Abstract

Why is negative advertising such a prominent feature of competition in the US political market? We hypothesize that the typical two-candidate race provides stronger incentives for “going negative” relative to non-duopoly contests: when the number of competitors is greater than two, airing negative ads creates positive externalities for opponents that are not the object of the attack. To investigate the empirical relevance of the existence of duopolies in explaining the volume of negative advertising, we collected information about all candidates running for US non-presidential primary contests in 2004 and 2008. The nature of primaries provides us with a cross section of independent races with variation in the number of entrants. We merge these data with the tone of political advertisements aired during the campaigns from the Wisconsin Advertising Project. We provide robust evidence showing that duopolies are twice as likely to air a negative ad when compared to non-duopolies.
1 Introduction

Political competition has long been famous for using negative portrayals of one’s opponent as a strategic weapon. Indeed negative advertising is usually considered par for the course in any political contest. What is more striking is the sheer amount spent on negative advertising. For example, Senator John Kerry and President George Bush together spent $522 million in the 2004 presidential campaign, with over $365 million (or 69.9 percent) of this amount being spent on negative advertising.\footnote{Calculation based on WiscAds 2004 presidential data (Goldstein & Rivlin 2007c).} In the 2009-2010 election cycle (the November 2010 electoral contests for state and federal offices), a media analysis company has reported that 80 percent of advertisements have been negative (NPR 2010).

The widespread presence of negative advertising in the political market has been a serious concern to policymakers, scholars, and news commentators alike. Critics have long bemoaned negative advertising as harmful to the health of a democracy. The fear that negative ads potentially turn off voters has prompted policymakers in recent times to regulate its usage. One such well known piece of legislation is the “Stand By Your Ad” provision of the Bipartisan Campaign Reform Act in 2002, which requires each candidate to provide a statement identifying himself and his approval of the communication. By forcing candidates to personally associate themselves with their campaign message, the belief is that candidates will be less inclined to air attack ads.

The conventional wisdom is consistent with the conclusions of a strand of studies that find negativity alienates the political middle and harms participation (Crotty and Jacobson (1980); Cappella and Jamieson (1997); Ansolabehere and Iyengar (1995)). Other works reach the opposite conclusion, that is exposure to negative advertising mobilizes the electorate (Freedman and Goldstein (1999)), or negative ads have no impact on turnout (Finkel and Geer (1998)). To a greater extent, Lau et al. (2007) recently examined the research literature and conclude that while negative campaigning tends to be more memorable and stimulate knowledge about the campaign, there is no robust evidence on the
detrimental effects on the political system. The lack of consensus on the effects of negative advertising on the electorate has lately prompted researchers to provide alternative explanations that could reconcile the mixed evidence, departing from the observation that not all voters react in the same way to the tone of the campaign. Whether negative campaigns have substantial effects on voter impressions may depend on the timing of exposure to negativity (Krupnikov (2011)); the relevance of the message, the degree of civility and the tolerance level of the voter (Fridkin and Kenney (2011)); the voter’s prior knowledge (Lovett and Shachar (2011)); the voter’s gender (Galasso and Nannicini (2013)).

While studies about the potential effects of negative advertising on voters’ opinions proliferated in the past two decades, what is largely overlooked in the current debate about negative advertising in politics is a clear understanding of why negative advertising is such a central feature of political competition. That is, while there has been much interest as to the consequences of campaigning for election outcomes, little empirical attention has been devoted to the supply side incentives to produce negativity. What is it about the nature of political competition, especially in the United States, that lends itself towards “going negative”?

In this paper we hypothesize that an important part of the explanation lies in a unique feature of the structure of political markets. In particular, the two-party system effectively gives rise to duopoly competition between political candidates in a general election, whereas pure duopolies are rarely observed in the consumer product market.\(^2\) We conjecture that there is a clear economic rationale for why duopolies are more likely to “go negative”: when the number of competitors is greater than two, engaging in negative ads creates positive externalities to those opponents that are not the object of the attack. In contrast, positive ads benefit only the advertiser. Therefore, the presence of a spillover effect makes it less beneficial to use negative advertising when you face more than one opponent.

\(^2\)While a number of industries might feature two dominant firms, even in these cases there will typically be a group of firms with smaller market share that impact the behavior of the dominant firms.
How can we empirically isolate the effect of the number of competitors in a market (i.e., election) on the incentive to go negative? An ideal strategy is to only use data on political races that share the same institutional features, but have different number of competitors. This strategy however gives rise to a natural problem: if political markets in the United States are for the most part characterized by head to head competition between the two major party candidates, how can we determine the effect of the number of competitors on the propensity for “going negative” when there is little to no variation in the number of candidates? Our strategy is to instead exploit the inherent variation in non-presidential primary contests within the United States, i.e., the contests among Democrats or Republicans that decide who will become the party nominee in a particular House, Senate, or gubernatorial race. The local nature of these primary contests provides us with a cross section of independent races that exhibit variation in the number of entrants. Using this variation, we seek to measure the effect of the number of competitors on the likelihood that a political ad is negative.

We use data from the Wisconsin Advertising Project (WiscAds), which contains information on all political advertisements aired in the top 100 media markets in 2004, which covers 85% of the U.S. population, and the same information for all U.S. media markets in 2008. In addition, we collect candidate level demographic characteristics to create a comprehensive database of primary races, candidate attributes, and advertising patterns. As the constructed data contain a comprehensive record of the amount of political advertising and its content, we are able to measure the probability of going negative at the ad level as a function of market and candidate characteristics. Our main finding is that duopolies have over twice as high a likelihood of airing a negative ad as compared to non-duopolies. The magnitude suggests that even just a handful of competitors can all but eliminate the incentives to “go negative” as compared to the duopoly case. This result remains robust to a variety of measures of negativity, measures of the number of

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3We only use data on races that took place after the implementation of the “Stand By Your Ad” reform, so we make sure we examine the the candidates’ own advertising incentives and choices.
candidates, and empirical strategies (such as linear, non-linear, and propensity score estimators). All results remain consistent when including a variety of potentially confounding covariates that we construct at the ad, candidate, and election levels.

Our empirical findings, which tie together the number of competitors and the tone of the campaign, also shed new light on the consequences that the policies aimed at shaping the “competitiveness” of primary elections (and therefore entry) may have on the tone of the campaign, and in turn on voters’ behavior.

The plan of the paper is the following. In Section 2 we review the related literature. Section 3 contains a discussion of the data construction process, where we create a comprehensive dataset on primary contests, candidate characteristics, and advertising patterns. In Section 4 we carry out the empirical analysis and illustrate the key spillover effect in the data. We also include a discussion of the robustness of the raw effects in the data due to omitted variable bias by controlling for relevant ad-, candidate- and election-level covariates. We conclude in Section 5.

2 Relevant Literature

This paper is broadly related to a vast literature in political science and economics that examines political advertising. Empirical studies of political advertising primarily investigate the effects of campaigning on voter behavior. For example, a number of papers focus on the effects of negative advertising on voter turnout and vote choice (Ansolabehere et al. (1994); Freedman and Goldstein (1999) Freedman et al. (2004); Lau Et. Al. (2007); Che Et. Al. (2007); Lau Et. Al. (1999); Shachar and Nalebuff (1999); Coate and Conlin (2004)) Other works, such as Gerber et al. (2007), Stromberg (2008), Gerber (1998) and Levitt (1994), investigate the relationship between campaign spending and vote choice, in gubernatorial, Presidential, Senate and House elections respectively. Urban and Niebler (2013) document that advertising exposure increases campaign contributions in Presidential contests. Further, De Mello and Da Silveira (2011) overcome the endogeneity
problem of campaign spending using races where candidates’ TV time is split equally among them (in a second round), and document a large effect of TV advertising on voter outcomes.

We differ from these studies in that, instead of focusing on the demand side (i.e., ‘voters’), and addressing the question of who is affected by advertising and why, we examine the campaign choices of candidates, positive or negative, and investigate how their advertising strategy changes with the number of competitors in the race. In this respect, our work is more closely related to the few works pertaining the supply side (i.e., candidate behavior). Lovett and Shachar (2011) estimate a model of electoral competition where two candidates decide how much to advertise and how to allocate the advertising expenditure between positive and negative advertising. Blackwell (2013) estimates the effectiveness of a candidate’s decision to “go negative” in Senate and Gubernatorial Democrats elections from 2002 to 2006. He finds that negative advertising could be an effective strategy only for challengers. In these papers, the strategies of candidates do not explicitly take into account the spillover effect of negative ads since they consider only races with two competitors. On the contrary, the focus of our work is the spillover effect that arises when there are more than two candidates. Finally, Peterson and Djupe (2005) investigate the supply side of negativity in the 1998 Senate primary elections. However, they look at newspaper content and not the candidates’ own advertising incentives, asserting that more candidates results in more negative newspaper coverage.4

This paper is also related to another growing strand of empirical literature focusing on the broader interaction of media and politics.5 Della Vigna and Kaplan (2007) study

4Other empirical papers focusing on the supply side are Gordon and Hartmann (2010, 2013), who estimate a model where candidates strategically choose advertising levels across markets, using the methodology in Berry, Levinsohn, and Pakes (1995) to account for the endogeneity of political advertising; Erikson and Palfrey (2000) who investigate the simultaneity problem in estimating the effect of campaign spending on election outcomes. None of the mentioned papers differentiate between positive and negative advertising.

5See Prat and Stromberg (2011) and citations therein for a complete review of this literature.
the impact of the entry of the first conservative-based news network on voter turnout, analyzing the effects of media bias. Similarly, Gentzkow (2006) and Gentzkow et. al. (2011) study the effect of television and newspaper entry, respectively, in specific markets on voter turnout. In other work, Chiang and Knight (2011) study the relationship between newspaper endorsements and voting, and Durante and Knight (2012) instead study viewer responses to a shift in partisan control and media bias. While all of these papers analyze the effects of media bias and link these effects to politics, none of them precisely study advertisements.

Further, this paper aims to contribute to the growing literature on the importance of primary elections in the US. Hirano and Snyder (2012b) document that 60% of voters live in Congressional Districts where one party generally dominates the general election. They find that primary contests are competitive races for these advantaged parties, which then raises the quality of the elected official. Further, Snyder and Ting (2011) support this finding. They conclude that primaries are the best at picking quality candidates when extreme districts exist. Hirano and Snyder (2012a) document the correlation between the existence of primary contests and a shift from party-based voting to candidate-based voting. All three of these works have pushed the envelope to understand what primary contests do, especially focusing on data collection. Each of these papers document a lack of primary election data, and the data collection involved with this paper helps to increase the field’s knowledge of primaries.

3 Data Description

In order to explore the empirical relevance of the spillover effect, we assemble a new dataset that contains information on all entrants of the 2004 and 2008 primary races in the United States (in 2006 data were not collected at all). We do not include 2002 races.

6Gentzkow and Della Vigna (2010) further study the persuasive nature of media and advertising on consumers and voters in their book chapter.
since the “Stand by Your Ad” act may have additionally changed the climate of negative advertising, as it was enacted mid primary season in 2002. We do not include ads data from races in 2000 because they span only 75 markets. Thus, the negativity measures fail to cover a significant enough portion of state or district to explain the tone of the race accurately, especially since these are not a random sample (these ones are the biggest, and most expensive, markets). In 1996 CMAG coded only ads aired during the presidential primaries.

In order to verify the identity and number of candidates running in any of these primary races, we first obtain information on each U.S. House, U.S. Senate, and gubernatorial primary election in both years from the records kept in America Votes (2005, 2009). Unlike in general elections where election results are widely available, the lack of consistent and thorough record-keeping for Senate, House, and gubernatorial primary races makes it challenging to obtain primary records. Thus, we choose to hard code primary information from this reliable, encyclopaedic source. From this data source, we collect information about each race held in that election cycle, the date of the election, the candidates running for office in that race (if there were any), the candidate’s incumbency status, and each candidate’s final vote share. Throughout our analysis, we refer to an election, or electoral contest, as each specific race (e.g., Democratic Primary for Wisconsin Governor). We then eliminate the unopposed elections (i.e., elections with only one candidate running) and all elections where no candidates ran. In a strongly Democratic district, for example, it is not uncommon for there to be no Republican candidates running in a primary.\(^7\) In 2004, there are 340 primary elections that have two or more competitors (199 are two-candidate races and 141 elections have three or more candidates). Similarly, in 2008, there are 384 primary elections that have two or more competitors (211 two-candidate races and 173 races with three or more candidates).

\(^7\)Overall there are 966 elections from 2004 Senate, House, and gubernatorial primaries; but of these, 558 elections are unopposed and 68 elections have no candidates. In 2008 Senate, House, and gubernatorial primaries, we start with 915 races, where 504 are unopposed and 27 have no candidates.
By matching candidates’ names with advertisers’ names, we then merge our election-candidate dataset with the dataset assembled by the TNSMI/Campaign Media Analysis Group (CMAG), and made available to us by the University of Wisconsin Advertising Project (WiscAds), to obtain detailed information about the tone of the campaigns and the advertising strategy of each candidate. The WiscAds is a monumental data set that includes information on each airing of a political advertisement in all media markets in the U.S. in 2008, and in the top 100 media markets in 2004. The top 100 media markets cover about 85% of the US population (see Figure 1).\footnote{See Goldstein and Rivlin (2007a, 2007b) for a detailed description of the WiscAds data.}

[Figure 1 about here]
Figure 1: Top 100 Media Markets
This merge leaves us with 104 (118) primary elections with two or more candidates and active campaign advertising in 2004 (2008), with 26 (22) for Senate, 63 (87) for House, and 15 (9) for gubernatorial elections in 2004 (2008).\(^9\)

Finally, for each individual in our sample, we collect information about his/her age when running for the primary, gender, ethnicity, educational background (i.e., if he/she holds a college degree and if he/she holds a law degree), and if he/she has political experience (i.e., holding another public office at the local, state, or federal level or being a member of the U.S. Congress) prior to running in the primary race of interest. This aspect of the data collection is important as it enables us to verify if the influence of the number of candidates on the tone of the advertising is partially driven by the fact that there are potentially different “types” of candidates across races of different size.

Another relevant aspect of the dataset we assemble is that we can exploit variation at the race, candidate, and ad level. Therefore, these data allow us to examine i) the overall tone of the campaign at the election level ii) a candidate’s advertising strategy (i.e., the ratio of negative versus positive, conditional on the total level of advertising) and iii) the probability that each ad is negative, based on ad-level attributes such as the time to the election. In case ii) we give equal weight to all candidates, whereas in case iii) we instead place more weight on the candidates who advertised more, and obtain similar findings.

\(^9\)When we conduct this merge, we lose 214 House races, 7 gubernatorial races and 13 Senate races in 2004. Of these dropped races that arose in the match with the advertising data, approximately 20% are due to the fact that they are outside of the top 100 media markets, and about 80% were due to the fact that there is no advertising for the primary election. In 2008, we have data for all 210 media markets, so we only lose races that do not contain any advertising, or 95 races. We drop one Louisiana governor race in 2004, since it had a runoff after the primary. We also drop Ronnie Musgrove’s advertising in a 5 candidate Mississippi election, since he (the incumbent) was prematurely attacking the general election candidate, which does not pertain to primary competition. The 2008 Tennessee Democratic Senate primary race contained a candidate (Gary Davis) with the same name as incumbent Congressmen David Davis and Lincoln Davis. He did not advertise and came close to winning the election, putting favorite Mike Padgett in third place, and thus creating odd incentives.
Thus, these three setups allow us to reassure ourselves that the amount of advertising does not influence our results.

We now describe each part of the dataset and the sources we used to construct it. In addition, the Data Appendix (Appendix A) provides information regarding the specific source of each variable used in this study (Table A.1) as well as the calculation of each (Table A.2).

**Candidate Data**

**Viable Candidates:**

There is natural concern that our measure of the number of competitors, which is the number of candidates who appear on the primary ballot (we refer to this measure of candidates as “Ballot N”) may be overstated, since there could be a number of fringe candidates on the ballot who pose no real competitive threat to the viable candidates (meaning that the viable candidates effectively ignore potential spillover to the fringe candidate in making advertising choices). We thus construct a number of alternative measures of the number of candidates in a race by ignoring candidates who earned less than 5 percent, 10 percent, and 15 percent of the popular vote in the election. We shall refer to these measures as “Effective N1,” “Effective N2,” “Effective N3,” respectively.

[Table 1 about here]

10 Ideally we would determine the effective candidates using polling data collected at an early stage of the campaigns. However, it is hard to find reliable data of polls for all primary elections. A popular resource on trends in American public opinion is PollingReport, which systematically reports all the electoral polling data that have been collected during a US campaign. According to PollingReport we could recover information about only 31 primary races that actually have primary match-up polls. When using this information, we do not observe remarkable differences in the distribution of N as compared to the one obtained using final vote shares.
### Table 1: Ballot N and Effective N

<table>
<thead>
<tr>
<th>Measure N</th>
<th>Ballot N</th>
<th>N 1</th>
<th>N 2</th>
<th>N 3</th>
<th>N 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>CDF</td>
<td>Frequency</td>
<td>CDF</td>
<td>Frequency</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1.8</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>84</td>
<td>37.84</td>
<td>107</td>
<td>50</td>
<td>116</td>
</tr>
<tr>
<td>3</td>
<td>54</td>
<td>62.16</td>
<td>58</td>
<td>76.13</td>
<td>61</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
<td>76.58</td>
<td>37</td>
<td>92.79</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>83.78</td>
<td>10</td>
<td>97.3</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>90.54</td>
<td>4</td>
<td>99.1</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>93.69</td>
<td>1</td>
<td>99.55</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>96.85</td>
<td>1</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>98.2</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>222</td>
<td>222</td>
<td>222</td>
<td>222</td>
<td>222</td>
</tr>
</tbody>
</table>

Ballot N includes all candidates whose names were on the ballot (not write-ins).

N 1 includes candidates who received at least 5% of the final vote share.

N 2 includes candidates who received at least 10% of the final vote share.

N 3 includes candidates who received at least 15% of the final vote share.

N 4 includes candidates who came within 10% points of winner.
Table 1 shows the effect on the distribution of the number of candidates across races for the aforementioned definitions of N.” Each “Effective N” measure puts more mass of the distribution on races with two, three, or four candidates (since elections with five or more candidates are getting re-classified into one of these groups). The more compressed distribution accords with general knowledge that primary races with five or more credible candidates vying for votes are quite rare. Further, when determining who poses a competitive threat in election with plurality rule, perhaps an important factor to take into account is the vote margin between the top (expected) candidate and the second candidate. Also a fixed percentage rule may have some limitations if we are comparing duopolies vs. non-duopolies. For instance, consider the case of a candidate who receives, in the end, 20 percent of the vote against one opponent is unlikely to ever have been a plausible winner in a duopoly race. On the contrary, a candidate who receives 20 percent in a 4-candidates primary may very well have been the front-runner at some point in time. Based on this consideration, we then construct an alternative measure that is expressed as percentage points of the winner’s final vote share. For instance, the fourth measure we consider only includes candidates who earned within 10 percentage points of the winner’s final vote share, which we denote “Effective N4”. When using the latter measure based on the margin of victory, we are also effectively imposing a sample selection, as only “close races” will be included, and the number of races decreases as the Effective N measure becomes more restrictive (147 races have only one effective candidate when using “Effective N4.”) For ease of exposition, the remainder of the paper will mainly focus on the “Effective N 2” measure in favor of the ballot measure. All results that follow are robust to using the Ballot N measure or “Effective N” measures.

In our sample, about 90% of the electoral contests have at least two viable candidates in the race. Races for gubernatorial and Senate seats tend to be associated with lower

\footnote{If we revise this measure to candidates who earned more than 2% of the vote share, the number of 2 candidate, 3 candidate, and 4 candidate elections remain similar. The only variability comes from races with 5 or more candidates.}
entry. The majority of races are from U.S. House races.\textsuperscript{12}

**Demographics:**

Little information is known about the types of candidates who enter U.S. House, U.S. Senate, or gubernatorial primary races, and this data collection process gives us an opportunity to explore who enters these primary races. For the specific purposes of this paper, concern may arise that individuals with certain demographics and political experience are more likely to enter races with few candidates and may be more prone to go negative. We collect information about each candidate’s age, education (college completion and law school completion), race, gender, private sector occupation, and political experience. In cases where the candidate has been a member of the U.S. Congress at some point, we obtain these characteristics from the official Biographical Directory of the U.S. Congress (1789-present). In the many cases where the candidate has never served in a U.S. Congressional office, we search through alternative web-based data sources, such as online versions of state and local newspapers and candidate’s biographies on their official campaign pages to obtain the relevant information.\textsuperscript{13}

Lawyers are the most common profession in our data for both years, followed by businessmen, and the average age of the candidates who advertise is 53, with approximately two thirds of candidates between 45 and 60 years of age. In addition, just over 80\% of the candidates in our data were men, and about 90\% of the candidates were white. Thus, we see that the “modal” advertiser is a white male between 45 and 60 years old, and is an attorney or businessman.\textsuperscript{14}

In Table 2 Columns (1) and (2) report the summary statistics of the advertisers’ demographics and political experience across duopolies and non-duopolies to ensure that different market structures do not attract intrinsically different types of competitors. The

\textsuperscript{12}See the Data Appendix Table A.3 for details.

\textsuperscript{13}Specific candidate information and sources are outlined in Appendix A.

\textsuperscript{14}The correlation between the percent of the vote share obtained and whether or not we have a candidate’s demographic information is 0.02, so the few candidates for whom we could not obtain this information are not less likely to be viable competitors.
demographics are quite similar across races, despite the number of competitors. Only political experience (whether the individual has held political office in the past 15 years) seems to slightly vary amongst duopolies and non-duopolies, making it crucial for us to control for this in the analysis to follow. As it is a standard practice, we follow Jacobson (1980) in accounting for prior political experience in our models as a proxy for quality or performance of politicians.

[Table 2 about here]
Table 2: Candidate Characteristics do Not Differ Across the Duopoly Measure

<table>
<thead>
<tr>
<th></th>
<th>Who Enters?</th>
<th>Who Advertises?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Duopoly</td>
<td>Duopoly</td>
</tr>
<tr>
<td>Male</td>
<td>0.8071</td>
<td>0.8555</td>
</tr>
<tr>
<td></td>
<td>(0.3956)</td>
<td>(0.3526)</td>
</tr>
<tr>
<td>White</td>
<td>0.9110</td>
<td>0.9118</td>
</tr>
<tr>
<td></td>
<td>(0.2855)</td>
<td>(0.2845)</td>
</tr>
<tr>
<td>College Degree</td>
<td>0.9526</td>
<td>0.9699</td>
</tr>
<tr>
<td></td>
<td>(0.2130)</td>
<td>(0.1714)</td>
</tr>
<tr>
<td>Law School</td>
<td>0.3316</td>
<td>0.3636</td>
</tr>
<tr>
<td></td>
<td>(0.4720)</td>
<td>(0.4825)</td>
</tr>
<tr>
<td>Political Experience</td>
<td>0.4635***</td>
<td>0.6294***</td>
</tr>
<tr>
<td></td>
<td>(0.5000)</td>
<td>(0.4844)</td>
</tr>
<tr>
<td>Observations</td>
<td>190</td>
<td>165</td>
</tr>
</tbody>
</table>

Sources of demographic variables available upon request. Mean of each variable with standard deviation in parentheses. Duopoly defined using the “N 2” measure, where candidates who came with at least 10% of the final vote share are “viable competitors.” **, *** Significantly different at the 5% and 1% level, respectively. Remainder are not significantly different at the 10% level.
We also collect information on the demographics of candidates running who are not included in our final sample (i.e., candidates who did not advertise) for the most recent cycles, 2004 and 2008, to confirm that demographic characteristics of entrants are not systematically different for television advertisers and those that do not advertise on television, as the data we use for the remainder of the analysis uses information pertaining only to advertisers. In Columns (3) and (4) of Table 2, we find that the only differences are that advertisers are slightly more inclined to hold a law degree, and advertisers are more likely to have political experience.\textsuperscript{15}

\section*{Advertising Data}

Throughout the entire 2004 election season, over half a million television spots -558,989 ads- were aired in favor of gubernatorial, U.S. Senate, and U.S. House candidates in the top 100 markets.\textsuperscript{16} Similarly, in 2008, our data records over 1 million advertisements 1,342,341 aired throughout the entire 2007-2008 election season. Of the total ads broadcasted, 443,325 aired during the primary campaigns for these elections, which are the focus of this paper due to their variation in the number of candidates. Whether an advertisement was aired during the primary or general election was determined by the date of the primary in each state.\textsuperscript{17}

\textsuperscript{15}Concern may arise that those races without televised advertising have different entry incentives than those with televised advertising. However, we find that the number of “viable” candidates is similar for elections with and without televised advertising: 2.66 and 2.25 respectively in 2004 and 3.52 and 2.64 respectively in 2008.

\textsuperscript{16}Candidates make an extensive use of televised advertising. For example, in the 2008 US presidential election, candidates spent over $360 million on broadcast time throughout their campaigns. Broadcast media accounted for the highest share of the overall media expenditure, followed by miscellaneous media ($273 million), internet media ($43 million) and print media ($21 million). See CRP (2011) for more details.

\textsuperscript{17}If the ad aired prior to the primary election, then it was counted as a primary ad. Any ads that aired after the primary were dropped from the dataset.
In Table A.4 of the Data Appendix, we report the total ads aired by viable candidates. We observe 431,418 total ads in campaigns for 2004 and 2008 races with 2 or more “Effective” candidates, of which 34% are from Senate elections, 29% from House elections, and 37% from gubernatorial elections. Given the fact that House districts generally span small sections of multiple media markets, making it costly to advertise in small portions of several markets, it is not surprising that a small percentage of campaign advertising is for House candidates. Senate and gubernatorial elections, on the other hand, are state-wide, and candidates more typically campaign via televised advertising.\footnote{See Snyder and Stromberg (2010) for more on the incongruence between media outlet boundaries and Congressional advertising. The obvious exception to this is in cases where there is only one House district in the state, though these states are more sparsely populated and their media markets are less likely to enter the 2004 sample.} Again, the increased continuity of media markets for state elections creates additional incentives to engage in televised advertising in Senate and gubernatorial races than in House races.

The CMAG data provide a rich set of information for each ad aired throughout the election, as the unit of analysis is an individual television broadcast of a single advertisement. The data contain information on when the advertisement aired (date, time of day, and program) and where the ad aired (television station and media market) in addition to the cost of the ad.\footnote{While there are cost measures in the dataset for each ad, they are estimated by TNS (the parent company of CMAG) based on the media market, time of day, and the show the ad aired on. Part of TNS’s expertise is the measurement of these costs.} Virtually all advertisements are for 30 second television spots, so the length of an ad is not a relevant issue. The WiscAds coders examine the content of each advertisement in the CMAG data and record a number of variables related to the content of the ad, including the name of the favored candidate, his/her political party, the race being contested, the tone, and issues addressed.\footnote{We also observe the sponsor of the ad both by name, i.e. “Paid for by Friends of Jon Jennings Committee” or “Paid for by Emily’s List” and by category, i.e. candidate, party, or special interest group. Since, however, candidates sponsored over 94% of all ads, with interest groups sponsoring only 4% of ads, we drop the latter two. The election years we study are pre-Citizens United, and thus there}
of the advertisement, coders are asked to determine whether the objective of the ad is to promote a candidate, attack a candidate, or a contrast of the two. Attack ads are coded as such if the favored candidate is not mentioned in the ad at all; contrast ads mention both the favored and opposing candidate; promote ads mention only the favored candidate. The WiscAds data also include measures for whether or not the opposing candidate is pictured in the ad, but not the identity of this opposing candidate who is the target of the attack, and if the focus of the ad is on personal or policy matters. It is possible to construct various measures of negativity based on this data. Four possible measures of negativity, which are not mutually exclusive, are the following (each of which is coded as one if the advertisement is designated as “negative” under a specific set of criteria, and zero otherwise):

**Negative1** includes ads that either spend the entire time attacking an opponent or spend some time promoting and some attacking (attack plus contrast ads).

**Negative2** includes ads that attack for at least half of the airtime.

**Negative3** includes only those ads that end with an attack.

**Negative4** includes all ads that only attack the opponent.

For our purposes, the most relevant categories of negative advertising are **Negative1** (which flags an ad as negative if it contains any negativity whatsoever) and **Negative4** (which only flags an ad as negative if all of its message is negative). Thus **Negative1** is a more inclusive measure than **Negative4**. We make the assumption that negative advertising is candidate specific, meaning each ad attacks one particular candidate. While it is plausible that a candidate can run an ad attacking all other competitors in the race, we do not find occurrences of this when spot-checking the ad data content explicitly. In no corporations or Super Pacs advertising in these contests.

---

21 We do know if the ad is refuting previous negativity directed at a candidate, which occurs about 6 percent of the time in the data.
primary contests, there are occasional ads that say a variant of “Candidate X is the only one to support Policy Y,” though this would not be coded as a negative ad.

4 The Spillover Effect

We now seek to empirically examine the effect of the number of competitors in a race on the incentive to air negative ads in the data. We expect that increasing the number of competitors beyond two players generates a spillover effect that reduces the return of negative advertising. The spillover effect thus suggests two predictions about the data:

1. Duopoly markets should exhibit a greater tendency for negative advertising than non-duopoly markets.

2. The tendency for negative advertising should decrease monotonically with the number of competitors.

Both predictions are products of the spillover story. Our analysis will be concerned with seeing whether these effects are present in the data and quantifying their magnitude. Assessing the magnitudes will provide a sense of the order of importance of competition as a means of explaining negativity.

[Figure 2 about here]

---

22In Appendix C, we formally illustrate our hypothesis that the introduction of more competitors creates a spillover effect that diminishes the incentive to negatively advertise, as it pertains to political competition. We construct a conceptual framework that draws upon ideas from the literature based on games of voters’ mobilization, which were first developed by Snyder (1989) and Shachar and Nalebuff (1999), and from the work of Chen (2003) on sabotage in promotion tournaments.
Figure 2: Frequency of Negative Ads with Two and more than Two Effective Candidates (using N2)
We start our empirical analysis with the first prediction and plot the proportion of negative ads under the five different measure of negativity for both duopoly and non-duopoly markets again using “Effective N 2” as the measure of competition. The result is shown in Figure 2. The figure reveals a clear consistency with our hypothesis: across all the negativity measures, duopoly markets exhibit a significantly higher probability of airing a negative ad as opposed to non-duopoly markets. The magnitude of this “duopoly effect” is striking: across all measures, duopolies exhibit over twice as high a likelihood of airing a negative ad as compared to non-duopolies. Figure 3 shows that these trends continue to exist when modifying the measure of “Effective N” as well as looking at the Ballot N measure, when focusing on the Negative1 and Negative4 measures. Still, we find that candidates in duopolies are at least twice as likely to engage in negative advertising as those in non-duopolies across all measures of Effective N, and one and a half times as likely when using the Ballot N measure. Figure 3 also shows that the relative increase in the rate of negative advertising for duopoly markets is larger when one considers the Negative4 (lower panel) measure as opposed to the Negative1 (upper panel) measure. This accords with our theory since Negative4 only counts ads that spend the whole time attacking as negative while Negative1 counts ads that spend any part of the ad attacking as negative. Thus the reduction in the benefits of using negative advertising for non-duopoly markets should be even larger under Negative4 advertising as compared to Negative1 advertising.

[Figure 3 about here]

---

23As mentioned above, an alternative measure of the number of effective candidates could be obtained using polling data collected at an early stage of the campaigns. However, it is hard to find reliable data of polls for all primary elections. A popular resource on trends in American public opinion is Polling Report, which systematically reports all the electoral polling data that have been collected during a US campaign. Using Polling Report, we could recover information about only 31 primary races that actually have primary match-up polls. With this small sample size, we still find that duopolies have more than double the probability of going negative when compared to non-duopolies.

24Each of the mean negativity values between duopolies and non-duopolies for both election cycles as displayed in Figure ?? and 3 are statistically different from each other at the 1% level.
Figure 3: Frequency of Negative Ads with Two and more than Two Effective Candidates
Table A.5 in the Data Appendix breaks out the information in Figure 2 further by showing the proportion of ads that are negative under the four different measures conditional on the number of competitors in each election by measure of “Effective N.” Here we see that the trend in the tables is again consistent with our prediction. When broken down further by “Effective N” measures, negativity decreases monotonically with the number of candidates. Interestingly, for most of the measures, the bulk of the reduction is realized in just doubling the number of players from 2 to 4 players (two person races having between 2 and 4 times the rate of negative ads as four person races). If we restrict attention to advertising that spends the whole time attacking, i.e., Negative4, we also see that with just 5 or more players, the rate of negative advertising virtually goes to zero. Thus with just a handful of competitors, we see that the monotone effect of negativity in the number of players can drive negativity to almost zero.

The evidence presented above illustrated a revealing empirical relationship between the number of competitors and the incentives for going negative. When we simply regress $\ln(N)$ on negativity, the estimated coefficients capture the unconditional moment found in Figures 2 and 3. The point estimates are reported in Table A.6. For instance, when using Effective N2 and Negative 1 measures, the propensity of airing a negative ad is nearly 25 percentage points higher in duopoly than in non-duopoly political markets. In other words, races with only two viable candidates have, on average, an 83% higher chance of exhibiting negative ads (the mean value of negativity is 30% in this sample, see Table A.5). Further, we see that doubling the number of candidates (say going from 2 to 4) leads to an absolute decline in the probability of going negative of about 46 percent. The steep reduction in the rate of negative advertising that is associated with adding just a few or even one viable player suggests that our hypothesis is a first order reason for the high rates of negative advertising in political markets overall (since most elections in the United States are head to head duopoly races). Next we will consider the robustness of these results to the possible presence of omitted variable bias. The potential endogeneity concern is that factors that lead a race to only have a few candidates might also be related
to the factors that cause the “tone” of an election to be more negative. While we may
view entry into a primary race as exogenous to the decision to go negative upon entering
(which accords with a common wisdom in political science, see e.g., Brady et al. (2007)),
we can nevertheless show that introducing control variables that are likely candidates for
explaining negativity at the election level (and might be associated with entry) do not
alter the estimated magnitude of the effect of competition on negativity.

4.1 Empirical Specification

When presenting the results, we mainly restrict attention to the two most straightfor-
dward categories of negativity, i.e., Negative1 and Negative4, and focus on the “Effective
N 2” measure of competition for ease of exposition. However we show that the results
would also hold if we had used the Ballot measure of N or other measures of “Effective
N” defined above. Specifically, we employ a linear probability model for the event that
an advertisement in the data is negative using the following equation:

\[ \text{Negative}_{i,j,t} = \alpha_0 + \alpha_1 \log(N_j) + \delta X_{i,j,t} + \epsilon_{i,j,t}. \] (1)

In our main specifications, Negative\(_{i,j,t}\) equals one if the ad run by candidate \(i\) in election \(j\) at time \(t\) was negative (based on the four definitions above), and zero otherwise. Our
main coefficient of interest is \(\alpha_1\), which is the effect of \(N\), the number of candidates in the
given election. We further include a vector of covariates in \(X_{i,j,t}\), including: Governor, Republican, Political Experience, Incumbent, 2008, and Days until Election. These are
each explained below. We are careful to cluster the ad level observations at the election
level to control for any unobserved shock that correlates observations within an election,
and we are also careful to use robust standard errors to control for heteroskedasticity.\(^{25}\)

\(^{25}\)Our use of clustered standard errors throughout the paper is a conservative strategy for the standard
errors. Given our data has a long panel dimension (many advertisements within each race), imposing more
model structure would allow us to improve upon standard errors. It is reassuring that such additional
While we focus on elections that share many institutional features, still, they might be heterogenous with respect to political factors, which affect the value of the seat as well as the electoral prospects, and might influence entry and perhaps the tone of the campaign. The first control we consider is the presence of an incumbent in the election. If there is an incumbent (own party) running for the seat, then there is presumably a lower chance other candidates can win it, which may decrease the number of potential entrants. In our sample, the average number of candidates is 2.04 and 3.15, conditional on the incumbent running or not running respectively. Upon entering, as an incumbent’s policy and personal stances are common knowledge, he/she can spend the duration of the campaigning attacking opponents, thus increasing the volume of negative advertising. Furthermore, the presence of an incumbent may affect the propensity of going negative of his/her opponent as well (it could be more likely to observe attacks directed towards the incumbent, whose past exposure makes it easier to collect information).\textsuperscript{26}

Second, we consider the possibility that gubernatorial races are susceptible to lower entry. A feature of most gubernatorial races that we attribute to this reduced entry is the existence of term limits, which reduce the average duration of Governors’ careers, and therefore lowers the value of the seat.\textsuperscript{27} In addition, the difference in the scope of accountability (state versus national) may deter entry, so we add a control variable for whether or not the race is gubernatorial.

Third, we may worry that one party historically has more negative primaries than the other, and may also attract more candidates in a certain time period (i.e., if it is the majority party in Congress), so we also control for whether or not the race was Republican.

Fourth, we also exploit the rich structure of the WiscAds data and introduce one additional control that may contribute to explain the propensity of going negative at the modelling structure is not needed for our main substantive results to hold.

\textsuperscript{26}Recall that this study restricts its analysis to primaries, so each election does not always have an incumbent and a challenger, as in general elections.

\textsuperscript{27}For example, Diermeier Et. Al. (2005) estimate that term limits induce a large reduction in the value of Congressional seats: 32% for a House seat and 21% for a Senate seat.
ad and candidate levels in order to gain a better sense of any confounding factors. At
the ad level, in addition to the controls previously discussed, we look at the number of
days from the primary election that the ad aired, as the WiscAds data provides us with
the specific date each ad airs. The ad level nature of observations gives us the benefit
of having more data, allowing us to have a richer specification. Since each primary has
a different duration, we standardize this measure normalizing it by the length of the
campaign. *Days until Election* is continuous on the interval \((0,1)\), and takes a value
equal to one at the farthest day away from the election and 0 at the election day. One
would expect that as the election approaches, all candidates may be more likely to engage
in negative advertising.\(^{28}\)

Fifth, at the candidate level we include an indicator for whether or not the advertiser
has political experience, which is defined as having held an elected office at the state level
or higher (i.e. state Senate). Recall that in Table 2, the only difference between duopolies
and non-duopolies in terms of candidate characteristics is that candidates in duopolies
are more likely to have held a political office in the past.\(^{29,30}\)

Finally, one may be concerned that if the openness of a primary election has an effect
on \(N\) as well as polarization, this in turn could be a relevant factor shaping the tone of
the campaign we should take into account. However, McCarty Et. Al. (2013) document
that the link between the openness of a primary system and the ideology of the state
legislators elected is quite weak. Similarly, Hirano Et. Al. (2010) have recently found

\(^{28}\)In alternate specifications, we also control for the total volume of advertising in an election, where
we take the natural log of this number, as elections with more ads will likely increase the probability
that each ad is negative. However, since ad volume and tone are simultaneously determined, we do not
include these in our main specifications. These results are available in Table B.1 of Appendix B.

\(^{29}\)We also run specifications including all the demographics we have collected. As expected, the
results do not change. Furthermore, none of the additional demographics seems to influence the tone of
the campaign. See Appendix B Table B.3 for these results.

\(^{30}\)These findings remain robust if we separate the data by election year. Similarly, if incumbency is a
dummy variable equal to 1 if the ad is aired by the incumbent, the results still hold. All these results are
available upon request.
little evidence that primary competition is related to partisan polarization in Senate roll call voting.

In sum, the vector of covariates is, $X=(\text{Incumbent, Governor, Days Until Election, 2008, Republican, Political Experience})$. Further, we include a dummy for the election cycle, and media market level fixed effects to absorb any variation that may affect the demand for negativity at the market level in the ad-level regressions. We also allow for state fixed effects to capture for example any regulation of primaries’ nominations (which did not change in the time period we consider) and may affect the entry decision, as well as the tone, in a race.

4.1.1 Baseline Results

[Table 3 about here]
Table 3: Benchmark Specification 1, Advertising-level Analysis

<table>
<thead>
<tr>
<th>Panel A</th>
<th>Dependent Variable: Negative1=1 if ad EVER attacked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>Ballot N</td>
</tr>
<tr>
<td>log(N)</td>
<td>-0.148**</td>
</tr>
<tr>
<td></td>
<td>(0.0582)</td>
</tr>
<tr>
<td>2008</td>
<td>0.0903</td>
</tr>
<tr>
<td></td>
<td>(0.0558)</td>
</tr>
<tr>
<td>Incumbent</td>
<td>0.0511</td>
</tr>
<tr>
<td></td>
<td>(0.0538)</td>
</tr>
<tr>
<td>Governor</td>
<td>0.0474</td>
</tr>
<tr>
<td></td>
<td>(0.0562)</td>
</tr>
<tr>
<td>Days Until Election</td>
<td>-0.382***</td>
</tr>
<tr>
<td></td>
<td>(0.0474)</td>
</tr>
<tr>
<td>Republican</td>
<td>0.0407</td>
</tr>
<tr>
<td></td>
<td>(0.0456)</td>
</tr>
<tr>
<td>Political Experience</td>
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</tr>
<tr>
<td></td>
<td>(0.0538)</td>
</tr>
<tr>
<td>Observations</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B</th>
<th>Negative1=1 if ad EVER attacked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative1=1 if ad EVER attacked</td>
</tr>
<tr>
<td>Duopoly</td>
<td>0.112</td>
</tr>
<tr>
<td></td>
<td>(0.0756)</td>
</tr>
<tr>
<td>Negative2=1 if ad attacked at least half airtime</td>
<td></td>
</tr>
<tr>
<td>log(N)</td>
<td>-0.133**</td>
</tr>
<tr>
<td></td>
<td>(0.0554)</td>
</tr>
<tr>
<td>Duopoly</td>
<td>0.127*</td>
</tr>
<tr>
<td></td>
<td>(0.0718)</td>
</tr>
<tr>
<td>Negative3=1 if ad ended in an attack</td>
<td></td>
</tr>
<tr>
<td>log(N)</td>
<td>-0.0940**</td>
</tr>
<tr>
<td></td>
<td>(0.0421)</td>
</tr>
<tr>
<td>Duopoly</td>
<td>0.0801</td>
</tr>
<tr>
<td></td>
<td>(0.0562)</td>
</tr>
<tr>
<td>Negative4=1 if ad ONLY attacked</td>
<td></td>
</tr>
<tr>
<td>log(N)</td>
<td>-0.0829**</td>
</tr>
<tr>
<td></td>
<td>(0.0341)</td>
</tr>
<tr>
<td>Duopoly</td>
<td>0.0904*</td>
</tr>
<tr>
<td></td>
<td>(0.0475)</td>
</tr>
<tr>
<td>Observations</td>
<td>411725</td>
</tr>
</tbody>
</table>

Robust standard errors clustered at the election level in parentheses.
Linear Probability Model. *p < 0.10, **p < 0.05, ***p < 0.01
We start with the results across different measures of N (or a duopoly indicator), where we employ a linear probability model for the event that an advertisement in the data is negative from Equation 1. The obtained results for Negative1 are reported in Panel A of Table 3. Comparable to the unconditional average effects in Table A.6, our point estimates show that the percent of negative advertising is decreasing in the number of effective competitors, in all specifications. Doubling the number of candidates results in about a 15 - 45 percent decrease in the fraction of negative advertisements depending on the measure of N we consider (the effect is largest for the N2 measure of Effective N, and smallest for the Ballot N measure). This shows that the unconditional means in Table A.6 remain approximately the same when we add control variables that might also be related to the likelihood of an advertisement being negative and/or the number of candidates who enter. The main significant control across specifications is the time before the election the ad aired. As the election approaches, meaning the time to the election decreases, the campaign becomes more negative.

Next, we show that our results are not particular to the Negative1 measure. In Panel B, we replicate our analysis for the other negativity measures, and the same phenomenon holds: doubling the number of candidates results in about a 10 - 20 percent decrease in the fraction of purely negative advertisements (Negative4). We also replicate the results with a duopoly indicator variable instead of Effective N. The magnitudes here mirror the findings in Figure 2 with a regression framework, where we see that duopolies have about a 26 percent absolute higher probability of airing a negative ad than non-duopolies (or almost double). Or, from Panel B, duopolies exhibit between 8 and 20 percentage points more pure negative ads than non-duopolies.

The variety of Effective N measures also sheds light on another finding, regarding the closeness of the race. When we shift to the N4 measure of entry, where only candidates that came within 10 percentage points of the winner are included, the effect is larger in

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31 Our results remain consistent if we instead use a logistic regression; these results are in Table B.2 of Appendix B.
magnitude. This is likely because we are selecting the sample to be those races with tighter competition. In comparison, the effects found in Column (1) when we focus on Ballot N are much smaller. This is likely due to the fact that some candidates do not enter with the intention to win the election. Instead, some of these candidates enter and advertise for self promotion, or potentially to build a positive image and run for future office. Thus, we think this finding is consistent with the spillover story. For the remainder of the analysis, we focus on the N2 measure for ease of exposition, though all results remain consistent if we use the remainder of the measures.

4.1.2 Robustness

In the remainder of this section, we consider alternative explanations to the spillover effect that could be entirely consistent with our findings, and provide additional evidence that could rule them out. When doing so, we include the same covariates as in Table 3.

[Table 4 about here]
Table 4: Robustness1 (N2)

<table>
<thead>
<tr>
<th>Dependent Variable: Negative1=1 if ad EVER attacked</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
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<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>logN2</td>
<td>-0.273*</td>
<td>-0.313***</td>
<td>-0.306***</td>
<td>-0.321</td>
<td>-0.414*</td>
<td>-0.553***</td>
<td>-0.243*</td>
</tr>
<tr>
<td></td>
<td>(0.159)</td>
<td>(0.114)</td>
<td>(0.107)</td>
<td>(0.299)</td>
<td>(0.231)</td>
<td>(0.158)</td>
<td>(0.138)</td>
</tr>
<tr>
<td>2008</td>
<td>-0.204*</td>
<td>0.103**</td>
<td>0.00455</td>
<td>0.0250</td>
<td>0.111</td>
<td>0.111</td>
<td>0.0270</td>
</tr>
<tr>
<td></td>
<td>(0.112)</td>
<td>(0.0477)</td>
<td>(0.0455)</td>
<td>(0.0652)</td>
<td>(0.122)</td>
<td>(0.0749)</td>
<td>(0.0533)</td>
</tr>
<tr>
<td>Governor</td>
<td>-0.181</td>
<td>-0.0217</td>
<td>0.0288</td>
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<td>-0.0170</td>
<td>-0.00368</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.136)</td>
<td>(0.0626)</td>
<td>(0.0441)</td>
<td>(0.135)</td>
<td>(0.0655)</td>
<td>(0.0673)</td>
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</tr>
<tr>
<td>Days Until Election</td>
<td>-0.325***</td>
<td>-0.417***</td>
<td>-0.381***</td>
<td>-0.188***</td>
<td>-0.467***</td>
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<td></td>
<td>(0.0891)</td>
<td>(0.0569)</td>
<td>(0.0546)</td>
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<td>(0.116)</td>
<td>(0.0644)</td>
<td>(0.0599)</td>
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<td>Republican</td>
<td>0.0453</td>
<td>0.0857**</td>
<td>0.172***</td>
<td>-0.0822</td>
<td>0.0302</td>
<td>0.211***</td>
<td>0.0413</td>
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<td>(0.122)</td>
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<td></td>
<td>(0.0970)</td>
<td>(0.0489)</td>
<td>(0.0489)</td>
<td>(0.167)</td>
<td>(0.0893)</td>
<td>(0.0602)</td>
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<td>Incumbent</td>
<td>0.110**</td>
<td>0.0604</td>
<td>0.152</td>
<td>0.0257</td>
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<td>(0.0527)</td>
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<td>(0.0944)</td>
<td>(0.0703)</td>
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<td>Keeps Races with an Incumbent</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
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<td>Drops Races with an Incumbent</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<td>Keeps only Dominant Party</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
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<td>No</td>
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<td>Drops Dominant Party</td>
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<td>Yes</td>
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<td></td>
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<tr>
<td>Keeps Close Districts</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td></td>
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<tr>
<td>Keeps only Close Races (&lt;= 5%)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Drops Close Races (&lt;= 5%)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>91318</td>
<td>290989</td>
<td>255335</td>
<td>27578</td>
<td>99394</td>
<td>110252</td>
<td>272055</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors clustered at the election level in parentheses. Columns (1), (4), and (6) use wild cluster bootstrap standard errors.

* p < 0.10, ** p < 0.05, *** p < 0.01.
1. Does the negative tone increase in the absence of an incumbent?

We first conduct our analysis by both dropping all races where an incumbent is running and including only races where incumbents are running to see if the results remain consistent with those obtained when controlling for incumbency. This exercise is motivated by an alternative story that could be consistent with our findings, and it is not based on the spillover effect through N. Specifically, valiant incumbents in the U.S. usually cruise to reelection (and, at least, to renomination by their party), and these uncontested races are all excluded from our data set. Instead, we include races where the incumbents draw at least one effective challenger (the average number of challengers of an incumbent, conditional on there being a challenger, is 1.04) and they have presumably some weakness a challenger can easily attack them on (as there is a negative selection from the set of all incumbents in competitive primaries). For example, Hirano and Snyder (2012b) document that incumbents in scandals are more likely to face a serious primary challenger compared to other incumbents. Hence, a challenger in these races may campaign much more negatively, and not because of the absence of a spillover effect. On the other hand, the incumbent may counter-attack, especially if she/he does not have much positive content to tell about him/herself.

A simple test of this story would be to split the sample into races including and excluding incumbents. In Columns (1)-(2) of Table 4, we find that the estimated effect is still significantly different from zero and of similar magnitude in the two subsamples: doubling the number of competitors results in a decrease of 27 percent in the likelihood of going negative in races with incumbents, versus 31 percent in the races without an incumbent. Thus, we can say that while the spillover effect is robust across incumbency, it seems that races without incumbents may have a larger spillover effect. We attribute this to the potential added competitiveness in primary races without incumbents.

2. Do districts with a clear dominant party play a role?

Primaries differ from general elections in the way that winning them is instrumental, rather than an objective per se. For example, candidates may participate in primaries in
order to build name recognition, rather than in order to win the nomination. If this is the intent, then a candidate will primarily engage in positive campaigning. Assuming that there are fewer candidates who compete in the disadvantaged party’s primaries, this would again distort the estimation. A response to this concern would be to just focus on the primaries in the advantaged party where winning the primary is essentially as good as winning the general election; in such primaries, it will be more likely that everybody who is in it is in it to win it. We collect information on the vote gap between the Democrat and the Republican for the last two general elections in the given district. We next split the sample three ways:

1. If at least one of the last two general election contests had a vote margin greater than 10 percentage points and that primary election corresponds to the winning party of both of those elections, we consider this the dominant party. This primary is likely to be close.

2. If both of the last two general election contests had a vote margin greater than 10 percentage points and those primary elections correspond to the losing party, we consider this to be the opposite of the non-dominant party. Here, entry may occur for other reasons than to win the contest.

3. If both of the last two general election contests were within 10 percentage points, we consider this a close district. In this case, a dominant party does not exist. Here, the primaries are also likely to be close.

Table 4 Columns (3)-(5) present the results for these three samples, respectively. Our results are consistent with our predictions, where the dominant party primary has a statistically significant spillover effect (Column (3)), and the non-dominant party (Column

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33 We restrict this to two lags, since re-districting in House races happened after the 2000 Census.
(4)) is no longer statistically significant.\footnote{In Column (4), we drop the incumbent control, since there are no incumbents running in the districts without dominant parties by construction (since these are the losing parties).} However, the effect size is largest in Column (5), where we look only at close districts in which there is no dominant or non-dominant party. In the latter case, the point estimate show that doubling the number of candidates decreases the likelihood of airing a negative ad by 41 percentage points.

We then create a measure of the deviation of the vote gap from the median vote gap (10 percentage points) in each of the lagged contest and take the average of the two previous contests. We control for both the lagged vote gap deviation, as well as the interaction between this deviation and our $\log(N_2)$ measure. Table 5 Column (2) provides these results, where less close races have a smaller spillover effect.

3. Does the negative tone increase in close races?

Anticipation of a close race may deter entry (Hirano & Snyder 2012b) and in close duopoly races the tendency to “go negative” is higher than races that are not close (Lovett and Shachar (2011)). We propose three specification checks to investigate the relevance of closeness when estimating the spillover effect.

First, we ensure that our results are not driven solely by close races, although our conjecture is that a close race should farther reduce the intensity of negative advertising in non-duopoly races due to the spillover effect. In fact, especially in a close race, candidates may fear that airing a negative ad will greatly advantage a close competitor who is not the object of the attack. Specifically, we split our sample to races where the winner and runner up were and were not within 5 percentage points of one another. Table 4 Columns (6)-(7) contain these results. In the former case, we are left with only 35 elections, and thus we use the wild cluster bootstrap from Cameron Et. Al (2008) to get better approximations to asymptotically valid standard errors. While our estimates are robust to the exclusion of all races outside of a 5\% vote margin at the conclusion of the race, the magnitude is higher in close races, where doubling the number of candidates in these races reduces negativity by 80 percent. The spillover effect is still present in races with a wider margin.
of victory, where doubling the number of competitors reduces negative advertising by 28 percent. Thus, our results remain consistent when considering these races. Similarly, the effect of interest is amplified when we used the Effective N 4 measure in Table 3, which selects the competitive races in the sample - 26% of the races.

Further, in Table 5, Column (1) also provides a measure of the deviation of the vote gap from the median, though this time we take the median for each measure of N2, so we do not compare the vote gaps between the winner and runner-up across N. As expected, we do find that closer contests have a higher spillover effect, as well as a slightly higher average level of negativity.35

Second, we compare duopoly and non-duopoly races with the same margin of victory. Define $\pi_e(1)$ as the tone of the campaign in a duopoly race and $\pi_e(0)$ as the tone of the campaign in a non-duopoly race. Let $D_e$ be a dummy variable equal to one if the race is a duopoly, and zero otherwise. The observed outcome is thus $\pi_e = D_e \cdot \pi_e(1) + (1 - D_e) \cdot \pi_e(0)$. The estimand of interest is the Average Treatment Effect (ATE), $E[\pi_e(1) - \pi_e(0)]$. We are also careful to ensure that our control variables from Table 3 are balanced post-estimation, meaning that each of these control variables are not statistically different from each other between the duopoly and non-duopoly groups at the 5 percent level.

Table B.8 in Appendix B reports nearest-neighbor propensity score matching estimates when we employ matching estimators as defined above, we allow for up to 10 neighbors, and use a matching caliper of 0.001. Our results are robust to different calipers as well as different forms of matching, such as a kernel. We provide only this measure for simplicity, but the remainder are robust. When we use this estimator, the results are largely un-

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35 Ideally, to construct these measure of closeness, we would like to exploit variation in the data that is not contaminated by advertising, i.e., opinion polls collected at the beginning of the campaign, which are not available for a large number of primaries. While we acknowledge the limitation of using ex-post voting measures, we could at least check the correlation between the measures of closeness obtained with final vote shares and electoral polls, for a subsample of 31 races, for which electoral polls were available (using Polling Report). When doing so, the correlation of the gap between the winner and runner up in the polls and the final election result is 0.44.
changed, though smaller in magnitude. Duopoly contests exhibit about 10 percent more negativity than non-duopolies.

Third, we construct one additional measure of closeness based on final vote shares. The first one is the own-party Herfindahl-Hirschman Index (henceforth, HHI), which measures the concentration of the popular vote share across candidates. As HHI gets large, the popular vote is becoming more concentrated on a small number of candidates. Thus a more concentrated HHI captures the presence of a dominant candidate in the election.\(^{36}\) When we control for the own party HHI in our main specifications in Table B.4, we find that the estimate of \(\alpha_1\) remains significant in all specifications except when we use the N4 measure.\(^{37}\) This finding seems to suggest that the closeness of the race does not jeopardize our main results.

In sum, we can conclude that i) our results are not entirely driven by the level of competition in the race; and ii) consistently with our proposed mechanism that underlies the effect of the number of competitors on the tone of the campaign, the spillover effect is amplified when the race is close.

4. **Does the opposing party primary election play a role?**

Now we use a unique feature of the political primary process - the existence of the opposing party’s primary for the same political seat. If the opposing party is fielding an especially strong candidate, then it makes it less likely that anyone from a candidate’s own party will succeed in the general election. Intuitively, if a strong candidate runs in the Democratic primary, this can reduce negativity in the Republican primary, as forward-looking candidates may internalize their general election prospects.\(^{38}\) To measure this, we

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\(^{36}\)When the opposing party has no entrants, we set HHI to missing, and when the opposing party’s candidate runs unopposed, HHI=1, as in a monopoly.

\(^{37}\)The correlation between own party HHI and our measure of log(EffN) are -0.6849 and -0.6511 for 2004 and 2008 respectively.

\(^{38}\)While Malhotra and Snowberg’s (2010) find that each state’s presidential primary contest/campaign in the 2008 election did not change the probability a party would win the general election. We are still concerned that in Governor, House, and Senate primary races, candidates may be forward looking.
construct the opposing party HHI, similar to the way we did the own party HHI. When
we control for the opposing party HHI in our main specification in Table B.5, we find that
our results remain substantively similar.

5. Do state or market-level factors impact the results?

Finally, it may be that the results are confounded by state-level unobservable factors
that drive candidates to enter and go negative. To show that this is not the case, we
provide a specification in Column (3) of Table 5, where we add state-level fixed effects.
Alternatively, it may also be the case that some markets are more susceptible to negative
advertising, and candidates target their negativity towards these markets. Thus, we
provide one more specification in Column (4) of Table 5 to show that this is not driving the
spillover effect. In both circumstances, the main spillover effect persists, where doubling
the number of candidates results in a reduction in the likelihood of negative advertising
by almost 40 percent.

[Table 5 about here]
Table 5: Robustness (N2)

<table>
<thead>
<tr>
<th>Dependent Variable: Negative</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>log(N2)</td>
<td>-0.496***</td>
<td>-0.379***</td>
<td>-0.383***</td>
<td>-0.382***</td>
</tr>
<tr>
<td></td>
<td>(0.124)</td>
<td>(0.101)</td>
<td>(0.0815)</td>
<td>(0.0863)</td>
</tr>
<tr>
<td>Vote Gap Deviation x log(N2)</td>
<td>-0.0108*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00629)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vote Gap Deviation</td>
<td>0.0104*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00556)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Vote Gap x ln(N2)</td>
<td>-0.0376*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0210)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Vote Gap</td>
<td>-0.0379**</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0172)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>0.0381</td>
<td>0.0568</td>
<td>0.0326</td>
<td>0.0449</td>
</tr>
<tr>
<td></td>
<td>(0.0486)</td>
<td>(0.0424)</td>
<td>(0.0398)</td>
<td>(0.0416)</td>
</tr>
<tr>
<td>Governor</td>
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<td>-0.0207</td>
<td>0.0263</td>
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<tr>
<td></td>
<td>(0.0638)</td>
<td>(0.0571)</td>
<td>(0.0583)</td>
<td>(0.0555)</td>
</tr>
<tr>
<td>Days Until Election</td>
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<td>-0.398***</td>
<td>-0.403***</td>
<td>-0.400***</td>
</tr>
<tr>
<td></td>
<td>(0.0489)</td>
<td>(0.0483)</td>
<td>(0.0476)</td>
<td>(0.0474)</td>
</tr>
<tr>
<td>Republican</td>
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<td>0.0624</td>
<td>0.0818**</td>
<td>0.0868**</td>
</tr>
<tr>
<td></td>
<td>(0.0499)</td>
<td>(0.0471)</td>
<td>(0.0389)</td>
<td>(0.0418)</td>
</tr>
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<td>Political Experience</td>
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<td>0.0349</td>
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<td>(0.0294)</td>
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<td>Incumbent</td>
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Robust standard errors clustered at the election level in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01
4.1.3 Discussion

Before turning to the next section, a few remarks are in order. When we estimate the above specifications using each ad as unit of observation, we essentially weight ads aired by candidates that made an extensive use of advertising more heavily. If candidates who advertise more are also more prone to engage in negative advertising, then our finding are driven by just a few candidates. Therefore, we verify these findings using the election, or the candidate, as the unit of observation.\(^{39}\) The results we obtain remain consistent in both cases, and are reported in Table B.6 and B.7 respectively. Finally, our basic marginal effects do not change in an economically significant way, and are somewhat strengthened when we use a logit instead of a linear probability model as illustrated in Appendix B Table B.2.\(^{40}\)

5 Concluding Remarks

In this paper we provide a novel explanation for the high volume of negative advertising that is generally found in the U.S. political market. When the number of competitors in a market is greater than two, engaging in negative ads creates positive externalities to those opponents that are not the object of the attack, as the beneficial effects of tearing down the target candidate are shared between the sponsor (who pays for the ad) and other competitors. However political competition in the U.S. is largely characterized by duopolies (races with only two viable competitors, i.e. Republican versus Democrat), where this spillover effect is not present, thus creating a greater incentive for negative advertising. This suggests that, perhaps including a viable third party in U.S. contests may decrease the amount of attack advertising.

Using a newly created dataset about primary elections in 2004 and 2008 merged with

\(^{39}\)In this specification, we also weight by the total advertising volume of each candidate, as with the ads-level results.

\(^{40}\)All linear probability models in the paper are similar to the marginal effects from a logit specification.
the WiscAds data, we find that duopolies are twice as likely to use negativity in an advertisement as non-duopolies. In addition, adding just a handful of competitors drives the rate of negativity found in the data quite close to zero. These results show that the data are not just consistent with our theory in a directional sense, but the magnitude of the results suggest that this economic mechanism appears to have first order implications for why general elections are associated with producing more negativity than primary contests.

The existence of a spillover effect suggests that the structure of the political market (e.g., duopoly versus not) can affect the incentives of candidates to engage in negative advertising, and this effect is more prevalent when the primary race is close and/or in a district with a dominant party. Therefore, the results of this article have important implications for the regulation of political contests. Any policy that affects entry in the race (and therefore the number of candidates) may have unintended consequences on the advertising strategies of candidates. Consider for example the regulation of primaries nominations. As states increasingly move toward more inclusive nominating procedures, these expanded eligibility rules lead the number of candidates to increase and this, in turn, may decrease the negative tone of the campaign. Another example is campaign finance reform. If relaxing spending caps decreases the number of candidates entering the race (Mattozzi and Iaryczower (2012)), then an unintended consequence of such a policy would be an increase of the negative tone of the campaign advertising. Understanding the presence of such unintended consequences should help inform the policy debate on campaign finance reform, the openness of the primary, and also the debate on controlling the amount of negativity in politics.
References


CRP. 2011. “Center for Responsive Politics.”.


