

The Divided Labor of Attack Advertising in Congressional Campaigns

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Abstract

This article offers a theory of how party networks divide the labor of attacking opponents. Using an extensive dataset of campaign advertising in the 2010 and 2012 congressional elections augmented with Nielsen television ratings data, it is shown that candidates attack opponents less when supporting outside group attacks more. Due to differences in how outside groups attack opponents compared to how candidates attack, when candidates partially outsource attack advertising to independent expenditure groups, attacks in that campaign become more issue and policy based. Thus, in perhaps an unintended consequence of the divided labor of attack advertising, outside group involvement makes it more likely that an election campaign will foster citizen knowledge about policy positions of the candidates.

Supplementary material for this article is available in the appendix in the online edition. Replication files for the quantitative analyses performed in this article are available in the JOP Data Archive on Dataverse (<http://thedata.harvard.edu/dvn/dv/jop>).

While independent expenditures have had a role in U.S. campaigns for many decades, the scale of independent activity has dramatically increased since the Supreme Court decision in *Citizens United v. FEC* and the federal court decision in *Speechnow.org v. FEC* in 2010. In the elections since these court decisions, spending by outside groups has risen to the point that outsider advertising outpaces candidate spending in some of the closest races (Fowler and Ridout 2014). Does this more crowded environment mean that candidates have lost control of their campaigns?

The independent expenditure groups, mostly super PACs and so-called “dark money” groups (those with undisclosed donors, usually social welfare organizations organized under section 501(c)4, 5, or 6 of the Internal Revenue Service code) that have taken on a larger role in recent elections are viewed by many scholars as integrated pieces of a broader party network (Herrnson 2009; Koger, Maskett, and Noel 2009; Skinner, Maskett, and Dulio 2012). Candidates, parties, and outside groups within these networks all share an interest in electoral success and should cooperate with one another to the degree that campaign law will allow (Dwyre and Kolodny 2014; Magleby, Monson, and Patterson 2007)¹.

Recent studies of independent group advertising have found that these actors tend to cooperate with candidates by emphasizing the same issues as the advertising of the candidates they support (Franz 2014; Franz, Fowler, and Ridout 2016). This study posits that the various actors within these party networks are more sophisticated when it comes to the positive or negative sentiment of advertising, that they engage in a compensatory style of cooperation by dividing of labor of attack. Using a dataset created by merging existing data of congressional advertising from the Wesleyan Media Project with television ratings data from Nielsen, this study shows that candidates have a lower proportion of their own advertising devoted to attack when they benefit from more outside group attacks on their opponent. This division of labor allows candidates to reduce attacks which carry the risk of public backlash and instead run more positive, self-promoting advertising.

The rise of new actors and the successful absorption of these actors’ activities into a cohesive team effort suggests the emergence of a new system of network-centered campaigns with features different from the candidate-centered campaigns of the last several decades. Cooperation between candidates, parties, and independent expenditure groups reveals how party networks operate in elections.

A division of labor by candidates and outside groups would be an interesting but unimportant story if there were no consequences for democratic deliberations. But when a greater responsibility for attack advertising is shifted to super PACs and dark money groups, the types of attacks change. Outside groups often have policy goals and a less candidate-specific perspective than candidates. Because of these differences, outside groups compared to candidates are more likely to air policy-based instead of personal attacks. Contrary to concerns that outside groups who are unaccountable to voters will degrade the quality of campaign discourse, when outside groups participate in campaigns the attacks in the campaigns become more policy-based and less focused on attacks on candidates’ personal characteristics.

¹Direct coordination between candidates, independent expenditure arms of party committees, and independent expenditure groups is prohibited by FEC rules: 11 C.F.R. §109.20(a) (2004)

The Risk and Reward of Attack Advertising

In any campaign advertisement the sponsor chooses to air attack messaging about the opponent, advocacy messaging about the supported candidate, or often a combination of both. While candidates may profess to prefer mostly positive campaigns, campaign professionals are confident that attack advertising works (Abbe et al. 2001; Kern 1989; Theilmann and Wilhite 1998). Political science has offered some support for this view, finding that under certain conditions attack advertising can affect vote choice (Anscombe and Iyengar 1995; Fridkin and Kenney 2011; Mattes and Redlawsk 2014; but for a dissenting assessment see Lau, Sigelman, and Rovner 2007). Attack advertising may have greater persuasive power than advocacy because individuals tend to give greater attention to negative information (Baumeister et al. 2001), and individuals are more likely to recall and use negative information when evaluating candidates (Lau 1985). Given these features, attack advertising is a very appealing tool for campaigns.

Campaigns are most likely to attack opponents when electoral success is threatened. As a race gets more competitive, candidates are increasingly willing to attack their opponent, and when candidates are lagging behind their opponent they are more likely to engage in attacks (Damore 2002; Kahn and Kenney 1999; Lau and Pomper 2004; Theilmann and Wilhite 1998). Challengers have an incentive to attack incumbents in order to redefine the officeholder and erode his/her support (Geer 2006; Lau, Sigelman, and Rovner 2007; Kahn and Kenney 1999; Tinkham and Weaver-Lariscy 1995), while incumbents are incentivized to rely on more advocacy messages to promote their accomplishments in office (Goldstein et al. 2001). Attack advertising can also be retaliatory, where candidates attack as a response to opponent attacks (Anscombe and Iyengar 1995; Damore 2002; Haynes and Rhine 1998; Lau and Pomper 2004). Finally, multi-candidate contests feature less attack advertising. In a multi-candidate race eroding support for one candidate may push those voters to another opponent, so the calculus for a candidate in deciding to attack is more complex and has a less certain payoff (Hansen and Pedersen 2008; Walter 2014).

Campaigns also have disincentives to attack opponents. First, attack advertising carries potential risk for the sponsor. Attacks might be considered out of bounds, unfair, or unacceptable by voters. Numerous studies have found a backlash effect from attack advertising, where viewers of attack ads lower their evaluations of the attacker instead of the target of the message (Allen and Burrell 2002; Brooks and Murov 2012; Dowling and Wichtowsky 2015; Garramone 1985; Garramone and Smith 1984; Lau, Sigelman, and Rovner 2007). Second, campaigns must still balance multiple communications objectives in their advertising. Besides attacking opponents, campaigns seek to define their own candidates in favorable terms to voters. Advocacy messages frame the candidate in the preferred context and reduce voters' uncertainty about candidates (Alvarez 1997; Alvarez and Franklin 1994; Shea and Burton 2006). Advertising time spent attacking the opponent is time not spent making the case for the supported candidate, so campaigns should seek a balance of both attack and advocacy messages in the advertising mix.

Campaign Actors and Cooperation

The advertising landscape is further complicated by the dramatically increased role of outside groups since 2010 (Fowler and Ridout 2012). The primary division of campaign actors is between *candidates* and *outside groups*. Outside groups are composed of *party groups* and three varieties of independent groups: *party-adjacent groups* that, like party groups pursue legislative majorities; *issue-based groups* that advance policy objectives through replacing opponents and defending allies; and *single candidate groups*, formed to support a single candidacy (more information about how groups were coded is included in the Online Appendix).² Parties and party-adjacent groups in particular, but all outside groups in general are rational and pragmatic in their decisions of which candidates to support (Magleby 2014; Miller 2017). These groups seek electoral victory and in as many contests as possible, thus they should prefer to cooperate with candidates as best they can.

The picture of how campaign actors cooperate with each other and provide advance signals of one another's activities is based on numerous accounts in press, scholarly studies and a set of eight open-ended one-on-one interviews conducted in June and July 2015 with individuals with direct experience in the current campaign landscape. The interview participants include: a former senior official from the Democratic Senatorial Campaign Committee, a television executive responsible for advertising sales to political clients in over a dozen major media markets, two campaign consultants both with extensive experience in U.S. House and Senate races (one Democrat and one Republican), a Democratic pollster, a Democratic campaign manager, a senior official from a Republican-aligned party-adjacent super PAC, and an official from an issue-based group. Respondents were recruited via email based on referrals from previous respondents. The semi-structured interviews were conducted “on background” since the interviews covered potentially sensitive topics of campaign strategy and techniques that push the limits of FEC regulations.

Campaign actors can cooperate without crossing the legal threshold of coordination by communicating with one another before the communications ban goes into effect (when the candidate files with the FEC to officially become a candidate), sending out cues to one another, through the use of public information, and because actors have formed reliable expectations of how the other actors will behave. Some techniques of signaling and cooperation may appear to push or surpass the limits of FEC rules, but campaign actors have little reason to be timid. The FEC often fails to issue any guidance to campaign actors because of a frequent partisan deadlock of 3-3 among FEC commissioners when groups request advisory opinions (Corrado 2014), leading FEC chairwoman Ann M. Ravel to tell one reporter, “The likelihood of the laws being enforced is slim . . . People think the FEC is dysfunctional. Its worse than dysfunctional” (Lichtblau 2015).³

²Party groups in federal legislative races are almost entirely made up of the four Hill Committees: DSCC, NRSC, DCCC, and NRCC. Hill Committees typically have two separate entities - a coordinated campaign component that gives strategic advice to candidates and an independent expenditure component that produces and airs political messages in races. The independent expenditure arm of the Hill Committee cannot communicate with candidates, nor with the coordinated campaign. Each component cuts off communication with the other a few months before the election. The independent expenditure arms of Hill Committees are what is referred to here.

³Ms. Ravel later resigned in frustration from the FEC in February 2017.

Parties and independent expenditure groups openly communicate their intentions and their spending through press releases that announce media buys and websites that feature lists of targeted contests (Dwyre and Kolodny 2014). In addition, other less formal methods are now used by campaign actors to share strategic information with outside groups: a stand-alone corporation was created on the Republican side to disseminate opposition research among both candidates and independent expenditure groups while remaining compliant with FEC rules (Confessore 2014); Twitter accounts were created on both sides to share polling information across party, candidate, and independent groups (Blumenthal 2014; Moody 2014); and Democratic candidates and the DSCC both posted “important messages” on their websites to highlight issues that were soon taken up by ads from Senate Majority PAC and Patriot Majority USA (Sullivan 2014). The political director for a party-adjacent super PAC interviewed for this project stated that his group rarely makes media buys, but instead shares information and coordinates efforts among independent allies during a campaign through research and regular conference calls with independent groups participating in the race. “We wanted to be point men and make sure there isn’t overlap.”⁴ So, while the communications ban prevents coordination between candidates and outside groups, outside groups can and (at least occasionally) do coordinate with one another.

Even if these signaling methods fail, the various campaign actors can easily track one another’s media activity during the campaign. Candidates learn of the support from outside groups before the supporting ads air, receiving advance warning sometimes days in advance, and many times weeks or even months in advance. According to interview respondents both in the television industry and in campaign management, media buying firms provide weekly and sometimes daily reports of other media buys in relevant markets.⁵ Thanks to these regular reports, campaign actors are aware of advertising by other actors in the race well in advance of the ads running on air. A Republican campaign consultant remarked that so much information, including ad buys, is public that running campaigns in this environment is “like playing poker with the cards face up.”⁶

Finally, campaign actors can synchronize their efforts because actors’ behavior is predictable. Campaign staff, Hill Committee leadership, and independent group leaders frequently swap roles and have all learned their craft in the same arena. Campaign professionals expressed confidence in outside actors in campaigns because they are “pros” or “veterans.”⁷ Since they all know the same strategies, they can properly interpret the moves of other actors. In addition, some actors have reputations for particular tendencies. In particular, respondents from both candidate campaigns and independent expenditure groups stated that outside groups are expected to “carry the negative,” that is, candidates expect that outside groups will run almost entirely attack advertising and take over some of the responsibility of attack on behalf of the candidate.⁸

⁴Author interview with super PAC official, June 29, 2015.

⁵Author interviews with television media executive, July 9, 2015, and Democratic campaign manager, July 10, 2015.

⁶Author interview with Republican campaign consultant, June 26, 2015.

⁷Author interviews with Republican campaign consultant, June 26, 2015, and Democratic campaign manager July 10, 2015.

⁸Author interviews with Republican and Democratic campaign consultants, June 26, 2015 and July 10, 2015.

Theory and Hypotheses

Candidates, parties, and independent groups face a challenge of how to work cooperatively in a campaign despite different levels of familiarity with one another and prohibitions on direct communication. But press accounts and author interviews with campaign professionals paint a picture of actors that are able to anticipate and communicate despite these challenges. In particular, interviews suggest that candidate campaigns look to outsource part of the job of attacks on the opponent.

Williamson (1975) offered a general theory of markets and hierarchies to describe when an organization (in this case a candidate's campaign for office) will internalize functions or outsource them to others. Frequent, costly, and uncertain transactions that cannot easily be transferred are more likely to take place internally where direct control is possible – within a hierarchy; whereas transactions that are straightforward, non-repetitive, and don't require transaction-specific investments will be outsourced to others – or to the market (Powell 1990; Williamson 1975, 1985).

Prior to changes in campaign finance regulations that increased the prominence of outside advertisers, candidates internally controlled the bulk of the advertising in their campaign. However, attacks carry risk of backlash and a candidate also needs to dedicate some advertising to establishing name recognition and making her own case for her candidacy, so outsourcing has some appeal for candidates. The 2010 *Citizens United* and *Speechnow.org* court decisions made transferring tasks easier since it effectively created a new class of outside groups who are free to advertise as much as they desire within the limits of their own fundraising. Interview respondents from both the candidate side and independent expenditure group side remarked that attack advertising can be easier than supportive advertising for outside groups to create when coordination with the candidate is prohibited. A Democratic campaign consultant said that supportive advertising by outside groups is still rare further down the ballot from the presidential race because “even today b-roll is still hard to come by on most Senators and especially House members.”⁹

But the current relationship between allied groups operating in a campaign and the candidate committee does not function as a market, characterized by self-interested, non-cooperative actors making “risky exchanges among strangers” (Jung and Lake 2011, 973; Powell 1990). This outsourcing is instead more of a cooperative relationship among allies. The form of organization described by campaign professionals more closely fits the definition of a network where a “collection of actors . . . pursue repeated, enduring exchange relations with one another and, at the same time, lack a legitimate organizational authority to arbitrate and resolve disputes that may arise during the exchange” (Polodny and Page 1998, 59). A network is a middle ground between a market or hierarchy where actors match complementary strengths and make interdependent choices (Powell 1990). Networks are further characterized by reciprocity, trust, mutual understanding of norms, and a “spirit of goodwill” in the relationship (Dore 1983; Granovetter 1995).

Candidates would likely prefer a hierarchical organization with the candidate at the top, directing the advertising decisions of groups who choose to support them. But prohibitions on communication prevent such a relationship and independent groups often have their own

⁹Author interview with Democratic campaign consultant, July 10, 2015.

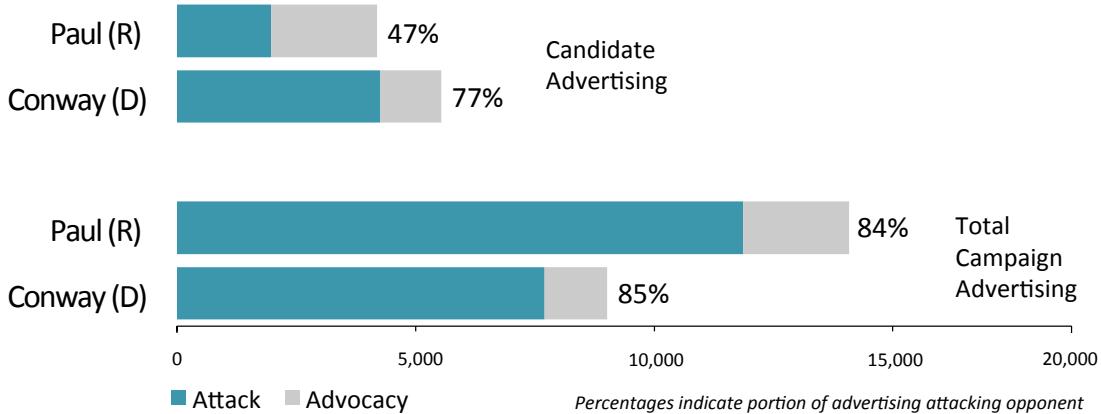


Figure 1: Portion of Ad Volume Devoted to Attack, Kentucky Senate 2010

broader goals. So these actors instead comprise a network form of organization where reputation, expertise, and expectations of reciprocity guide actors' decisions.

Advertising totals in the 2010 Kentucky Senate race, shown in Figure 1, illustrate how candidates might adjust their advertising when they anticipate that outsiders will carry the negative. The top half of the figure displays the volume of advertising and proportion of attack and advocacy by the candidates, while the bottom half of the figure displays the total advertising for each campaign, that is, the total of candidate advertising plus all advertising supporting that candidate by outside groups. First for the candidates, Rand Paul appeared to run a more positive campaign – he attacked Conway with 47% of his advertising while Conway attacked him with 77% of his ad volume. However, moving down to the bottom half of the figure we see that including the outside group support into the total advertising changes this picture. Both campaigns devoted nearly identical proportions of advertising to attacking the opponent (84% and 85%, respectively).

This should be a broad pattern across legislative campaigns. Many voters do not connect candidates to attack advertising by outside groups (Dowling and Wichowsky 2015). Because of this disconnect, candidates can escape backlash from attacks if the attack is made by outside groups on behalf of the candidate instead of by the candidate's own committee (Brooks and Murov 2012; Dowling and Wichowsky 2013; Weber, Dunaway, and Johnson 2012). Therefore, in a well-functioning network there should be an inverse association between outside group attacks and the candidate's attacks:

Compensatory sentiment hypothesis: The greater the volume of attack advertising by supporting outside groups in a campaign, the lower the proportion of attack advertising by the candidate in that campaign.

All attack ads are not alike. Attacks can be based on issues and policies or on personal aspects of the candidates. While personal attacks are often considered a distasteful tactic in campaign communications, policy-based attacks are usually acceptable to viewers (Kahn and Kenney 1999; Mattes and Redlawsk 2014). Furthermore, policy-based attacks can be more beneficial to democratic discourse than positive advertising since attacks carry more information about issues and candidate positions (Geer 2006).

In a network, candidates should cooperate with outside groups and have expectations about the support they will receive, but candidates do not have control over outside advertisers as they would in a hierarchical relationship. Candidates might prefer that personal attacks on opponents be made by outside groups so that the candidate will be insulated from public backlash against these more distasteful attacks.

But a recent study of independent advertising in the 2012 presidential campaign concluded that voters did not consider ads by outside groups more negative or more misleading than ads from the candidates (Dowling and Miller 2014). Outside groups have different perspectives and incentives than candidates. Issue-based groups are formed around policy goals and will likely focus on their issues of interest in their advertising. For example, the Sierra Club will be more likely to attack a candidate's environmental record than a candidate's honesty. Because of the groups' objectives, we might instead expect these groups to be the most likely to base their attacks on policy considerations. Parties and party-adjacent groups have broader agendas than issue-based groups, but they may prefer to emphasize the top issues for the national party, using nearly identical advertising across numerous races, e.g., "voted with Nancy Pelosi 95% of the time" (Memmott 2010). In essence, groups with broader perspectives than a single campaign (outside groups other than single candidate groups) will have more policy-oriented agendas and not concern themselves with the minutiae of the personal characteristics of each individual opponent:

Outside agendas hypothesis: Outside groups will be more likely than candidates to engage in policy-based attacks.

Finally, the type of attacks may vary based on the groups' organizational forms. One recent study finds that groups with undisclosed donors are more likely than groups with disclosed donors to make expenditures in opposition to candidates than in support of candidates (Chand 2017). Perhaps dark money groups are also more likely to attack on personal grounds since their donors are fully shielded from any backlash. Furthermore, many 501(c) issue-based groups with undisclosed donors are authentic social welfare groups such as Sierra Club or the Humane Society, with members interested in advancing an issue more so than influencing elections. Party-adjacent dark money groups, however, generally organize as 501(c)s in order to offer their donors anonymity, e.g., Americans for Prosperity or Crossroads GPS. Among party-adjacent and issue-based independent groups the level of transparency may be associated both with their sensitivity to backlash and the authenticity of their commitment to a declared issue interest, and thus may be associated with the frequency of their use of personal attacks against candidates.

Data

The campaign advertising data used here come from the Wesleyan Media Project (WMP) for the 2010 and 2012 election cycles (Fowler, Franz, and Ridout 2014, 2015). The WMP captures and codes all airings of political advertisements on broadcast television in all 210 media markets in the United States. This study includes the broadcast campaign advertising by all campaign actors in federal legislative races in the general election phase. In all, 2,382,138 airings of political advertisements by 751 House and Senate candidates and 232

Table 1: Percentage of Advertising Attacking Opponents

	Senate		House	
	2010	2012	2010	2012
Candidates	50%	40%	58%	44%
Parties	82%	84%	94%	89%
Party-Adjacent Groups	97%	92%	94%	93%
Issue-Based Groups	90%	87%	92%	77%
Single Candidate Groups	70%	99%	99%	98%
Total Campaign Advertising	63%	57%	71%	67%

outside groups are included. In addition this study takes the additional step of accounting for the differences in the audience size of advertising airings occurring in different markets and at different times of day. Using television audience data obtained from Nielsen, each airing is expressed as the size of the media market (in thousands of television households) times the average portion of television households viewing broadcast television in the daypart when the ad aired (see the Online Appendix for a detailed description of this process and an evaluation of the impact of using this measurement instead of a count of airings).

The WMP records if ads are contrast, promote, or attack spots. Using this information, the proportion of campaign actors' advertising volume dedicated to attack of opponents is calculated (see the Online Appendix for a full description of how all variables were calculated). Consistent with previous studies (Fowler and Ridout 2012, 2014), outside groups devote much more of their advertising volume to attacking opponents compared to candidates' advertising (see Table 1). There is some variation between groups and election years, but broadly speaking candidates average about 45% – 50% of advertising devoted to attack while outside groups average about 85% – 90% of advertising devoted to attack. Total campaigns, the sum of all advertising by candidates as well as supporting outside groups, dedicate about two-thirds of advertising to attacking opponents.

Analyses

Cross-Sectional Models

The compensatory attack hypothesis expects that the percentage of candidate advertising devoted to attack in a campaign will have a negative association with outside group supporting attacks. Cross-sectional models are estimated for the percentage of a candidate's advertising volume attacking opponents, separately for Senate and House campaigns. This relationship should be driven by expectations among trusted and familiar actors in a network and by signals unobserved in the advertising data, e.g., advertising buys appearing on FEC reports weeks before the spots air, or press releases from groups announcing intended or recent ad buys. If these are the means of cooperation between campaign actors, then an inverse relationship may not be observed in a lagged analysis but it will still be present in a cross-sectional analysis of the total sum of advertising in campaigns.

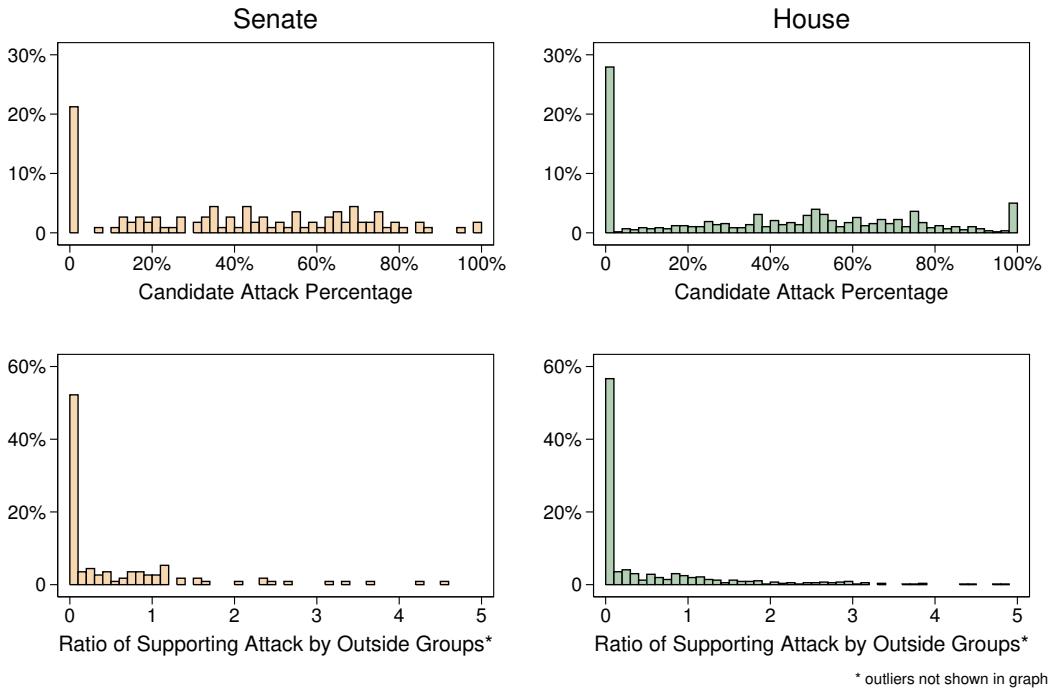


Figure 2: Distribution of Candidate Attacks and Supporting Attacks

The unit of analysis in the models is the campaign, defined as the total advertising activity of the candidate and all outside allies in support of the candidate in the general election phase of the race. Campaigns are included if the candidate ran 50 or more television spots and if the candidate had an opponent (Senate N=119; House N=632).¹⁰

The dependent variable in the models is the candidate attack percentage, that is, the proportion of a candidate's advertising volume devoted to attacking the opponent(s). The independent variable of interest, *supporting attacks*, is measured as the total volume of attacks on behalf of the candidate by all outside groups (parties, party-adjacent groups, issue-based groups, and single candidate groups) divided by the candidate's total advertising volume. Expressing supporting attacks as a ratio of the candidate's advertising volume accounts for varying sizes of campaigns, since candidates should only be interested in adjusting the advertising mix when the outside support is at a volume that is meaningful in their race.

The overall mix of advertising sentiment by candidates and the volume of attack advertising from outside groups supporting candidates is shown in Figure 2. Since so many legislative

¹⁰The sample is restricted to those campaigns where the candidate aired 50 or more spots because with so little of their own advertising, there would be insufficient “room” for candidates with less advertising to alter their mix of advocacy and attack, and inflated supporting attack values resulted from the candidates’ own paltry advertising volumes. As a result, not included in the House sample are the 2010 Republican campaigns in IL-11 and MN-8 and the 2012 Republican campaign in NC-7. Not included in the Senate sample are the 2010 NY Senate races since it proved too difficult to reliably account for which candidate was supported by a given advertisement. To ensure that the results were unaffected by dropping these cases, the model was estimated with their inclusion and the results were almost entirely unaffected.

seats are safe in any election, it is no surprise that many candidates aired no attack messages at all in their television campaigns (24 Senate campaigns and 191 House campaigns, shown in the top row of Figure 2).¹¹ On the other hand, 34 candidates in House races and 2 in the Senate devoted all of their advertising to attacking their opponents. Within these extremes, however, the distribution of attack/advocacy mixes by candidates was highly variable. Such diverse mixes are possible since candidates on average run about 9 separate creative executions in House races and over 20 in Senate races.¹² Outside groups aired no attacks at all in 39% of Senate and 53% of House campaigns where candidates did air their own advertising, and had highly variable levels of supporting attacks in those races where they did support candidates.¹³

To isolate the independent effect of supporting outside attacks on a candidate's attack percentage the model must also account for the other major determinants of a candidate's choice to attack the opponent. The most important determinant is the state of the race, or the closeness of the campaign and the candidate's prospects for winning, represented by nine-category race ratings from the Rothenberg & Gonzales Political Report from the first week of October in each election year. The overall relationship between the strategic context of the race and a candidate's percentage of attack should be curvilinear: candidates in closer races will be more likely to attack the opponent while safe and hopeless campaigns will attack less. Furthermore, candidates who are behind should be more likely to attack than candidates who are ahead. Folding the scale would fail to account for this second effect. Therefore, the Rothenberg ratings are included in the models as a set of eight dummy variables with the *safe seat* category omitted.

The *opposing attacks* directed against a candidate are measured as the total advertising volume attacking the candidate from all actors divided by the total volume of the candidate's own advertising. The status of the candidates as *incumbents*, *challengers*, or in *open contests* is included in the model as two dummy variables (the omitted category is *incumbent*). In a handful of Senate contests a viable independent candidate (a candidate who eventually received 15% or more of the total vote) was also in the race. Since attacking opponents is not as beneficial of a strategy in a multi-candidate contest than in a two-way contest, a dummy variable for candidates running in a *three-way race* is included in the Senate model. Finally, because this is a pooled sample of 2010 and 2012 races an indicator for the year of the election is included in the models as a dummy variable for *2012*.¹⁴

A fractional logit model is used for the cross-sectional analysis because the dependent variable is a percentage. This is a generalized linear model with a binomial distribution and a logit link estimated with robust standard errors (Wooldridge 2011). This form is suited for a fractional response variable since it allows the dependent variable to take on any value between 0 and 1, including the boundary values, and can accommodate the large portion

¹¹These candidates did not have any attacks in their advertising despite having an opponent, that is, none of the campaigns in the sample were unopposed.

¹²House 2010: Mean= 10.2, S.D.= 6.7; House 2012: Mean= 8.0, S.D.= 4.9; Senate 2010: Mean= 21.4, S.D.= 11.3; Senate 2012: Mean= 22.3; S.D.= 9.5

¹³There were no cases in the sample of campaigns where outside groups ran ads to support a candidate but the candidate herself ran none.

¹⁴The validity of pooling 2010 and 2012 is tested using Wald tests on models fully interacted with year, provided in the Online Appendix. No independent variable had a significantly different slope between years.

of zeros in the dependent variable (Papke and Wooldridge 1996).¹⁵ Models are estimated separately for Senate and House campaigns. The basic model to measure the association between supporting outside attacks and candidates' attack percentage can be written as follows:

$$E(candattack_i) = \Lambda(\beta_0 + \beta_1 supattack_i + \sum_{j=2}^9 \beta_j rating_i + \beta_{10} oppattack_i + \beta_{11} challenger_i \\ + \beta_{12} open_i + \beta_{13} threeaway_i + \beta_{14} 2012_i)$$

The estimates from this model for House and Senate races are shown in Table 2. Variables for the state of the race have the anticipated association with candidate attacks, illustrated by the marginal effects on the predicted candidate attack percentage for each category of competitiveness in Figure 3.¹⁶ As expected, the highest predicted proportions of attack advertising are for candidates slightly behind in race, though the predicted percentages of attack are similar for all candidates within two categories of a toss up race. Safe candidates have the lowest predicted attack percentages, while their opponents (hopeless candidates) are predicted to run a moderate amount of attacks.

A greater volume of attack from the opponent is associated with a greater share of the candidate's advertising going towards attack, though the effect is significant only in a one-tailed test in the Senate sample. No significant differences in the level of attack were observed between incumbents, challengers, and open seat candidates. The independent effect of running in a three-way race, however, is strongly negative in Senate contests. When there are three viable candidates, the candidates in those races run much less attack advertising. House candidates but not Senate candidates were much less likely to attack in 2012, perhaps because this was a redistricting year and even incumbents needed to introduce themselves to new electorates.

After controlling for these factors, the results of the models support the compensatory sentiment hypothesis. A greater volume of supporting attacks from outside groups is negatively associated with the percentage of attack advertising from the candidate, in both Senate and House races. The marginal effects of outside group attacks on the candidate's predicted mix of attack and advocacy are shown in Figure 4. The model predicts that in Senate contests an increase of one standard deviation in the supporting attack ratio is associated with a decrease of candidate attacks of 8.3 percentage points. In House races the relationship is smaller. An increase of one standard deviation in the supporting attack ratio in House contests is associated in a decrease of candidate attacks of 4.0 percentage points.¹⁷

¹⁵High frequencies of zeros and/or ones might suggest that a zero-one inflated beta regression model would be appropriate, however such a model assumes that the extreme values are a result of a process separate from that generating other values of the dependent variable. Such a model is inconsistent with the theory of the data generating process offered here, however to ensure that the findings that follow are not dependent upon the choice of a fractional logit model, the models were estimated using a zero-one inflated beta model, a tobit model, and OLS. The differences in observed associations in these models are small and do not affect any conclusions drawn in this study. These estimates are provided in the Online Appendix.

¹⁶All marginal effects in this study are calculated with the continuous variables held constant at their means and categorical variables at their mode.

¹⁷One standard deviation change of supporting attacks (Senate = 0.92; House = 1.53) starting from the variable's mean (Senate = 0.54; House = 0.69).

Table 2: Fractional Logit Models of Candidate Attack Percentage

Independent Variables	Senate	House
Supporting attacks	-.422* (.181)	-.138** (.056)
Nearly safe seat (2)	2.337*** (.616)	1.405*** (.215)
(3)	2.810*** (.538)	1.912*** (.255)
(4)	2.926*** (.539)	1.717*** (.219)
Toss Up (5)	2.811*** (.570)	1.792*** (.211)
(6)	2.990*** (.580)	1.854*** (.243)
(7)	2.380*** (.671)	2.111*** (.254)
(8)	2.072*** (.543)	1.499*** (.247)
Hopeless candidacy (9)	2.002* (.616)	1.032*** (.216)
Opposing attacks	.202+ (.125)	.123** (.043)
Challenging candidate	-.088 (.358)	.172 (.143)
Open seat candidate	-.340 (.279)	-.242 (.173)
Three-way race	-1.326*** (.344)	—
2012	.181 (.219)	-.552*** (.109)
Intercept	-2.378*** (.219)	-1.412 (.150)
N	119	632
BIC	-466.33	-3721.24
Log Pseudo-Likelihood	-50.79	-290.24

Robust standard errors in parentheses

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests

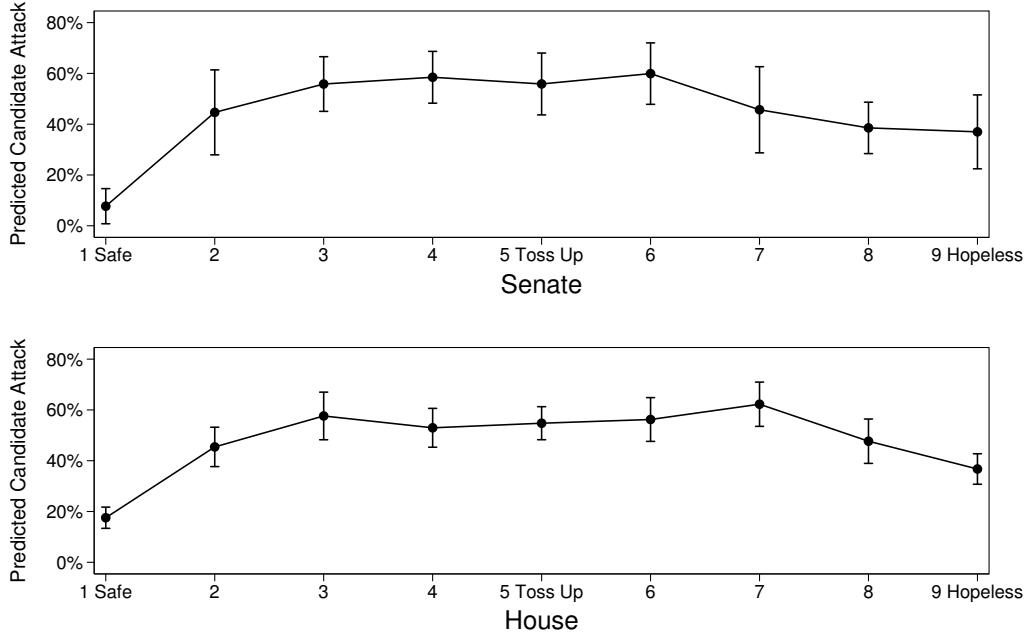


Figure 3: Marginal Effects of the State of the Race

These differences in proportion of attack advertising by candidates are equivalent differences that would be expected between a Senate candidate contest that was two categories less competitive than a tossup and a House candidate contest that was one category less competitive than a tossup in the Rothenberg & Gonzales Race Ratings.

Additional models interact several variables with supporting attacks, shown in Table 3. In these models the difference in the slopes shown in Fig. 5 between Democratic and Republican campaigns approaches but does not reach the 95% confidence threshold for statistical significance in the Senate sample ($\chi^2 = 7.71, p = .052$) but is statistically significant in the House sample ($\chi^2 = 19.41, p < .001$). In the Senate, Democratic candidates are predicted to air 11.7 percentage points less attacks when there is one standard deviation increase in supporting attacks (moving from a supporting ratio of 0.54 to 1.46) while Republican candidates are predicted to air 8.2 points less attack over the same range. In the House the difference is more stark. One standard deviation increase from the mean of supporting attacks (from 0.69 to 2.22) is associated with 9.5 points less attacks by Democrats versus 2.8 points less attacks by Republican candidates.

Supporting attacks by the parties was included together with all other outside group attacks because the overwhelming majority of advertising activity by parties is conducted by their independent expenditure arms. These groups, like all other varieties of independent groups, are prohibited from direct communication or coordination with the candidates. It is possible, however, that parties and candidates can cooperate more efficiently and the inverse relationship between candidates and outside advertisers' attacks is more pronounced when more of that support is from the formal parties. To test for this possibility cross-sectional models were estimated with a variable for the proportion of outside group attacks

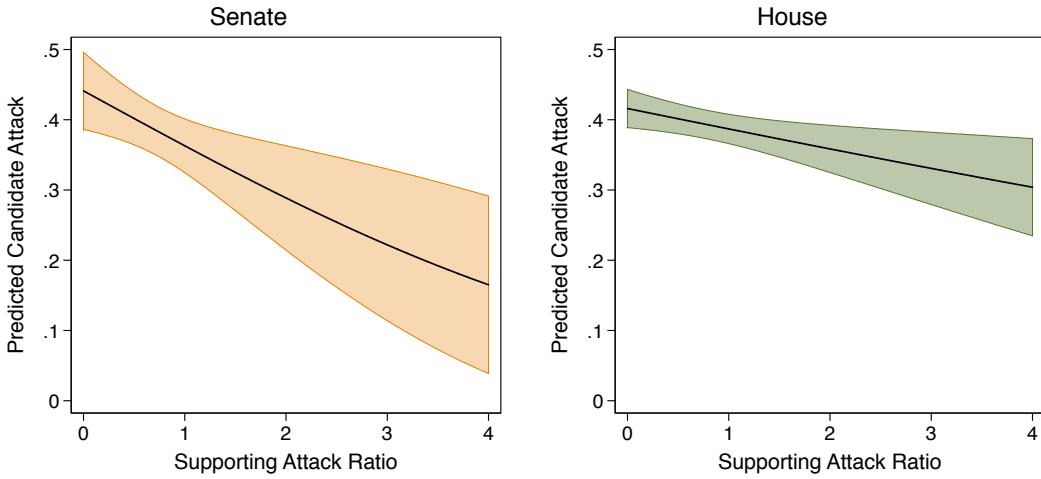


Figure 4: Marginal Effects of Supporting Attacks from Outside Groups

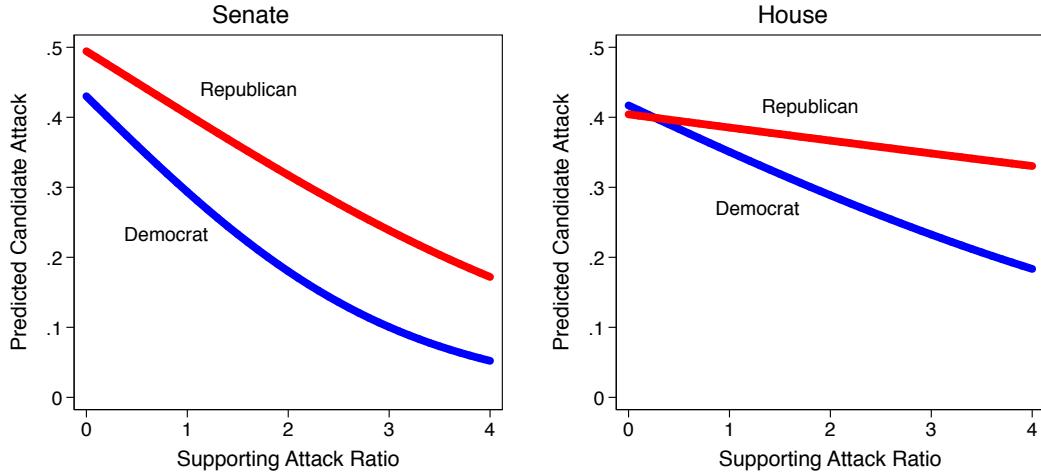


Figure 5: Marginal Effects of Supporting Attacks by Party

coming from parties versus other group types interacted with supporting attacks. In this model, shown in the middle columns of Table 3, a Wald test of the interaction did not find significant differences (Senate: $\chi^2 = 2.50, p = .11$; House: $\chi^2 = 1.12, p = .29$), meaning that the inverse relationship between outside group attacks and candidate attacks is not stronger when outside supporting attacks come more or less from parties versus other types of groups.

Finally, the interactive models examine differences in the slope of the coefficient for supporting attacks between incumbents, challengers, and candidates in open-seat races in the far right columns of Table 3. Incumbents might be more tightly networked with outside groups and thus the slopes may be stronger. But significant differences are not observed between incumbents and challengers. In the Senate sample, however, the inverse association between supporting outside attacks and the candidate's proportion of attacks loses statistical significance within the subsample of open-seat candidates.

Table 3: Interaction Models of Candidate Attack Percentage

Independent Variables	× Party		× % Party Support		× Incumbency	
	Senate	House	Senate	House	Senate	House
Supporting attacks	-.751*	-.343***	-.648**	-.012	.090	-.219
	(.361)	(.080)	(.210)	(.098)	(.409)	(.074)
Republican	.340	-.065	—	—	—	—
	(.311)	(.132)				
Rep. × supporting attacks	.275	.246**	—	—	—	—
	(.291)	(.085)				
% Party support	—	—	-.548	-.258	—	—
			(.509)	(.211)		
Party Sup. × supporting attacks	—	—	.568	-.157	—	—
			(.359)	(.147)		
Challenger	-.328	.183	.118	.173	.338	.120
	(.412)	(.153)	(.391)	(.145)	(.419)	(.173)
Open seat	-.540	-.237	-.145	-.270	-.270	-.447 ⁺
	(.330)	(.173)	(.331)	(.337)	(.337)	(.196)
Cha. × supporting attacks	—	—	—	—	-.769*	.071
					(.388)	(.076)
Open × supporting attacks	—	—	—	—	-.386	.248 ⁺
					(.371)	(.130)
Intercept	-2.585***	-1.386***	.427	.178	-2.292***	-1.311***
	(.489)	(.166)	(.548)	(.230)	(.481)	(.150)
χ^2 test of interaction	7.71 ⁺	19.41***	2.50	1.12	6.29*	3.73
N	119	632	119	632	119	632
BIC	-438.06	-3711.26	-438.06	-3711.26	-427.56	-3365.76
Log Pseudo-Likelihood	-49.80	-288.79	-49.80	-288.79	-47.32	-263.98

Models calculated with full set of regressors. For compactness, only interactive components shown in table

Robust standard errors in parentheses

⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests

Panel Models

The inverse relationship in the previous models between candidate attack advertising and supporting attacks by outside groups is consistent with trusted relationships, signals, and reciprocity in a network form of organization among campaign actors. However, these patterns could also occur if candidates simply react to unexpected support from independently-minded outsiders by reducing their level of attack in following weeks. If campaign actors have accurate expectations of each others' advertising efforts in campaigns, then timing of when the advertising runs should be largely irrelevant. A former Democratic Party operative emphasized in an interview that "even if a committee hasn't run an ad yet, the reservations are public."¹⁸ Thus, candidates should be able to adjust their percentage of attack based on both past and expected future advertising by supporting outside groups.

To examine whether candidates or outsiders simply respond to ads after they run, the data are partitioned into weekly blocks and linear fixed effects panel time series models are estimated, shown in Table 4.¹⁹ In these models *candidate attacks* in a given week are a function of *supporting attacks* and *opposing attacks* with both 1 and 2 week lags, and *supporting attacks* are modeled as a function of *candidate attacks* and *opposing attacks* with 1 and 2 week lags. The other explanatory variables from the cross-sectional models,

¹⁸Author interview with super former Democratic party operative, July 10, 2015.

¹⁹Stationarity of the dependent variables is verified with Fisher-type unit-root tests ($p < .01$ for each test).

Table 4: Fixed Effects Linear Models of Attacks

Independent Variables	DV: Candidate Attack		DV: Supporting Attack	
	Senate	House	Senate	House
Supporting attacks t_{-1}	.005 (.004)	-.003 (.005)	—	—
Supporting attacks t_{-2}	-.001 (.007)	.003 (.005)	—	—
Candidate attacks t_{-1}	—	—	-1.903 (1.357)	-.291* (.138)
Candidate attacks t_{-2}	—	—	.273 (1.287)	-.348** (.132)
Opposing attacks t_{-1}	.001 (.003)	.009* (.004)	.211** (.079)	.733*** (.021)
Opposing attacks t_{-2}	.003 (.004)	.009+ (.005)	-.002 (.124)	-.254*** (.026)
Intercept	.426*** (.009)	.389*** (.005)	1.838** (.634)	.413*** (.061)
N	1012	3,531	822	2,547
Overall R ²	.01	.03	.06	.53

Standard errors in parentheses

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests

race rating, incumbent/challenger/open, three-way race, and election year, are time-invariant and thus their effects are removed by these models.²⁰ The functional form of the models where the unit of analysis is each campaign (i) in each week (t) is as follows:

$$candattack_{it} = \beta_1 supattack_{it-1} + \beta_2 supattack_{it-2} + \beta_3 oppattack_{it-1} + \beta_4 oppattack_{it-2} + \alpha_i + e_{it}$$

$$supattack_{it} = \beta_1 candattack_{it-1} + \beta_2 candattack_{it-2} + \beta_3 oppattack_{it-1} + \beta_4 oppattack_{it-2} + \alpha_i + e_{it}$$

These models are estimated to assess an alternative explanation that attack advertising by campaign actors is associated with the level of attack by other actors in prior weeks. The potential insight from these models should not be overstated, however. The theory offered in this study predicts null findings from these models since candidates learn of the support from outside groups before the supporting ads air and with irregular advance warning – sometimes days in advance and many times weeks or even months in advance.²¹ In other words, while the theory offered in this study proposes a dynamic process between campaign actors, the dynamic should not be directly observable through the timing of when advertising airs. These models are unable to extract causal effects from endogenous data and are not estimated as a strategy of lag identification (see Bellemare,

²⁰The race ratings could vary, but Rothenberg rarely changed their ratings of a race over the course of a campaign cycle, thus the race rating had too little variation to be included as a time-variant explanatory variable in these models.

²¹Bellemare et. al. caution that lagging explanatory variables “will lead analysts working in the mainstream approach to hypothesis testing to reject null hypotheses that are true and to find too many estimates of causal effects that are spurious” (956). In this case a Type I error is of somewhat less concern than a Type II error because the purpose of these models is to verify that campaign actors do not simply respond in time to one another.

Masaki, and Pepinsky 2017 for a discussion of the limits of causal estimation possible with lagged explanatory variables).

If candidates exclusively react to supporting attacks in prior weeks, then the coefficients for *supporting attacks*_{t-1} and *supporting attacks*_{t-2} should have negative associations with the candidate attack dependent variable (left two columns of Table 4). But the models find no relationship between the percentage of candidate advertising devoted to attack in a given week and the volume of outside group supporting attacks in prior weeks.

Going in the other direction, if outside groups reduce their volume of supporting attack in response to the supported candidates airing more attack, then coefficients for *candidate attacks*_{t-1} and *candidate attacks*_{t-2} should have negative associations with the supporting attack ratio (right two columns of Table 4). The models find mixed evidence for such a relationship. On the House side more attack oriented advertising by candidates in the prior two weeks is associated with less supporting attacks from outsiders. Specifically, a House candidate running 100% attacks in a week versus zero attacks is associated with about 30% less volume of supporting attacks in following weeks (-.291 and -.348). On the Senate side, however, no significant association is observed between candidates' attack percentage and supporting attacks by outside groups.

Type of Attack

When outside groups take on a larger role of attack in a campaign, what impact does this have on the substance of the attacks in the race? The outside agendas hypothesis expects that while outsiders are better positioned to make personal attacks, their own internal characteristics will instead make them more likely to emphasize policy matters in their attacks. A straightforward evaluation of this hypotheses is to compare the proportions of attack advertising by each group devoted to personal attacks versus policy-based attacks. The percentage of attacks based on personal attributes is also examined between dark money groups and groups with disclosed donors. Single candidate groups were not included here since they represented only a trivial amount of advertising in the 2010 and 2012 congressional elections.

Table 5 shows the percentage of all attacks for each category of actors that were on personal characteristics versus policy matters. Because these percentages reflect the proportion of personal attacks in all attack advertising by each category of actor (total attack ad airings are shown in parentheses), all differences are significant at $p < .001$ in two-tailed proportions tests.

Candidates (30% Senate, 28% House) followed by parties (27% Senate, 21% House) were the most likely campaign actors to base their attacks on personal characteristics instead of policy considerations. Issue-based independent groups rarely made personal attacks (all issue-based groups combined 9% Senate, 14% House), but even party-adjacent groups both with disclosed and undisclosed donor support made mostly policy-based attacks against opponents when compared to candidates (all party-adjacent groups combined 15% Senate, 13% House). Furthermore, while the differences were modest, dark money groups were less likely than transparent groups to air personal attacks. These findings offer support for the outside agendas hypothesis, as outside groups of all varieties and independent groups in particular (both dark money and transparent) were more likely than candidates to engage in policy-based attacks. In Senate contests but not in House races, anonymously funded party-adjacent groups were the least likely to use personal attacks (7%).

The difference in types of attacks by different groups suggests that campaigns with greater independent group activity are more policy focused, not less. However it is also possible that, just as with the mix of attack versus advocacy, an inverse association is present in the type of attacks by campaign actors. To look for evidence of such an association, a model was estimated with the percentage of a candidate's attacks based on personal characteristics as the outcome variable.

Table 5: Percentage of Attacks on Personal Characteristics

	Senate	House
Candidates	30% (431,848)	28% (435,004)
Parties	27% (190,285)	21% (293,861)
Transparent Party-Adjacent Groups	16% (67,511)	18% (42,627)
Dark Party-Adjacent Groups	14% (85,477)	7% (29,747)
Transparent Issue-Based Groups	9% (45,518)	19% (36,491)
Dark Issue-Based Groups	8% (38,875)	11% (63,219)

Total airings of ads with attack content in parentheses

Single candidate groups are excluded because of their trivial advertising volume

No association was found between the proportion of personal attacks by candidates and outside supporting policy-based attacks (full model results provided in the Online Appendix). So candidate advertising does not feature more personal attacks in campaigns where outside groups' attacks are more policy-based. Thus, when outside groups make more attacks in a campaign overall advertising in that campaign tends to be more policy-based.

Conclusion

This study has offered a theory of how the network form of organization of candidates, parties, and outside groups enables campaigns to coherently manage their efforts despite legal barriers to communication. Holding other factors constant, the proportion of attack advertising by a candidate is inversely associated with the volume of attack advertising supporting that candidate. This observed relationship is consistent with statements from campaign professionals in interviews that candidates expect outside groups to attack on their behalf. In addition, the combination of weak findings in panel models and significant relationships in cross-sectional models is consistent with cooperation between campaign actors occurring through legal communication, the use of publicly available ad buy data, and due to reliable expectations of each other's strategies, and not through adjustments after the observed occurrence of ads airing.

An important caveat to these findings is that if candidates, parties, and other outside groups effectively cooperate as networked actors in the mix of attack and advocacy advertising, it is through a dynamic process that is only indirectly observable through the campaign advertising data used here. The analyses by themselves do not demonstrate a causal relationship of outside attack advertising on candidates' advertising mix.

When outside groups take on more of the load of attacks in a campaign, the policy content of advertising in campaigns increases. This could be because personal attacks are more customized attacks that require more localized knowledge. Another possibility is that even party-adjacent outside groups are motivated by policy interests, and they prefer to champion those policy per-

spectives in their advertising. Since candidates are the most likely campaign actor to engage in personal attacks, this also suggests that backlash is not a major consideration in the choice to attack opponents on personal versus policy grounds.

Finally, these findings inform some normative concerns about independent group advertising in congressional races. When outsiders are attacking candidates, the attacks are more likely to be of the type that citizens have judged to be fair game in campaigns. Outsiders are more attack-oriented than candidates, but the ratio of attack advertising for candidates is biased downward by safe candidates running purely advocacy spots in their contests. Furthermore, because greater attack advertising by outsiders is associated with less by candidates, the net effect of outside group attack advertising on the negativity of the campaign is partially muted.²² These findings do not mitigate concerns about the lack of accountability of independent group advertising and of the distortive effect of unlimited independent expenditures. And the conclusions here are based solely on television advertising and do not include other forms of mass communication such as robo-calls, direct mail, and web ads that may carry more vitriolic messages by various groups. But at least in terms of advertising sentiment and the substance of attacks on the still dominant form of campaign communication, television, the increased role of independent groups in campaigns has not had a corrosive effect on campaign discourse.

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²²In an average Senate campaign a candidate's shift towards advocacy in response to outside attacks reduces the total percentage of attack advertising in a campaign from 63% to 57%.

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Appendix A: Description of Variables

Advertisement Audience

Each airing of an advertisement was assigned a value to account for the size of the media market where the ad aired and the share of the market typically viewing during the daypart when the ad ran, where $\text{audience} = \text{market} \times \text{daypart}$. The resulting audience value can be thought of as the maximum potential audience for the airing. Market size is the total number of television households in the market in thousands, obtained from Nielson for the year of the election, 2010 and 2012. Daypart viewership represents the average portion of television homes watching broadcast television during that time period, provided by Nielson. These values are national averages calculated separately by month for each election cycle. For a lengthier discussion of this measure, and robustness checks of models using this measure, see Appendix C. For example, an ad in 2012 airing in the Miami market (1,621,130 television households) during early news (estimated 23.4% of homes watching local television during this daypart) has a value of 379.34 ($1621.13 \times .234 = 379.34$) while another ad airing in the Jacksonville market (659,170 television households) during late news (estimated 18.4% of homes viewing local television during this daypart) has a value of 121.29 ($659.17 \times .184 = 121.29$).

Attack Percentage

The attack percentage was measured for each airing using two variables provided in the WMP data. The WMP codes ads into three categories: *attack*, *contrast*, and *promote*, and further codes contrast ads for the mix of attacking and advocacy within each ad. A *negativity* score to measure the proportion of attack in each spot was created where attack ads were coded as 1, promote ads as 0, and contrast ads were coded as follows: “more promote than attack” = .25, “about equal attack and promote” = .50, “more attack than promote” = .75, “only contrasting element is brief statement in oral authorization” = 1. The resulting scale assigned one of five values to each airing: 0, .25, .50, .75, or 1. Then 20 randomly selected ads each from 2010 and 2012 were viewed to ensure that the coding provided by WMP accurately reflected the balance of positive and negative sentiment in each ad. In each of the 40 ads checked, the coding from WMP was an accurate representation of the ads’ sentiment. Multiplying the audience for each airing by its *negativity* score yields the total volume of attack advertising, where $\text{attackvol} = \text{negativity} \times \text{audience}$. The sum of a candidate’s attack volume divided by the the sum of the candidate’s total audience yields that candidate’s attack percentage.

Supporting Attack Ratio

Supporting attack is the total volume of attack by outside groups in support of a candidate divided by that candidate’s own total advertising volume. For example, Jack Conway the Democratic Senate candidate in Kentucky in 2010 had a total advertising volume value of 442,586 and outside groups supported his campaign with a volume of 274,855 attack on his opponent. The resulting supporting attack ratio is 0.62 ($\frac{274,855}{442,586} = 0.62$).

Opposing Attack Ratio

Opposing attack is the volume of advertising attacking against a candidate by all campaign actors (the opposing candidate’s advertising plus opposing outside group advertising) divided by that

candidate's own total advertising volume.

Personal Attack Percentage

Each attack ad airing was coded for personal attack according to the following: *personal only* = 1, *both personal and policy* = .5, and *policy only* = 0. The volume of personal attack for each actor is the sum for all airings of *personalvol* = *personal* × *attackvol*. The volume of personal attack divided by the volume of all attack by each actor yields the personal attack percentage.

Race Ratings

The Rothenberg & Gonzales Political Report rates the likelihood of each party winning the presidency, House, Senate, and gubernatorial contests using a nine-point scale, from safe Republican to safe Democrat. The ratings are created by interviewing “more than 150 congressional candidates every cycle and talk with key partisan decision-makers in Washington and astute political observers in the states. We also rely heavily on data, including past electoral history and trends, current polling (public and private, partisan and nonpartisan), as well as national surveys” (Gonzales 2015). Rothenberg’s nine category scale reflects the probability that one party or the other will win the seat, not the expected vote share. The nine point scale of the state of the race for each candidate was created by flipping the scale for Republicans (the original scale is 1= safe Democrat) to create a nine-category rating of a candidate’s chances: 1 = safe, 2 = favored, 3 = lean toward, 4 = tilt toward, 5 = toss-up, 6= tilt away, 7= lean away, 8 = unlikely, 9 = hopeless. Three way races in the Senate were manually coded to reflect Rothenberg’s expectation for each candidate.

Table A1: Competitiveness of Races, 2010 & 2012

	Senate	House
Safe	21%	33%
Favored	7%	7%
Leaning towards	5%	6%
Tilting towards	9%	6%
Toss Up	15%	9%
Tilting away	9%	5%
Leaning away	7%	6%
Unlikely	9%	6%
Hopeless	18%	23%
N=	119	632

Represents only campaigns included in analyses

Candidates and Outside Groups

Candidates are defined as the campaign committees of the candidates for office and outside groups are defined as all other groups making independent expenditures in support of and in opposition to candidates in elections. Outside groups were coded based on the stated objectives of the group on its own website, profile information from opensecrets.org, and press accounts if available.

Party Committees: Groups explicitly connected with one of the two major parties.

Party-Adjacent Groups: Groups that refer to multiple issues all consistent with one party's platform, or refer to electing Republicans / conservatives or Democrats / progressives. Allocate resources across multiple races all on one partisan side and do not back challengers in partisan primaries.

Issue-Based Groups: Groups that are affiliated with an interest group or industry, offer memberships, or advocate for narrow policy goals. Note that Tea Party groups are included in this category despite seemingly broad issue interests due to their tendency to oppose Republican incumbents in primaries and references to "true conservatives". Tea Party groups mostly engaged in direct contact of voters via mail and post for fundraising and advocacy, and only rarely aired television advertisements.

Single Candidate Groups: Groups created to support a single candidate in a single election.

Table A2: Top Independent Groups

Party-Adjacent, 2010		Issue-Based, 2010	
Crossroads GPS	35.48%	U.S. Chamber of Commerce	31.23%
American Crossroads	23.08%	Club for Growth	5.92%
American Action Network	19.66%	60 Plus	5.36%
Patriot Majority PAC	7.39%	AFSCME	4.82%
American Future Fund	5.79%	Americans for Tax Reform	4.65%
Americans for Prosperity	5.10%	Ntl. Fed. of Ind. Business	3.34%
Comm. Hope Growth & Opportunity	4.64%	Americans for Job Security	3.03%
America's Family First Action Fund	3.54%	Women Vote	2.89%
Commonsense Ten	2.29%	Citizens for Strength and Security	2.57%
Republican Jewish Coalition	2.10%	National Education Association	2.49%
Party-Adjacent, 2012		Issue-Based, 2012	
Crossroads GPS	33.32%	U.S. Chamber of Commerce	18.81%
House Majority PAC	18.51%	AFSCME	9.11%
Majority PAC	17.51%	Independence USA	8.04%
Congressional Leadership Fund	8.06%	Now or Never PAC	6.69%
American Crossroads	6.50%	Americans for Tax Reform	6.45%
American Action Network	6.08%	Club for Growth	5.05%
YG Action Fund	3.51%	SEIU	3.70%
Patriot Majority PAC	2.90%	Center Forward	3.53%
Freedom PAC	2.65%	American Future	2.85%
Americans for Prosperity	1.67%	Freedomworks	2.55%

Percentages indicate proportion of category's advertising volume by each group in that year

Donor Transparency

Donor transparency was classified as a dichotomous variable based on information from the Center for Responsive Politics (opensecrets.org) and the outside groups' own websites. Groups with

fully disclosed donors were coded as *transparent* groups and groups with limited or completely undisclosed donors were coded as *dark* groups.

Summary Statistics

The summary statistics of the variables included in the models in this study are detailed below.

Table A3: Summary Statistics for Models of Attack Percentage

	Senate				House					
	Mean	Std.	Dev.	Min.	Max.	Mean	Std.	Dev.	Min.	Max.
Dependent Var.										
Candidate attack pct.	0.38	0.29		0	1	0.38	0.33		0	1
Independent Vars.										
Supporting attacks	0.54	0.92		0	4.58	0.69	1.53		0	11.53
Race rating						(for the distribution see Table A.1)				
Opposing attacks	1.09	1.46		0	8.01	1.15	1.88		0	16.11
Republican	50%	—		0	1	51%	—		0	1
Incumbent candidate	30%	—		0	1	47%	—		0	1
Challenger candidate	27%	—		0	1	36%	—		0	1
Open seat candidate	43%	—		0	1	17%	—		0	1
Three-way race	9%	—		0	1	—	—		—	—
2012	53%	—		0	1	50%	—		0	1
			N=119					N=632		

Appendix B: Additional Models and Robustness Checks

Assessing the Audience Measure

Obtaining ratings estimates for each of the 2,382,138 airings included in this study is neither practical nor financially possible (precision ratings data, even several years old, are proprietary and are available only at significant cost). So a compromise must be struck between increased precision on one hand and feasibility and cost on the other. The information we would need to have the most precise estimate of the total impressions of an advertisement, in order of increasing precision, are: first, the television market in which the ad aired; second, the part of the day when the ad aired; third, the station on which the ad aired; fourth and at the greatest level of precision, the program during which the ad aired. The approach taken in this study includes the first two in arriving at an audience estimate: the size of the market and the average broadcast television viewership during the daypart.

The typical approach to measuring political advertising volume is as a count of ad airings, but different airings often reach quite different audience sizes. This approach does not capture differences in both the cost and the reach of airings occurring in different markets, at different times, and during different programming. For example, an airing that occurs during the 6 o'clock news in a district's largest media market versus another airing that occurs during daytime programming in a secondary media market are quite different in terms of both cost to the campaign and in voters reached with the message (for related discussions of advertising measurement, see Freedman and Goldstein 1999; Jamieson, Waldman, and Sherr 2000; and Shaw 1999).

Measuring campaign advertising using a count of airings does not pose a problem if the comparisons involve sets of airings that occurred in sufficiently similar times and markets or the differences are random noise that cancel out in large sample sizes. However, the essential relationship under study in the analyses here is between candidates and independent groups who purchase advertising at different rates and therefore might pursue different media buying strategies. If independent groups, which pay far higher advertising rates than candidates, tend to purchase larger numbers of spots in cheaper time slots compared to candidates or vice versa, then the assessment of the impact of super PAC advertising using a count of airings would be biased.²³

It is important to also note that the advertising under study here is limited to broadcast television. This reduces the variance in audience sizes within dayparts across stations within the dataset. For example, it would be inappropriate to treat a spot airing during the early news daypart on the Hallmark Channel the same as a spot airing at the same time on an ABC affiliate local news broadcast. This study only compares airings from broadcast stations that have a smaller variation in audience sizes at a given time compared to the wide range of audience sizes across cable networks.

While this measure improves the quality of comparisons of advertising strength, it should be noted what is still left out. This weighting scheme does not differentiate between broadcast television stations within a market, does not differentiate between programs within a daypart, and does not account for demographic differences in viewership of different television programs - all considerations of great importance to media buyers for campaign actors. Still, weighting airings by market and daypart is a significant improvement on the measurement of advertising volume in terms of reach compared to a count of ad airings, and there is no reason to expect that this weighting introduces more error than it eliminates.

²³The Federal Election Campaign Act requires that broadcasters offer advertising time at the “lowest unit charge” to federal candidates in the last 45 days before a primary and 60 days before a general election (U.S.C. §315(b)(1)(A)). Independent groups, however, have no such protection and thus pay far larger rates.

Where Groups Place Their Ads

If candidates and outside groups have differences in the distribution of their airings across dayparts, this would be an immediate indication that their individual airings are reaching audiences of different sizes. A broad picture of the advertising placement patterns of outside groups compared to candidates is provided in Table B1. In the aggregate, outside groups and candidates have very similar ad placement patterns in terms of dayparts.

Table B1: Portion of Airings by Daypart

	2010		2012	
	Candidates	Outsiders	Candidates	Outsiders
Early Morning	26.5%	28.2%	28.3%	24.9%
Daytime	19.9%	19.0%	16.9%	17.9%
Early Fringe	14.5%	13.8%	13.5%	13.4%
Early News	7.4%	7.5%	8.3%	8.7%
Prime Access	9.2%	9.3%	10.5%	11.5%
Prime Time	6.3%	5.8%	5.6%	6.4%
Late News	7.6%	7.4%	8.6%	8.5%
Late Fringe	8.6%	8.9%	8.3%	8.8%
N=	758,542	414,314	1,642,628	1,028,814

General election advertising only, combines Senate and House campaigns

The more important bias could occur in the values for supporting attacks since this variable is a quotient of supporting outside group advertising volume divided by candidate advertising volume. The differences between the supporting attacks calculated from audience-weighted airings minus the supporting attacks calculated from unweighted airings is quite small: the average difference in the values is just 0.03 (SD = 0.36).

In short, for analyses that include a large number of campaigns, these differences are smoothed out enough that we can be comfortable with airings as a unit of analysis. In analyses of a single campaign we should be wary of ad counts, but in studies of a larger scope, these minor errors should largely disappear as a concern. Despite the small differences, the weighted values are used in the analyses in this paper since the values better represent the total impressions of the advertising under study.

Attack Percentage Model Using Unweighted Airings

To ensure that the results reported in the study are robust to alternative measures of advertising strength, the models are re-estimated using unweighted ad airings, and the results are given in Table B2. In these models the candidate attack percentage, the supporting attack ratio, and opposing attacks are all calculated without the inclusion of a weight for the estimated audience, but the models are otherwise the same. The associations between outside group attacks and candidate attacks in these models are all still in the expected negative direction, the magnitude of the effects are very close to those in the models in the body of the paper, and the coefficients are statistically significant. The coefficient for House races in the base model is slightly smaller, -.115 versus -.138,

and is significant only in a one-tailed test, though the p-value in the two-tailed test ($p = .056$) is very close to standard thresholds of statistical significance. The results from these additional models provide confidence that the results reported in the body of the paper are robust.

Table B2: Candidate Attack Models with Unweighted Airings

Independent Variables	Base Model		Partisan Model	
	Senate	House	Senate	House
Supporting attacks	-.492*	-.115 ⁺	-.819*	-.293***
	(.197)	(.060)	(.306)	(.081)
Republican	—	—	.374	-.078
			(.307)	(.134)
Republican × supporting attacks	—	—	.278	.252**
			(.280)	(.091)
Nearly safe seat (2)	2.377***	1.392***	2.485***	1.394***
	(.615)	(.216)	(.645)	(.216)
(3)	2.737***	1.844***	2.953***	1.900***
	(.538)	(.255)	(.535)	(.255)
(4)	3.017***	1.678***	2.965***	1.684***
	(.533)	(.222)	(.555)	(.227)
Toss Up (5)	2.837***	1.783***	2.970***	1.844***
	(.579)	(.215)	(.628)	(.219)
(6)	2.951***	1.845***	3.217***	1.953***
	(.585)	(.249)	(.617)	(.256)
(7)	2.396***	2.103***	2.130**	2.133***
	(.664)	(.252)	(.655)	(.262)
(8)	2.092***	1.508***	2.244***	1.475***
	(.534)	(.252)	(.556)	(.254)
Hopeless candidacy (9)	1.985**	1.039***	2.169**	1.017***
	(.613)	(.217)	(.629)	(.227)
Opposing attacks	.218*	.125**	.312**	.125**
	(.125)	(.047)	(.117)	(.047)
Challenging candidate	.045	.140	-.359	.152
	(.361)	(.144)	(.405)	(.154)
Open seat candidate	-.405	-.254	-.556	-.244
	(.277)	(.175)	(.323)	(.176)
Three-way race	-1.298***	—	—	—
	(.356)			
2012	.225	-.549***	.281	-.517***
	(.220)	(.110)	(.227)	(.110)
Intercept	-2.396***	-1.417***	-2.616***	-1.383***
	(.470)	(.150)	(.482)	(.166)
N	113	580	113	580
BIC	-466.79	-3725.95	-438.93	-3714.93
Log Pseudo-Likelihood	-50.65	-291.22	-49.46	-290.28

Robust standard errors in parentheses

⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests

Alternative Models

The dependent variable in the main models in this study, candidate attack percentage, has a high frequency of zeros and a smaller spike at one. This suggests that a zero-one inflated beta regression model might be appropriate. A zero one inflated beta distribution consists of three parts: a probability that the dependent variable equals 0, a probability that the dependent variable equals one, and the distribution of the dependent variable given that $0 < y < 1$. The effects on the log odds of having the value 0 or 1 on the dependent variable are represented in the zeroinflate and oneinflate equations respectively. The remaining proportions are modeled using a beta-distribution and the effects are reported on the logit scale.

The zero-one inflated beta regression model presumes that the proportions of 0 or 1, that is, a candidate running no attack advertising at all or a candidate running nothing but attack advertising, are a result of a process separate from that generating other values of the attack percentage variable. Such a model is inconsistent with the theory of the data generating process offered here. However to ensure that the findings presented in the article are not dependent upon the choice of a fractional logit model, the models were re-estimated using a zero-one inflated beta model, a tobit model, and OLS. The results are shown in Tables B3 and B4. The differences in observed associations in these models are small and do not affect any conclusions drawn in this study.

Table B3: Additional Candidate Attack Models, Senate

Independent Variables	Frac. Log.	ZOIB	Tobit	OLS
Supporting attacks	-.417* (.170)	-.339* (.153)	-.096* (.042)	-.093* (.038)
Nearly safe seat (2)	2.290*** (.611)	1.492** (.480)	.553*** (.117)	.384*** (.100)
(3)	2.780*** (.535)	1.954*** (.481)	.676*** (.116)	.513*** (.101)
(4)	2.837*** (.532)	1.900*** (.476)	.694*** (.116)	.509*** (.098)
Toss Up (5)	2.838*** (.569)	2.002*** (.436)	.686*** (.215)	.514*** (.085)
(6)	2.904*** (.571)	1.978*** (.474)	.713*** (.115)	.530*** (.097)
(7)	2.410*** (.650)	1.560*** (.587)	.612*** (.147)	.417*** (.127)
(8)	2.020*** (.540)	1.339*** (.468)	.485*** (.114)	.323** (.097)
Hopeless candidacy (9)	2.099** (.664)	1.870*** (.504)	.487*** (.122)	.341** (.105)
Opposing attacks	.212+ (.118)	.220* (.101)	.044 (.027)	.049* (.024)
Challenging candidate	-.088 (.342)	-.197 (.341)	-.016 (.095)	-.013 (.085)
Open seat candidate	-.340 (.273)	-.374 (.280)	-.076 (.076)	-.066 (.066)
Three-way race	-1.323*** (.345)	-.875* (.346)	-.313*** (.085)	-.264*** (.073)
2012	.038 (.227)	-.262 (.200)	.034 (.052)	.009 (.044)
Intercept	-2.304*** (.476)	-1.397*** (.362)	-.069 (.067)	.097+ (.051)
One inflation	—	-4.500*** (1.005)	—	—
Zero inflation	—	-1.409*** (.237)	—	—
N	113	113	113	113
BIC	-436.79	—	—	—
Log Likelihood	-47.64	-355.75	—	—
Pseudo R ²	—		.73	—
Adj. R ²	—	—	—	.41

Robust standard errors in parentheses

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests

Table B4: Additional Candidate Attack Models, House

Independent Variables	Frac. Log.	ZOIB	Tobit	OLS
Supporting attacks	-.147* (.061)	-.153** (.048)	-.042** (.015)	-.032** (.038)
Nearly safe seat (2)	1.280*** (.213)	.334 (.181)	.403*** (.063)	.247*** (.045)
(3)	2.780*** (.255)	1.143*** (.194)	.539*** (.068)	.385*** (.049)
(4)	1.593*** (.218)	.469* (.187)	.491*** (.068)	.328*** (.049)
Toss Up (5)	1.711*** (.211)	.601** (.178)	.524*** (.062)	.351*** (.044)
(6)	1.643*** (.230)	.793*** (.206)	.491*** (.076)	.341*** (.055)
(7)	2.023** (.254)	.673** (.211)	.605*** (.074)	.418*** (.053)
(8)	1.414*** (.246)	.236 (.207)	.458*** (.071)	.278*** (.051)
Hopeless candidacy (9)	1.010*** (.217)	.313+ (.179)	.346*** (.060)	.202*** (.042)
Opposing attacks	.138** (.049)	.072+ (.040)	.043** (.013)	.028** (.009)
Challenging candidate	.186 (.141)	.080 (.129)	.055 (.048)	.050 (.034)
Open seat candidate	-.271 (.173)	-.366* (.142)	-.067 (.047)	-.051 (.032)
2012	-.568*** (.109)	-.288* (.091)	-.162*** (.110)	-.115*** (.022)
Intercept	-1.338*** (.150)	-.204 (.113)	.066+ (.166)	.228*** (.022)
One inflation	—	-2.800*** (.210)	—	—
Zero inflation	—	-.897*** (.093)	—	—
N	580	580	580	580
BIC	-3376.92	—	—	—
Log Likelihood	-264.76	-355.75	—	—
Pseudo R ²	—	—	.31	—
Adj. R ²	—	—	—	.34

Robust standard errors in parentheses

⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests

Model of Personal Attack

If candidates increase their personal attacks on the opponent as policy-based attacks on their behalf from outside groups increase, then we should see a positive association between the dependent variable and *supporting policy attacks* – the volume of policy-based attacks by supporting outside groups over the total volume of the candidate’s advertising volume. The other independent variables in the model are identical to the ones in the main model in this study except for *opposing personal attacks*, which is the total volume of personal attacks made by the opposing side on the candidate, divided by the candidate’s total advertising volume, and a more compact and simplified treatment of the state of the race using two variables: *race competitiveness*, which is a folded scale of the race ratings and *likelihood of loss* which measures the positive or negative difference from the opponent’s race rating.

The estimates from the models provided in Table B5 show no association between policy-based attacks by outside groups and candidates’ proportion of personal attacks. Neither in Senate or House campaigns does the volume of policy based attacks made by supporting outside groups have any influence on the personal/policy mix of attacks made by candidates. None of the independent variables in the Senate model had effects that were statistically significant, and just two variables in the House model had statistically significant effects on candidate’s proportion of personal versus policy-based attacks: candidates further behind are more likely to attack on personal grounds, while challenging candidates are less likely to make personal attacks on incumbent opponents.

Testing the Validity of Pooled Samples

To increase the statistical power the data were pooled across years. However, this pooling may merge data with very different relationships at work. In particular, the 2010 election came up shortly after clarification from the FEC on independent expenditures, so a learning curve could be expected and coefficients estimated for 2010 might be significantly different than the coefficients estimated for 2012. To examine differences by year, the model of compensatory attack is fully interacted with the year variable. The table below provides the results from Wald tests to determine whether the coefficients are the same between election years (this is equivalent to a Chow test). In these tests, a chi-square is performed to determine the probability that the coefficients are significantly different between election years in the fractional logit model. In the pooled sample of attack advertising no significant differences are observed between any of the variables between 2010 and 2012 (Table B6). The single difference is the main effect term for year in the House model, reflecting that there was a difference in the intercept for candidate attack percentage from 2010 to 2012, but the slopes for other variables were identical.

Table B6: Test of Interactions: Models of Attack Advertising

	Senate		House	
	χ^2	p-value	χ^2	p-value
Year	1.23	.26	5.35	.02
Supporting attacks \times year	1.35	.24	0.35	.55
Race rating \times year	7.23	.51	7.72	.46
Opposing attacks \times year	2.12	.15	0.65	.42
Inc., cha., open \times year	0.79	.67	1.13	.57

Table B5: Fractional Logit Models of Candidate Personal Attack

Independent Variables	Senate	House
Supporting policy attacks	-.062 (.211)	-.073 (.073)
Race competitiveness	.133 (.107)	-.032 (.054)
Likelihood of loss	.083 (.070)	.089** (.033)
Opposing personal attacks	.112 (.286)	.014 (.029)
Challenging candidate	-.177 (.427)	-.559** (.206)
Open seat candidate	.069 (.346)	-.166 (.209)
2012	.443 (.300)	-.080 (.147)
Intercept	-2.113*** (.474)	-1.064*** (.208)
N	87	440
BIC	-319.94	-2422.38
Log Pseudo-Likelihood	-38.42	-203.49

Robust standard errors in parentheses

⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests

Note: Only candidates with any volume of attack advertising are included in the models, and three-way race was dropped due to insufficient variation in this model