pr(x_D = -1|\emptyset)[1 - f(S_{DD}) - f(S_{DR}) + f(S_{DD})f(S_{DR})]
$$

Where $\Pr[x_j = 1|\theta_j^o = \emptyset] = \Pr^i(1,0,0,0) f(V_j) [1 - f(V_k)]^i - f(S_{kk})]^i - f(S_{kj})]

$$
+ \Pr^i(0,1,0,0) [1 - f(V_j)] f(V_k) [1 - f(S_{kk})]^i - f(S_{kj})] + \Pr^i(0,0,1,0) [1 - f(V_j)] f(V_k) [1 - f(S_{kk})]^i - f(S_{kj})]

$$
+ \Pr^i(0,1,1,0) f(V_j) [1 - f(V_k)] f(S_{kk}) [1 - f(S_{kj})] + \Pr^i(1,0,0,0) f(V_j) f(V_k) [1 - f(S_{kk})]^i - f(S_{kj})]

$$
+ \Pr^i(0,1,0,1) [1 - f(V_j)] f(V_k) f(S_{kk}) [1 - f(S_{kj})] + \Pr^i(0,0,1,1) [1 - f(V_j)] f(V_k) f(S_{kk}) [1 - f(S_{kj})]

$$
+ \Pr^i(1,1,0,0) f(V_j) f(V_k) f(S_{kk}) [1 - f(S_{kj})] + \Pr^i(1,0,1,0) f(V_j) f(V_k) f(S_{kk}) [1 - f(S_{kj})]

$$
+ \Pr^i(1,1,0,1) f(V_j) f(V_k) f(S_{kk}) [1 - f(S_{kj})] + \Pr^i(1,1,1,0) f(V_j) f(V_k) f(S_{kk}) [1 - f(S_{kj})]

$$
+ \Pr^i(1,1,1,1) f(V_j) f(V_k) f(S_{kk}) [1 - f(S_{kj})] + \Pr^i(1,1,1,1) f(V_j) f(V_k) f(S_{kk}) [1 - f(S_{kj})]

$$
and $\Pr[x_j = 1|\theta_j^o = \emptyset] = \emptyset \emptyset = a, V_k^o = b, S_{kk}^o = c, S_{kj}^o = d).$ $\Pr^i(a,b,c,d).

$$
\Pr(x_R = 0|\emptyset) = \Pr(x_R = 1|\emptyset) = \frac{.5p(q_R)}{.5p(q_R) + .5(1 - p(q_R))} = p(q_R)

$$
\Pr(x_D = 0|\emptyset) = \Pr(x_D = -1|\emptyset) = \frac{.5p(q_D)}{1 - .5p(q_D) + .5p(q_D)} + 2p(q_D) = p(q_D)

$$
\Pr(x_R = 0|\emptyset) > \Pr(x_R = 0|\emptyset) \text{ and } \Pr(x_D = -1|\emptyset) > \Pr(x_R = 1|\emptyset)

$$
\Pr(x_j = a|\emptyset) = 1 - \Pr[x_j = b|\emptyset]

$$
Because we assume that candidates do not condition their revelation of signals on true types then the probability that a candidate is an extremist when no signal is revealed is bounded by the probabilities the candidate is an extremist with signal revelation as follows:

$$
\Pr(x_j = 1|\emptyset) \leq \Pr^i(a,b,c,d) = \Pr(x_j = 1|\emptyset).
$$
We also assume that because voters know that candidates have a choice whether to advertise substance or style and that that choice is influenced by their signals as discussed in the text (pages 15-17). Formally, these assumptions are as follows:

\[
\Pr^j(1,b,c,d) \geq \Pr^j(0,b,c,d), \quad \frac{\partial}{\partial q_j} \left[ \Pr^j(1,b,c,d) - \Pr^j(0,b,c,d) \right] \geq 0
\]

\[
\Pr^j(a,1,c,d) \geq \Pr^j(a,0,c,d), \quad \frac{\partial}{\partial q_j} \left[ \Pr^j(a,1,c,d) - \Pr^j(a,0,c,d) \right] \geq 0
\]

\[
\Pr^j(a,b,1,d) \leq \Pr^j(a,b,0,d), \quad \frac{\partial}{\partial q_j} \left[ \Pr^j(a,b,1,d) - \Pr^j(a,b,0,d) \right] \geq 0
\]

\[
\Pr^j(a,b,c,1) \leq \Pr^j(a,b,c,0), \quad \frac{\partial}{\partial q_j} \left[ \Pr^j(a,b,c,1) - \Pr^j(a,b,c,0) \right] \geq 0
\]

\[
|\Pr^D(a,b,0,d) - \Pr^D(a,b,1,d)| > |\Pr^R(a,b,c,1) - \Pr^R(a,b,c,0)|
\]

\[
|\Pr^R(a,b,0,d) - \Pr^R(a,b,1,d)| < |\Pr^D(a,b,c,1) - \Pr^D(a,b,c,0)|
\]

From these assumptions it follows that:

\[
\frac{\partial \Delta}{\partial f(V_d)} \leq 0 \text{ and } \frac{\partial \Delta}{\partial f(V_d)} \geq 0, \quad \frac{\partial^2 \Delta}{\partial V_j \partial q_j} \geq 0, \quad \frac{\partial^2 \Delta}{\partial V_j \partial q_k} \geq 0
\]

\[
\frac{\partial \Delta}{\partial f(S_{DD})} \geq 0 \text{ and } \frac{\partial \Delta}{\partial f(S_{DR})} \geq 0 \text{ if } \theta_D = 0, \quad \frac{\partial \Delta}{\partial f(S_{DD})} \leq 0 \text{ and } \frac{\partial \Delta}{\partial f(S_{DR})} \leq 0 \text{ if } \theta_D = 1
\]

\[
\frac{\partial \Delta}{\partial f(S_{RD})} \leq 0 \text{ if } \theta_R = 0, \quad \frac{\partial \Delta}{\partial f(S_{RR})} \geq 0 \text{ if } \theta_R = 1
\]

\[
\frac{\partial \Delta}{\partial f(S_{DD})} > \frac{\partial \Delta}{\partial f(S_{RR})} \text{ if } \theta_D = 0 \text{ and } \theta_R = 1, \quad \frac{\partial \Delta}{\partial f(S_{DD})} < \frac{\partial \Delta}{\partial f(S_{RR})} \text{ if } \theta_D = 1 \text{ and } \theta_R = 0
\]

\[
\frac{\partial^2 \Delta}{\partial S_{DD} \partial q_D} > 0, \quad \frac{\partial^2 \Delta}{\partial S_{DR} \partial q_D} > 0, \quad \frac{\partial^2 \Delta}{\partial S_{DR} \partial q_D} > 0, \quad \frac{\partial^2 \Delta}{\partial S_{RD} \partial q_R} > 0
\]

While the marginal effects are obviously functions of the advertising of a candidate’s opponent and the experience levels of the two candidates, they are constants ceteris paribus, i.e.: \( \frac{\partial^2 \Delta}{\partial f(\cdot)^2} = 0 \).

**Derivation of Necessary Conditions for Candidate Optimal Advertising Choices**

We designate \( S^*_j, S^*_k, V^*_j \) as candidate j’s equilibrium advertising strategies. Candidate R’s optimal advertising strategies can be represented as the solution to a constrained optimization problem
with an inequality constraint. The Lagrangian representing her minimization problem and the Kuhn-Tucker necessary conditions for her choices to be optimal are given by:

\[ L_R = -\Delta - w \left( E(V_D^o) - E(V_R^o) \right) + z \left( E(A_D^o) - E(A_R^o) \right) + \lambda_R \left[ B_R - S_{RR} - S_{DR} - V_R \right] \]

\[
\frac{\partial L_R}{\partial S_{RR}} = -\left[ \Delta_{RR} + z \left[ 1 - f(S_{DR}) - f(V_R) + f(V_R)f(S_{DR}) \right] \right] \frac{df(S_{RR})}{ds_{RR}} - \lambda_R \leq 0, \quad S_{RR} \frac{\partial L_R}{\partial S_{RR}} = 0,
\]

\[
\frac{\partial L_R}{\partial S_{DR}} = -\left[ \Delta_{DR} + z \left[ 1 - f(S_{RR}) - f(V_R) + f(V_R)f(S_{RR}) \right] \right] \frac{df(S_{DR})}{ds_{DR}} - \lambda_R \leq 0, \quad S_{DR} \frac{\partial L_R}{\partial S_{DR}} = 0
\]

\[
\frac{\partial L_R}{\partial V_R} = \left[ w - z \left[ 1 - f(S_{RR}) - f(S_{DR}) + f(S_{RR})f(S_{DR}) \right] - \Delta_R \right] \frac{df(V_R)}{ds_{RR}} - \lambda_R \leq 0, \quad V_R \frac{\partial L_R}{\partial V_R} = 0
\]

\[
\frac{\partial L_R}{\partial \lambda_R} = B_R - S_{RR} - S_{DR} - V_R \geq 0, \quad \lambda_R \left[ B_R - S_{RR} - S_{DR} - V_R \right] = 0
\]

where \( \Delta_j = \frac{\partial \Delta}{\partial f(V_j)} \), \( \Delta_j = \frac{\partial \Delta}{\partial f(S_j)} \), and \( \Delta_k = \frac{\partial \Delta}{\partial f(S_k)} \)

Candidate D’s optimal advertising strategies can be represented as the solution to the following constrained minimization problem (note that because D might minimize her advertising with \( E(NU) > 0 \) if for example neither she nor R advertises, we allow for that possibility by presenting the Kuhn-Tucker necessary conditions for her choices to be optimal):

\[ L_D = -S_{DD} - S_{RD} - V_D + \lambda_D \left[ \Delta + w \left( E(V_D^o) - E(V_R^o) \right) - z \left( E(A_D^o) - E(A_R^o) \right) \right] \]

\[
\frac{\partial L_D}{\partial S_{DD}} = -1 + \lambda_D \left[ \Delta_{DD} - z \left[ 1 - f(S_{RD}) - f(V_D) + f(V_D)f(S_{RD}) \right] \right] \frac{df(S_{DD})}{ds_{DD}} \leq 0, \quad S_{DD} \frac{\partial L_D}{\partial S_{DD}} = 0
\]

\[
\frac{\partial L_D}{\partial S_{RD}} = -1 + \lambda_D \left[ \Delta_{RD} - z \left[ 1 - f(S_{DD}) - f(V_D) + f(V_D)f(S_{DD}) \right] \right] \frac{df(S_{RD})}{ds_{RD}} \leq 0, \quad S_{RD} \frac{\partial L_D}{\partial S_{RD}} = 0
\]

\[
\frac{\partial L_D}{\partial V_D} = -1 + \lambda_D \left[ \Delta_D + w - z \left[ 1 - f(S_{DD}) - f(S_{RD}) + f(S_{DD})f(S_{RD}) \right] \right] \frac{df(V_D)}{ds_{RD}} \leq 0, \quad V_D \frac{\partial L_D}{\partial V_D} = 0
\]

\[
\frac{\partial L_D}{\partial \lambda_D} = \Delta + w \left( E(V_D^o) - E(V_R^o) \right) - z \left( E(A_D^o) - E(A_R^o) \right) \geq 0
\]

\[
\lambda_D \left[ \Delta + w \left( E(V_D^o) - E(V_R^o) \right) - z \left( E(A_D^o) - E(A_R^o) \right) \right] = 0
\]

\[ S_{DD}, S_{RD}, V_D, \lambda_D \geq 0 \]
Proof of Result 1:

First part: Assume $\theta_D = 1$ and $S_{DD}^* > 0$. From (A3) for $D$ to be choosing an optimal strategy: $\frac{\partial L_D}{\partial S_{DD}^*} = 0$.

However given (A1) above and that $z[1 - f(S_{RD}) - f(V_D) + f(V_D)f(S_{RD})] > 0$, then $\frac{\partial L_D}{\partial S_{DD}^*} < 0$, which implies that $S_{DD}^* = 0$. Similar results hold for $S_{RR}^*$ if $\theta_R = 1$. Second part: Assume $\theta_D = 0$ and $S_{DR}^* > 0$.

From (A2) for $R$ to be optimizing, then: $\frac{\partial L_R}{\partial S_{DR}^*} = 0$. However given (A1) above and that $z[1 - f(S_{RR}) - f(V_R) + f(V_R)f(S_{RR})] > 0$, then $\frac{\partial L_R}{\partial S_{DR}^*} < 0$ which implies that $S_{DR}^* = 0$. Similar results hold for $S_{RD}^*$ if $\theta_R = 1$.

QED

Proof of Results 2 and 3:

These result follow directly from solving simultaneously equation systems (A1), (A2), and (A3).


References


All Style and No Substance?


### Table 1: Candidate Strategies if Advertising Style and/or Substance is Optimal for Both

<table>
<thead>
<tr>
<th>$R$’s Signal</th>
<th>$D$’s Signal</th>
<th>$\theta_D = 0$</th>
<th>$\theta_D = 1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Experience</td>
<td>$R$ advertises only style, $D$ advertises style and/or positive substance</td>
<td>$R$ advertises style and/or negative substance, $D$ advertises only style</td>
<td></td>
</tr>
<tr>
<td>Experienced $\theta_R = 0$</td>
<td>Both $R$ and $D$ advertise style and/or positive substance</td>
<td>$R$ advertises style and/or negative substance and possibility positive substance, $R$ advertises more negative than positive substance, $D$ advertises only style,</td>
<td></td>
</tr>
<tr>
<td>Experienced $\theta_R = 1$</td>
<td>$R$ advertises only style, $D$ advertises style and/or positive substance and possibility negative substance, $D$ advertises more positive than negative substance</td>
<td>Both $R$ and $D$ advertise style and/or negative substance</td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Basic Descriptive Statistics (standard deviations in parentheses)

<table>
<thead>
<tr>
<th>Ads</th>
<th>Frequency/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Broadcasted</td>
<td>70,658</td>
</tr>
<tr>
<td>Number Created</td>
<td>513</td>
</tr>
<tr>
<td>Total Number of House Elections where at Least One Candidate Advertised</td>
<td>399</td>
</tr>
<tr>
<td>Number of House Elections with Positive Substance Ads on Incumbent</td>
<td>131</td>
</tr>
<tr>
<td>Number of House Elections with Negative Substance Ads on Incumbent</td>
<td>62</td>
</tr>
<tr>
<td>Number of House Elections with Positive Substance Ads on Challenger</td>
<td>26</td>
</tr>
<tr>
<td>Number of House Elections with Incumbent Style Ads</td>
<td>53</td>
</tr>
<tr>
<td>Number of House Elections with Challenger Style Ads</td>
<td>106</td>
</tr>
<tr>
<td>Number of House Elections with Challenger Style Ads</td>
<td>74</td>
</tr>
<tr>
<td>Mean Number of Positive Substance Ads on Incumbents Across All Contests</td>
<td>68.14 (250.95)</td>
</tr>
<tr>
<td>Mean Number of Negative Substance Ads on Incumbents Across All Contests</td>
<td>103.18 (402.12)</td>
</tr>
<tr>
<td>Mean Number of Positive Substance Ads on Challengers Across All Contests</td>
<td>20.37 (108.86)</td>
</tr>
<tr>
<td>Mean Number of Negative Substance Ads on Challengers Across All Contests</td>
<td>44.48 (213.06)</td>
</tr>
<tr>
<td>Mean Number of Incumbent Style Ads in Contests with Such Ads Across All Contests</td>
<td>156.02 (470.03)</td>
</tr>
<tr>
<td>Mean Number of Challenger Style Ads in Contests with Such Ads Across All Contests</td>
<td>173.38 (704.71)</td>
</tr>
<tr>
<td>Mean Number of Positive Substance Ads on Incumbents in Contests with Such Ads</td>
<td>438.5 (495.82)</td>
</tr>
<tr>
<td>Mean Number of Negative Substance Ads on Incumbents in Contests with Such Ads</td>
<td>776.79 (839.25)</td>
</tr>
<tr>
<td>Mean Number of Positive Substance Ads on Challengers in Contests with Such Ads</td>
<td>312.65 (305.97)</td>
</tr>
<tr>
<td>Mean Number of Negative Substance Ads on Challengers in Contests with Such Ads</td>
<td>537.85 (539.41)</td>
</tr>
<tr>
<td>Mean Number of Incumbent Style Ads in Contests with Such Ads</td>
<td>587.28 (762.73)</td>
</tr>
<tr>
<td>Mean Number of Challenger Style Ads in Contests with Such Ads</td>
<td>934.85 (1409.25)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>District/Candidate Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Distance in Candidate Ideology</td>
<td>0.248 (0.166)</td>
</tr>
<tr>
<td>Challengers who were Former Members of Congress</td>
<td>4</td>
</tr>
<tr>
<td>Challengers who served as State Officials</td>
<td>4</td>
</tr>
<tr>
<td>Challengers who served as State Legislators</td>
<td>29</td>
</tr>
<tr>
<td>Challengers who served as Local Officials</td>
<td>40</td>
</tr>
</tbody>
</table>
Table 3: Three-Stage Least Squares Estimates, Incumbent Advertising Strategies

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Positive Substance Ads on Incumbent</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>-86.51*</td>
<td>36.41</td>
</tr>
<tr>
<td>Tenure</td>
<td>-.06</td>
<td>.40</td>
</tr>
<tr>
<td>Challenger Style Ads</td>
<td>.26*</td>
<td>.01</td>
</tr>
<tr>
<td>Positive Substance on Challenger Ads</td>
<td>.51*</td>
<td>.14</td>
</tr>
<tr>
<td>Constant</td>
<td>33.89*</td>
<td>11.72</td>
</tr>
<tr>
<td><strong>Number of Negative Substance Ads on Challenger</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former Member of Congress</td>
<td>315.33*</td>
<td>67.77</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>40.32</td>
<td>25.15</td>
</tr>
<tr>
<td>State Legislator</td>
<td>57.81*</td>
<td>17.54</td>
</tr>
<tr>
<td>State Official</td>
<td>8.91</td>
<td>31.41</td>
</tr>
<tr>
<td>Party Official</td>
<td>1.83</td>
<td>23.04</td>
</tr>
<tr>
<td>Challenger Style Ads</td>
<td>.38*</td>
<td>.07</td>
</tr>
<tr>
<td>Negative Substance on Incumbent Ads</td>
<td>-.35*</td>
<td>.13</td>
</tr>
<tr>
<td>Constant</td>
<td>-13.42</td>
<td>13.22</td>
</tr>
<tr>
<td><strong>Number of Incumbent Style Ads</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>253.09*</td>
<td>65.24</td>
</tr>
<tr>
<td>Female Incumbent</td>
<td>8.37</td>
<td>8.95</td>
</tr>
<tr>
<td>Positive Substance on Challenger Ads</td>
<td>1.99*</td>
<td>.30</td>
</tr>
<tr>
<td>Negative Substance on Incumbent Ads</td>
<td>-1.27*</td>
<td>.26</td>
</tr>
<tr>
<td>Challenger Style Ads</td>
<td>1.14*</td>
<td>.23</td>
</tr>
<tr>
<td>Constant</td>
<td>-15.44</td>
<td>20.24</td>
</tr>
</tbody>
</table>

N = 399
R² Equation 1: .72, Equation 2: .31 Equation 3: .64
** = Denotes estimate significant at p=.10 level
* = Denotes estimates significant at p=.05 level
### Table 4: Three-Stage Least Squares Estimates, Challenger Advertising Strategies

<table>
<thead>
<tr>
<th>Number of Positive Substance Ads on Challenger</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legislative Professionalism</td>
<td>33.60*</td>
<td>15.74</td>
</tr>
<tr>
<td>Local Official</td>
<td>2.52</td>
<td>10.25</td>
</tr>
<tr>
<td>State Legislator</td>
<td>57.81*</td>
<td>17.55</td>
</tr>
<tr>
<td>State Official</td>
<td>8.91</td>
<td>31.41</td>
</tr>
<tr>
<td>Incumbent Style Ads</td>
<td>.25*</td>
<td>.05</td>
</tr>
<tr>
<td>Positive Substance on Incumbent Ads</td>
<td>.24*</td>
<td>.12</td>
</tr>
<tr>
<td>Total Number of Challenger Ads</td>
<td>-.09*</td>
<td>.03</td>
</tr>
<tr>
<td>Constant</td>
<td>-26.52*</td>
<td>9.29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Negative Substance Ads on Incumbent</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>63.37*</td>
<td>26.86</td>
</tr>
<tr>
<td>Presidential Closeness</td>
<td>.06</td>
<td>.23</td>
</tr>
<tr>
<td>Incumbent Style Ads</td>
<td>-.18*</td>
<td>.04</td>
</tr>
<tr>
<td>Negative Substance on Challenger Ads</td>
<td>-.13*</td>
<td>.07</td>
</tr>
<tr>
<td>Total Number of Challenger Ads</td>
<td>.42*</td>
<td>.02</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.09</td>
<td>7.38</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Number of Challenger Style Ads</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>6.35</td>
<td>96.73</td>
</tr>
<tr>
<td>Female Challenger</td>
<td>14.11</td>
<td>12.33</td>
</tr>
<tr>
<td>Challenger Prestige</td>
<td>-26.19</td>
<td>24.07</td>
</tr>
<tr>
<td>Negative Substance on Challenger Ads</td>
<td>-1.29*</td>
<td>.54</td>
</tr>
<tr>
<td>Positive Substance on Incumbent Ads</td>
<td>2.32*</td>
<td>.44</td>
</tr>
<tr>
<td>Total Number of Challenger Ads</td>
<td>.11</td>
<td>.14</td>
</tr>
<tr>
<td>Incumbent Style Ads</td>
<td>.66</td>
<td>.44</td>
</tr>
<tr>
<td>Incumbent Vote</td>
<td>21.97*</td>
<td>11.29</td>
</tr>
<tr>
<td>(Incumbent Vote)</td>
<td>-.14*</td>
<td>.07</td>
</tr>
<tr>
<td>Semi-Closed Primary</td>
<td>-30.19</td>
<td>21.35</td>
</tr>
<tr>
<td>Semi-Open Primary</td>
<td>-3.61</td>
<td>29.28</td>
</tr>
<tr>
<td>Pure Open Primary</td>
<td>27.41**</td>
<td>22.77</td>
</tr>
<tr>
<td>Blanket Primary</td>
<td>-123.03</td>
<td>173.34</td>
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<tr>
<td>Non Partisan Primary</td>
<td>44.79</td>
<td>41.82</td>
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<tr>
<td>Runoff</td>
<td>7.78</td>
<td>20.81</td>
</tr>
<tr>
<td>Convention</td>
<td>-10.49</td>
<td>22.98</td>
</tr>
<tr>
<td>Endorsements</td>
<td>22.22</td>
<td>23.58</td>
</tr>
<tr>
<td>Major Party Signature Requirement</td>
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<td>.00</td>
</tr>
<tr>
<td>Minor Party Signature Requirement</td>
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<td>.00</td>
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<tr>
<td>Independent Candidate Signature Requirement</td>
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<td>.00</td>
</tr>
<tr>
<td>Constant</td>
<td>-916.33*</td>
<td>442.31</td>
</tr>
</tbody>
</table>

N: 399                                          
R² Equation 1: .20, Equation 2: .73, Equation 3: .82

** = Denotes estimate significant at p=.10 level

*  = Denotes estimates significant at p=.05 level