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Do campaign contributions fuel political sabotage?

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Abstract

Political donations are a cornerstone of political campaigns, yet their impact on the dynamics of electoral contests remains largely unexplored. This study examines the role of campaign contributions in fostering sabotage, particularly through negative campaigning in gubernatorial elections. Using a model of political contests, with endogenous sabotage and asymmetries in candidates' popularity, we demonstrate that an increase in funding can incentivize candidates to escalate sabotage efforts. We validate this by performing a highly granular merge, at the candidate-date level, of two extensive datasets—political donations and political TV ads—in U.S. gubernatorial elections, encompassing approximately 3.5 million ads from 564 candidates between 2002 and 2020. Exploiting plausibly exogenous variations in state contribution limits and party-level donations, we find that political donations translate to negative campaigning within a relatively short timeframe: a one standard deviation increase in the extent of political donations made in the preceding week raises the average campaign negativity by approximately 7%. We show that this effect is driven primarily by donations made by individuals, and is strengthened in corrupt, symmetric, and economically weak environments. Our results shed light on hitherto overlooked political externalities of campaign contributions.

JEL classifications: D72, P00

Keywords: Campaign contributions, political sabotage, negative campaigns, contests.

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1 Introduction

Campaign contributions take a central role in the execution of election campaigns, with a continuously growing impact over the past few decades. For instance, while only \$200 million were raised by political candidates in the U.S. presidential, congressional, and gubernatorial races in 1960, in the mid-1990s this figure grew to over \$3 billion, and by 2024 it has reached a record high of over \$21 billion. Consequently, understanding the implications of political donations has been of perennial interest to economists and policymakers. The literature so far highlighted a range of related facets, spanning from the impact of donations on election outcomes and policy formation, to their effect on productivity and mobilization.¹ Little attention, however, was given to the potential impact of political donations on the dynamics of election contests, a cornerstone of democratic systems. This paper touches on this gap by examining the conceivable role of campaign contributions in fueling aggressive political practices, potentially leading to the emergence of political sabotage. The latter, defined as the costly act of damaging a rival’s likelihood of winning the political contest (see Chowdhury and Gürtler, 2015), inflicts significant adverse effects, and reduces social welfare.²

Our study examines the impact of campaign contributions on political sabotage, theoretically and empirically, vis-à-vis the case of negative campaigning and donations in U.S. gubernatorial elections. Undertaking a highly granular merge, at the candidate-date level, of two wide datasets on political contributions and TV ads, and leveraging plausibly exogenous variations in contribution limit regimes and party-level donations, we find that political contributions induce sabotage campaigning, in a robust and significant magnitude, within a relatively short time frame, namely within a week of the donation. These patterns, we show, are most prominent in corrupt, symmetric, and recessionary cases. Our results illustrate that political donations, whose primary intention is supporting the political discourse, may generate rather counterproductive political dynamics, shedding light on hitherto overlooked externalities of political giving.

To understand the process behind these conclusions and results, we must study the problem from first principles, beginning with the fundamental elements of political campaigns. Given a

¹See, e.g., Avis et al. (2022); Bombardini (2008); Levitt (1994); Prat (2002), among others. de Figueiredo John and Snyder James (2003) and Stratmann (2005), among others, provide syntheses of the literature, reviewed in more detail in the next section.

²Sabotage in tournaments has been shown to reduce productivity (Carpenter et al. (2010); Gürtler et al. (2013); Deutscher et al. (2013)) and the utility of third parties (Charness et al. (2014)), as well as induce adverse selection (Münster (2007)). This extends to political contexts, in which sabotage adversely affects voter turnout (Soubeyran (2009)), trust in democratic processes and the government (Chaturvedi (2005); Lau et al. (2007)), and institutional legitimacy (Gibson (2008)).

budget, each candidate can allocate funds to either positive (non-negative) self-advertisements that highlight their key advantages, or to negative ads (i.e., sabotage) aimed at convincing voters of the opponent’s drawbacks. Each of these strategies has its own merits and drawbacks. On the one hand, negative campaigns tend to have a greater impact than non-negative ones—a phenomenon commonly referred to as the *negativity bias*.³ On the other hand, negative campaigns can also backfire, leading to what is known as the *backlash effect*, where a candidate’s own supporters are alienated by the negativity.⁴ Our analysis uses these two properties to establish a conceptual connection between political donations and campaign sabotage.

Building on key features from Skaperdas and Grofman (1995), Chen (2003), and Lovett and Shachar (2011), our theoretical framework models a contest between two candidates with fixed individual budgets, which they can allocate to either a non-negative campaign or sabotage. The non-negative campaign aims to persuade undecided voters, whereas sabotage seeks to suppress the opponent’s voters. Under these assumptions, we consider both campaign channels to have diminishing marginal returns, leading candidates to balance their investments between the two.⁵ Moreover, in line with the previously discussed negativity bias and backlash effect, we assume that while sabotage has a greater marginal impact, it also carries a limited deterrent effect on the candidate’s own voters. Our analysis leads to two testable hypotheses. First, we show that non-negative campaigns are more prevalent than sabotage, as candidates initially focus on establishing their base of support. However, beyond a certain point, the relative investment in sabotage increases, meaning that each additional donation leads to a higher proportion of campaign funds being allocated to sabotage. Second, we show that in an asymmetric contest, the less popular candidate invests more heavily in sabotage relative to the advantaged candidate. This is because the negative channel is more beneficial for the weaker candidate, given that their base of supporters is relatively small compared to that of the popular candidate.

These two hypotheses constitute the main theoretical contributions of this paper. However, above all, our model’s most significant contribution is its ability to simultaneously explain all relevant phenomena within a unified framework. For example, Skaperdas and Grofman (1995)

³This refers to the tendency of negative information to exert a stronger influence. The phenomenon has been widely documented across various fields, including Political Science, Marketing, and Psychology. For more on this phenomenon, see Lau (1985); Cacioppo et al. (1997); Ta et al. (1998); Ito and Cacioppo (2000); Baumeister et al. (2001); Holbrook et al. (2001); Klein and Ahluwalia (2005), among others.

⁴See, e.g., Dowling and Wichowsky (2015) and references therein, for empirical evidence of this phenomenon.

⁵The assumption of diminishing marginal returns also aligns with a parallel strand of literature on political contributions from interest groups, originating with Baron (1994), Grossman and Helpman (1994, 1996), and Coate (2004), and more recently with Walker and Nowlin (2021) and Bouton et al. (2024), who focus on small donors. Specifically, Baron (1994) and Bouton et al. (2024), under certain parametric assumptions, apply the Tullock structure with diminishing marginal returns on investments. However, these studies primarily examine informed and uninformed voters and do not consider negative advertising, as noted by Coate (2004).

assume normalized budgets, rendering the impact of additional donations irrelevant. Yet, even when budgets vary, their results suggest that “weak” candidates may refrain from sabotage (see Proposition 2 therein). Similarly, Chen (2003) introduces a convex cost function instead of fixed budgets and concludes that sabotage is independent of costs or budgets (see Equations (4) and (5) therein, along with the subsequent results). By combining different elements from various models, we achieve a comprehensive theoretical framework that aligns with the empirical evidence. A broader discussion of these issues is provided in Section 2.

The model’s predictions are corroborated by the empirical analysis. We undertake an empirical investigation of the effect of political donations on political sabotage via examinations of the tone characteristics of political ads related to U.S. gubernatorial elections. The focus on the gubernatorial framework is appealing for our purposes for several reasons. First, gubernatorial elections in the U.S. are held independently across states, enabling the examination of multiple races concurrently. Second, gubernatorial elections are largely bi-partisan, matching well with a simplified 2-player framework. Third, races alternate across states annually, thus providing a substantive, continuous time dimension. Last, an intra-U.S. perspective provides ample cross-state variation in institutional features related to contribution limits, representing a crucial identification facet, and politico-economic factors, which are central to the analysis. These features closely follow the theoretical setup, and enable examining its main hypotheses.

The analysis is based on two key measures, namely campaign contributions and political sabotage. To measure campaign contributions, we employ detailed data on political donations from the Database on Ideology, Money in Politics, and Elections (DIME), outlined in Bonica (2024). Each donation in these data is characterized by its amount, date, and recipient, among other things, features that we exploit for the analysis, including undertaking a highly granular merge with the political sabotage data. To execute the latter, we first aggregate donations across recipients and dates. Thereafter, realizing that the impact of donations on campaign features may depend heavily on the time frame considered, we construct a number of donation measures, accounting for different possible time frames that are relevant to the analysis.⁶ Namely, we consider the amount donated to a recipient within the preceding day/preceding week (with the exclusion of the preceding day)/penultimate week/penultimate two weeks/campaign (with the exclusion of the preceding month), representing mutually-exclusive, non-overlapping groups of donation time frames.

As for political sabotage, we measure this via the tone characteristics of political ads related

⁶For instance, decisions concerning campaign characteristics may be taken based on aggregate donations to date, or otherwise on donations made recently within the past month, week, or even day, noting that a number of TV campaign ads, with different characteristics, may be pre-recorded, or that decisions concerning their features may be taken contemporaneously or within a relatively short time frame.

to races for governorship in U.S. states, derived from the Wesleyan Media Project (WMP) for the 2002-2020 races (Fowler et al., 2022). This data covers the universe of TV political ads related to gubernatorial elections broadcasted in (36) major U.S. TV affiliates, across all (210) media markets, covering all state races. It provides a wealth of ad characteristics, ranging from estimated costs to the type of issue raised (all of which exploited in the analysis), including the tone of the ad. Based on the latter, we construct a binary Ad Tone Index, which outlines whether an ad bears a non-negative tone (promoting a candidate, or contrasting a candidate with an opponent, taking the value 0), or rather a negative one (attacking an opponent, taking the value 1). This index provides a measure of political sabotage that maps to the model, and follows the standard definition in the literature noted initially. Hence, we exploit its considerable variation across candidates and time, as well as across additional dimensions at the ad and state levels, and employ it as the baseline outcome variable. We outline further characteristics of these measures in the empirical section.

We employ daily-level data of TV political ads across the 50 U.S. states and over all gubernatorial races within the period 2002-2020, covering 3.5 million ads, limited by the availability of the key variables in the analysis. Our unit of analysis is at the ad level, which outlines, among its various characteristics, the ad’s beneficiary (referred to as *candidate*), and the ad’s date. Based on these identifiers, we match the noted recipient-date aggregate donation measures to the ads’ data. Altogether, we (manually) identify and match 564 pairs of recipient (DIME) – candidate (WMP), across the dates in our sample period. Using these data, we estimate the impact of political donations on the extent of negative tone, under a fixed effects framework, with candidate-by-year and date fixed effects. The latter capture important within- and cross-campaign time effects, such as seasonality in campaigning (noting that elections are held in November) or campaign-specific characteristics. The former capture a host of observable and unobservable year-specific candidate and state fixed effects.⁷ These effects may include various characteristics, ranging from states’ corruption and electoral competition levels, to candidates’ party affiliation and incumbency status; importantly, they also cover institutional features related to state contribution limits, essential to the analysis. Put together, this framework enables considering a relatively symmetric environment, mapping to the one considered under the basic setup of the analytical framework.

An initial examination yields two key preliminary observations. First, we notice that the average Ad Tone Index is well below 0.5, and is increasing over time, suggesting that at the aggregate positive campaigning is more dominant, consistent with the theoretical insights; in

⁷Notably, all candidates in our sample are state-specific, hence candidate-by-year fixed effects also absorb annual-based state characteristics.

addition, the extent of negativity increases over time, consistent with the donation time trend noted initially, hence motivating further examination of a potential causal association. Second, initial OLS estimations of the baseline framework, under the various donation measures, indicates that (only) donations made in the preceding week (referring to it as such, yet noting that it excludes the preceding day) are positively associated with the extent of negativity, suggesting that donations may translate to sabotage within a relatively short time frame, and motivating a focus on this time frame, which we adopt in the remaining analysis.

In the main analysis, therefore, we focus on the preceding week time frame, seeking a causal interpretation. We do so by following an instrumental variable (IV) approach. Our proposed instrument is, in effect, an interaction of two measures that, together, provide plausibly exogenous variation at the candidate-date level that is strongly correlated with that of donations. The first measure exploits institutionally-entrenched cross-state differences in contribution limit regimes. Notably, some states put no limits on the extent to which individuals and corporations may donate to candidates in gubernatorial races, while others do. We construct a Contribution Regulation Index that captures this cross- and within-state variation in limit regimes, and show that, consistent with previous studies (e.g., Avis et al. (2022)), it is associated with the extent of donations across states. The second considers aggregate donations at the party level, noting that fundraising efforts made by the party may reflect positively on the extent of donations received by candidates affiliated with that party, as we illustrate in the analysis, yet while being plausibly exogenous to their specific efforts.⁸ Importantly, this measure varies by day. The interaction of the two provides candidate-date level variation because candidates of each gubernatorial race, in each state, are affiliated with different parties. Given the inclusion of candidate-by-year fixed effects, absorbing elements related to candidate party affiliation and state institutional features, we assume that this proposed instrument affects the tone of TV ads only via its effect on donations, hence meeting the exclusion restriction. In addition, based on its noted characteristics, we also assume, and thereafter substantiate in the analysis, that it yields a viable first-stage.

Following this approach throughout the main analysis, we find that the preceding week’s donations increases the extent of negative campaigns significantly, in an economically meaningful and robust magnitude. Specifically, our baseline estimates indicate that a one standard deviation increase in the donations made in the preceding week raises the average extent of campaign negativity by about 7%. We show that the main result is robust to the inclusion of controls

⁸The notion that parties may play a significant role in successfully targeting campaign donors has been considered in previous studies (see, e.g., Bouton et al. (2024)); we assume that this aggregate success may trickle down to that of individual candidates.

across various related dimensions, including measures at the ad, and candidate levels, as well as to different specifications, sample restrictions, various donation and sabotage measures, and demanding specifications that include additional fixed effects across the levels examined. We test for underlying potential mechanisms, via an heterogeneity analysis that considers the main controls and additional differences in candidate and state indicators, as well as in state political institutions. We find that the main effect is manifested primarily by donations made by individuals (as opposed to corporations) and is observed more strongly in corrupt, symmetric, and economically weak settings.

The next section reviews the related literature and places the current contribution within it. Section 3 presents a model that explains how campaign contributions may affect political sabotage. The data, empirical findings, and robustness tests are presented in Section 4. Section 5 concludes and the appendices present data, as well as technical details.

2 Related literature

The paper is related to a number of literature strands. First, the literature on the effects of political donations, summarized in de Figueiredo John and Snyder James (2003), Roscoe and Jenkins (2005), Scarrow (2007), and Stratmann (2005). Political donations play a crucial role in shaping policy outcomes, legislative behavior, and electoral competition, with various studies offering differing perspectives on their effects, including Bombardini and Trebbi (2011); Erikson and Palfrey (2000); Gerber (2004); Levitt (1994); Stratmann (2006, 2009). While no consensus has been reached on whether the effects of donations are economically significant, a number of studies pointed at the significance of challengers' spending, relative to that of incumbents (Benoit and Marsh (2008); Fourniaies and Hall (2014); Gordon et al. (2007); Schuster (2020)). In the current effort we highlight a new, adverse, externality of political giving, namely inducing political sabotage, vis-à-vis negative campaigning. To our best knowledge, our study is the first to consider the potential impact of political donations on the dynamics of political contests, focusing on their tone characteristics. In addition, similar to the conclusions made in the noted studies, our results also point at the relatively stronger impact of donations on the behavior of challengers, as we observe that they tend to direct relatively more of their contributions toward negativity, observing these patterns also under broader asymmetric settings.

Second, the literature on sabotage in contests that was recently surveyed by Chowdhury and Gürtler (2015). Our theoretical framework builds on several key studies on sabotage in contests, including Lazear (1989), Konrad (2000), and Soubeyran (2009). However, it is most influenced

by Skaperdas and Grofman (1995), Chen (2003), and Lovett and Shachar (2011). Specifically, we adopt the functional form of marginally decreasing returns on campaign investment from Lovett and Shachar (2011), combined with the interaction between non-negative campaigns (sabotage) and undecided voters (opponent’s voters, respectively) as in Skaperdas and Grofman (1995). Unlike past studies that assume normalized budgets or cost functions, we incorporate the flexible budget framework of Soubeyran (2009); Lovett and Shachar (2011). Additionally, we follow Chen (2003) in allowing general random components and analysis, rather than restricting our model to a specific Tullock structure (Assumption 6 in Skaperdas and Grofman (1995)) or an extreme-value distribution (as in Lovett and Shachar (2011)).

By integrating these elements, we develop a unified model whose results align with key empirical findings: (i) candidates invest more in non-negative campaigns; (ii) relative sabotage levels increase with budget size beyond a certain threshold; (iii) less popular candidates invest relatively more in sabotage, while popular candidates invest relatively less; (iv) sabotage increases with the opponent’s initial support; (v) additional funds are always allocated to both channels, though in varying proportions. For comparison, if one assumes a linear impact function for the non-negative campaign (sabotage) as in Chen (2003) (or Skaperdas and Grofman (1995), respectively), one of the campaign channels may become independent of additional donations. Moreover, without incorporating negativity bias and the backlash effect—along with the interaction between campaign channels and the set of undecided or opponent’s voters—several of the aforementioned conclusions, such as the asymmetric effect between popular and less popular candidates, may no longer hold.

Last, the empirical literature on sabotage in contests. The latter has been examined via lab experiments, surveys, and sport events, among others, as surveyed in Chowdhury and Gürtler (2015). Within the political context, examinations of negative campaigns have taken a central role. This vast literature, summarized in Haselmayer (2019) and Maier and Nai (2023), examines the roles of a wide range of determinants in explaining patterns of negative campaigns, ranging from candidate characteristics to campaign dynamics, which we consider in the empirical analysis. More specifically, several studies examine the impact of asymmetries in the political contest (Elmelund-Præstekær (2010); Fridkin and Kenney (2011); Lau and Pomper (2004); Nai (2020); Theilmann and Wilhite (1998)), as well as changes in the contest’s prize (Del Corral et al. (2010); Harbring and Irlenbusch (2005, 2011); Ikan et al. (2024); Vandegrift and Yavas (2010)), indicating that challengers, and greater stakes, increase the extent of sabotage. To our best knowledge, however, none studied the potential effects of asymmetries in the budget, vis-à-vis political contributions. We contribute to this literature by illustrating that such, donation-driven, increases in the budget may induce adverse political dynamics, giving

rise to political sabotage, within a relatively short time frame of approximately one week from the time of making the donation. In addition, we show that these patterns are stronger under symmetric settings, extending the noted standard challenger effect to the impact of political donations.

3 The political contest

The political contest consists of two players, denoted by $i = 1, 2$, who compete for public support by allocating their private budgets between two types of campaigns: a non-negative campaign, aimed at attracting undecided voters, and a negative campaign, intended to reduce the support of their opponent. After both players have allocated their funds, a winner of the political contest is determined and elected into office.

Formally, each player i has a baseline reputation $v_i > 0$ and a budget $B_i > 0$, which is divided between non-negative and negative campaigns. Without loss of generality, assume $v_1 \geq v_2$. The baseline reputation v_i can be interpreted as the initial number of supporters of player i , while the number of undecided voters is denoted by $u > 0$. These values constitute the initial conditions that the players seek to shift in their favor to secure election. To this end, each player i invests $e_i \in [0, B_i]$ in a non-negative campaign and $s_i = B_i - e_i$ in a negative campaign (i.e., sabotage). We denote player i 's strategy by $a_i = (e_i, s_i)$.

The effects of non-negative and negative campaigns differ. An investment of e_i in a non-negative campaign increases player i 's support by ue_i^α from the pool of undecided voters, where $\alpha \in (0, 1)$.⁹ Non-negative campaigns thus convert undecided voters into supporters, with diminishing returns, consistent with Skaperdas and Grofman (1995); Konrad (2000); Lovett and Shachar (2011), among others.

In contrast, sabotage targets the opponent's decided voters rather than undecided ones. If every player i invest s_i in sabotage, the support of player i is reduced by $(s_{-i}^\beta + bs_i^\beta)v_i$, where $\beta \in (\alpha, 1)$ and $b \in (0, 1)$. Namely, negative campaigns reduce a player's support through two mechanisms. First, sabotage by player $-i$ reduces player i 's supporters by a factor of s_{-i}^β , again with diminishing returns but with a greater effect than non-negative campaigns ($\beta > \alpha$), reflecting the well-documented phenomenon of negativity bias as in Lovett and Shachar (2011); Lagziel et al. (2023) and others.¹⁰ Second, a *backlash effect* occurs when player i 's own negative

⁹Throughout the analysis, we assume that the budgets (B_1, B_2) are scaled such that all proportions remain within $[0, 1]$. In case of non-negative campaigns and undecided voters, assume that $B_1^\alpha + B_2^\alpha \leq 1$ such that the pool of undecided voters u is at most divided between the players. Alternatively, one may normalize the relevant terms accordingly.

¹⁰Negativity bias has been widely studied and used in Economics, Psychology, and Political Science. For

campaign alienates some of their supporters, reducing support by $v_i(bs_i^\beta)$. The backlash effect is limited relative to the damage caused by the opponent's sabotage ($b \in (0, 1)$) and is an established feature in both the empirical literature and theoretical models such as Skaperdas and Grofman (1995); Shen and Wu (2002); Dowling and Wichowsky (2015) and many others. As before, we assume the budgets are set such that all aggregate proportions are well-defined.

Taking these effects into account, and given the strategy profile (a_1, a_2) , the interim support level of every player $i = 1, 2$ is given by

$$V_i = v_i + ue_i^\alpha - v_i(bs_i^\beta + s_{-i}^\beta) + \epsilon_i,$$

where ϵ_1 and ϵ_2 are non-atomic, i.i.d. random variables.¹¹

Each player's objective is to maximize the probability of winning the contest. Specifically, player i aims to maximize the payoff function

$$\begin{aligned} R_i(a_1, a_2) &= \Pr(V_i > V_{-i}) \\ &= \Pr(v_i + ue_i^\alpha - v_i(bs_i^\beta + s_{-i}^\beta) + \epsilon_i > v_{-i} + ue_{-i}^\alpha - v_{-i}(bs_{-i}^\beta + s_i^\beta) + \epsilon_{-i}) \\ &= F(v_i - v_{-i} + ue_i^\alpha + (v_{-i} - bv_i)s_i^\beta - ue_{-i}^\alpha - (v_i - bv_{-i})s_{-i}^\beta), \end{aligned}$$

where F is the cumulative distribution function of $\epsilon_i - \epsilon_{-i}$, which is assumed to be continuously differentiable on $\mathbb{R}$ with strictly positive density $f(x) > 0$ for every $x \in \mathbb{R}$.¹² For notational convenience, define $\Delta v_i = v_i - v_{-i}$ and $\Delta b_i = v_{-i} - bv_i$, so that the payoff function simplifies to

$$R_i(a_1, a_2) = F(\Delta v_i + ue_i^\alpha + \Delta b_i s_i^\beta - ue_{-i}^\alpha - \Delta b_{-i} s_{-i}^\beta).$$

We henceforth assume that $\Delta b_i > 0$ for every i , ensuring that the backlash effect exists but remains limited, thereby preserving incentives for sabotage. In a symmetric setting where $v_1 = v_2$, this assumption holds trivially for all $b \in (0, 1)$.

These payoff functions define a one-stage, constant-sum game, which we refer to as a *political*

example, Skaperdas and Grofman (1995) assume that non-negative campaigns have a concave impact on reputation, while sabotage has a linear effect, capturing the negativity bias. See also Lau (1985); Cacioppo et al. (1997); Ta et al. (1998); Ito and Cacioppo (2000); Baumeister et al. (2001); Holbrook et al. (2001); Klein and Ahluwalia (2005).

¹¹In the standard Tullock-contest framework, as in Assumption 5 of Skaperdas and Grofman (1995) or Konrad (2000), these variables follow the extreme value distribution; see, e.g., Lovett and Shachar (2011). Here, we follow the general setup of Chen (2003), without imposing specific a distribution.

¹²We do not restrict the support of $\epsilon_i - \epsilon_{-i}$ to avoid pathological cases in which additional campaign investments have no effect.

contest, and we solve it using Nash equilibrium (NE).

3.1 Theoretical analysis and main result

Consider the political contest described in the previous section. The action set of each player i is $[0, B_i]$, as the level of sabotage is uniquely determined by the investment in the non-negative campaign. Accordingly, the payoff function of player i can be expressed as:

$$R_i(e_1, e_2) = F(\Delta v_i + u e_i^\alpha + \Delta b_i(B_i - e_i)^\beta - u e_{-i}^\alpha - \Delta b_{-i}(B_{-i} - e_{-i})^\beta).$$

This formulation defines a fixed-sum game with continuous payoff functions and compact action sets, so by standard fixed-point arguments, an equilibrium exists.

To establish the existence of a *pure-strategy* equilibrium, we apply Theorem 3.1 of Reny (1999). This theorem guarantees the existence of a pure-strategy NE in any game with finitely many players, compact and convex action sets, and payoff functions that are bounded, continuous,¹³ and quasi-concave (i.e., $R_i(\cdot, e_{-i})$ is quasi-concave for every e_{-i}). In our setting, the action sets are intervals and thus compact and convex, while the payoff functions are continuous and bounded. It remains to verify quasi-concavity.

For any constant $c \in \mathbb{R}$, define the function $G_c(x) \equiv u x^\alpha + \Delta b_i(B_i - x)^\beta + c$. This function is strictly concave and single-peaked on $[0, B_i]$, implying quasi-concavity. Since $F(\cdot)$ is strictly increasing on $\mathbb{R}$, the composition $(F \circ G_c)(\cdot)$ is also quasi-concave for every c , ensuring the existence of a pure-strategy equilibrium.

To characterize these equilibria, consider the first-order conditions (FOCs):

$$\frac{\partial R_i(e_1, e_2)}{\partial e_i} = f(\cdot \cdot \cdot) [\alpha u e_i^{\alpha-1} - \beta \Delta b_i(B_i - e_i)^{\beta-1}] = 0,$$

for each player $i = 1, 2$. Since the density $f(\cdot)$ is strictly positive over the support, the FOC for player i holds at $\arg\max_x G_c(x)$, which is a unique interior point in $(0, B_i)$, independent of c . In other words, for each player i , the function $R_i(\cdot, e_{-i})$ attains its maximum at an interior point $e_i^* \in (0, B_i)$, independent of e_{-i} .

Rearranging the terms, we summarize the analysis in the following result:

Proposition 1. *There exists a unique pure-strategy NE. Given this equilibrium, player i 's*

¹³Reny (1999) requires the payoffs to be better-reply secure, which follows from continuity.

investments in the non-negative campaign and sabotage satisfy

$$e_i = \left(\frac{\alpha u}{\beta \Delta b_i} \right)^{\frac{1}{1-\alpha}} s_i^{\frac{1-\beta}{1-\alpha}}. \quad (1)$$

It follows directly from Equation (1) that investments in non-negative campaigns (in equilibrium) increase with u and decrease with Δb_i . That is, player i invests more in sabotage as v_{-i} increases. We explore additional conclusions in the following section.

3.2 Comparative statics and testable hypotheses

Before deriving our two main testable hypotheses from Equation (1), we present Figure 1, which illustrates the equilibrium investment levels in negative and non-negative campaigns as functions of the budget, assuming $\alpha = 0.5$, $\beta = 0.75$, and $u = 1.4\Delta b_i = 1.4(v_{-i} - bv_i)$. Graph (a) presents the investment levels in absolute terms, whereas Graph (b) presents them in relative terms, as a share of the budget. As the figure demonstrates, non-negative campaign investments dominate for lower budget levels, while sabotage investments increase at a faster rate from a certain point onward. This pattern follows directly from Equation (1), noting that $\frac{1-\beta}{1-\alpha} < 1$, which implies that e_i is a concave function of s_i . Consequently, as the budget grows, sabotage investments eventually surpass non-negative campaign investments.

These insights motivate our *first testable hypothesis*: although non-negative campaign investments are relatively higher than sabotage investments—resulting in less negative campaigns on average—the negative character of the campaign intensifies with each marginal donation.

The underlying mechanism driving this result is the interplay between negativity bias and the backlash effect. Negativity bias implies that, beyond a certain investment level, sabotage becomes more effective at the margin, leading additional donations to be increasingly allocated to the negative campaign. However, this does not imply that all funds are directed toward sabotage, as both campaign channels exhibit diminishing returns. At the same time, the backlash effect directly limits the profitability of sabotage by reducing support among a player’s own voters. The combined influence of these forces results in a marginally increasing share of investments in sabotage as the budget grows, while the baseline investment in the non-negative campaign is higher.

Our *second testable hypothesis* addresses asymmetries between players, particularly when one player holds a structural advantage over the other in terms of popularity, such that $v_1 > v_2$. For instance, this advantage may arise if a well-known incumbent faces an unfamiliar

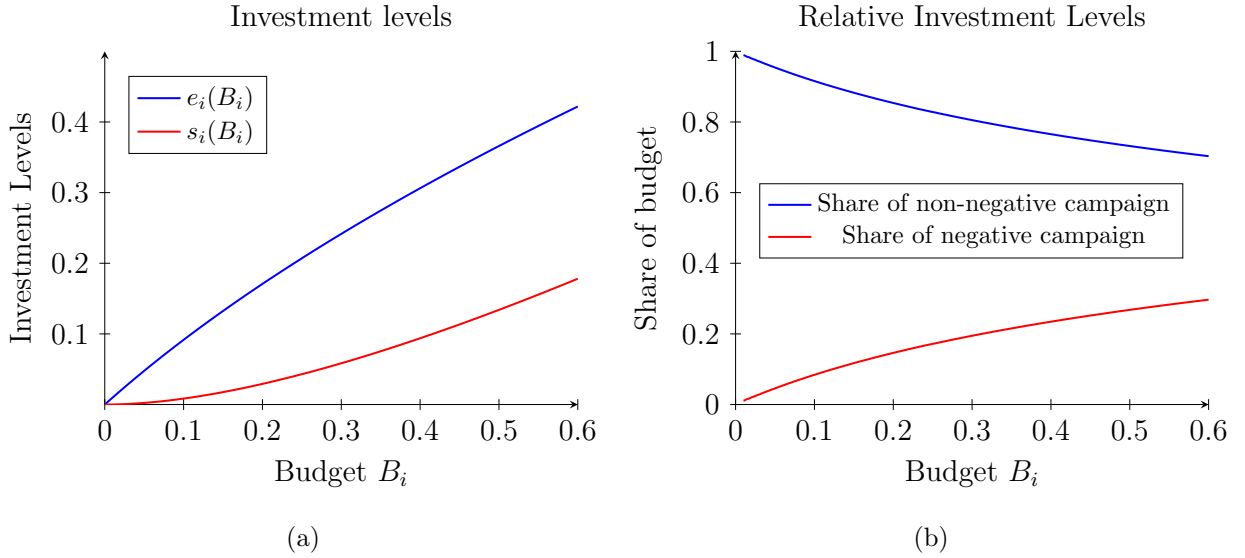


Figure 1: Graph (a) shows the investment levels e_i (blue) and s_i (red) as functions of the budget B_i , in a pure-strategy NE with parameters $\alpha = 0.5$, $\beta = 0.75$ and $u = 1.4\Delta b_i$. Though the non-negative campaign investment e_i appears dominated, sabotage levels s_i grow faster as B_i increases. Given the same parametric assumptions, Graph (b) presents every investment possibility in relative terms, as a share of the budget.

challenger, or if two new contenders compete for office with one perceived as more charismatic. Asymmetries may also emerge from differences in budget constraints (e.g., $B_1 > B_2$), where one player, by virtue of superior donor support, can invest more heavily in both campaign channels.

Our primary focus, however, is on how such asymmetries in baseline reputation ($v_1 > v_2$) influence the relative allocation of resources between sabotage and non-negative campaigning. Specifically, note that $\frac{\alpha u}{\beta \Delta b_i}$ decreases as a function of $\Delta b_i = v_{-i} - bv_i$. Therefore, when $v_1 > v_2$, it follows that $\Delta b_2 > \Delta b_1$. Other things being equal, including similar budgets, Equation (1) implies that the more popular player allocates relatively more resources to the non-negative campaign, while the less popular invests more heavily in sabotage.

The intuition behind this result is driven by the backlash effect. When a player holds a structural advantage—namely, a higher baseline reputation—it becomes optimal to allocate relatively more resources to the non-negative campaign. This strategic shift occurs for two main reasons. First, a higher baseline reputation magnifies the cost of the backlash effect, as any sabotage effort not only targets the opponent, but also alienates a larger share of the popular player’s own supporters. Consequently, the negative returns from self-inflicted harm increase with reputation size, discouraging excessive investment in sabotage. Second, when the opponent’s baseline reputation is lower, the effectiveness of attacking their supporter base diminishes. With fewer supporters to erode, the marginal benefit of sabotage declines. Together, these dynamics create strong incentives for the advantaged player to prioritize positive cam-

paigning while limiting sabotage to mitigate self-damage and exploit the diminished returns from attacking a weaker rival.

4 Empirical analysis

The model indicates that campaign contributions may fuel political sabotage. In this section, we empirically test this hypothesis by considering the case of political campaigning in U.S. gubernatorial elections. Hence, we examine the impact of political donations on the tone characteristics of political campaigns related to U.S. gubernatorial elections.

U.S. gubernatorial election races are suited to our purposes for a number of reasons. First, gubernatorial elections are undertaken independently across states. Furthermore, while gubernatorial elections generally occur every four years,¹⁴ they alternate across state-groups annually, hence enabling undertaking a continuous analysis, examining each year over large parts of the sample period (depending on data availability), which better accounts for related short-term phenomena. Third, gubernatorial elections are largely bi-partisan, and hence map well onto a simplified 2-player setup. Finally, U.S. states provide significant cross-state variation in political donations, political institutions (importantly, including in those related to contribution limits), and political behavior, as we describe below. These features follow the theoretical framework, and they make it possible to identify the causal link running from campaign contributions to the extent of negative political campaigning.

4.1 Data

The data consist of a panel of political TV ads aired as part of U.S. gubernatorial election campaigns, across the 50 U.S. states during the period 2002-2020. The data provide a set of characteristics for each ad, as we further note below, including the specific date in which it was aired, and its beneficiary (candidate). We merge detailed data on political donations, to the noted panel of political TV ads, by matching donations' recipients to ads' candidates across dates, as we further describe below. All variables are described in the Data Appendix. The analysis is based primarily on two key measures: political donations and political TV ads, which we describe next.

¹⁴With the exception of NH and VT, in which elections are held every two years.

4.1.1 Political ads

Data on political TV ads are gathered from the WMP (Fowler et al., 2022), which has tracked political advertising on major TV networks across states from 2002 and up to 2020.¹⁵ Given our focus on gubernatorial elections and the data availability, the data is (bi-)annual post-(pre-)2010, with varying states participating in each cycle, depending on whether gubernatorial elections were held there in the given year.¹⁶ The Wesleyan data is based on ad tracking by Kantar Media / CMAG a commercial firm, which detects and classifies ads aired in each of the 210 media markets in the U.S. These data are then processed and (re)coded by the WMP.

The data are at the level of an ad airing, representing an observation. For each advertisement, we observe a host of characteristics that range from the media market, and the television affiliate on which it was aired, to its length, cost, and sponsor. We examine the full set of available ad characteristics in the analysis, with the set alternating across specifications, depending on the case examined. Hence, we outline each measure within the relevant estimated specification in the analysis. Of the set of ad characteristics, three are most relevant to the analysis. The first two are the ad’s date in which it was aired (date being a *specific* day within our sample period), and the ad’s beneficiary (candidate), based on which we match the campaign contribution data, as we further describe below. Notably, over the sample period (i.e., 2002-2020), the dataset includes about 3.5 million ads with identified dates and candidates, to which political donations are matched.

A third central ad characteristic is the tone of the ad. An ad can have a positive tone in which the candidate practices self-promotion, it can have a negative tone in which the preferred candidate attacks a competing candidate, or it may have a contrasting tone in which the ad contrasts between the preferred and competing candidates. The ad tone is (re)coded by WMP, which categorizes each ad into one of three options: promote, contrast, or attack. We exploit this feature for measuring the extent of sabotage via political campaigns, by constructing a binary Ad Tone Index that takes the values 0-1, as follows: 0 non-negative tone (promote or contrast), 1 negative tone (attack). We, thus, adopt a 2-level index, in which positive and contrasting ads are grouped together, to form a non-negative classification. Therefore, the index is increasing in the negative tone, where a change from 0 to 1 represents a movement from non-negative to negative.¹⁷ This index provides a direct measure for the endogenous political sabotage defined in the model, and is consistent with the standard definition of political sabotage noted in the

¹⁵In effect, the WMP data begin in 2000; however, candidate names, which are imperative for matching political donations, are not provided in 2000, thus limiting the commencement of our sample period to 2002.

¹⁶See the Data Appendix for a list of the participating states in each year of the panel.

¹⁷Nonetheless, later in the analysis we also examine a 3-level index that considers a contrasting tone as a separate, intermediate negativity level, illustrating that the main outcome is robust to this change.

literature (e.g., Lazear, 1989); hence, it represents the baseline outcome variable in the analysis.

Notably, this index has considerable variation across states and time. This is illustrated in Figure 2, which plots the average index level across states, over the sample period. As observed, the average negativity level is 0.14, with a standard deviation of 0.35, and while in states like NV or SD it is close to 0, in others like TX or WA, the average is higher than 0.25. This initial examination of the index distribution yields a central first observation, pertaining to the first testable theoretical hypothesis, namely that the general tone characteristic of political campaigns (irrespective of marginal changes in donations) tends toward the non-negative side. We see this through the average tone level, which is considerably below 0.5 (0.14, as noted), i.e. leaning toward non-negative (0). Evidently, this characteristic is also observed at the cross-section, as we see in Figure 2 that the average Ad Tone Index is lower than 0.5 in all states, and is similarly well below 0.5 across the temporal dimension, in each of the years in the sample. These observations lend support to the theoretical framework concerning the overall dynamics of tone characteristics. In the main analysis we examine how political donations affect these dynamics, in line with the model’s testable hypotheses.

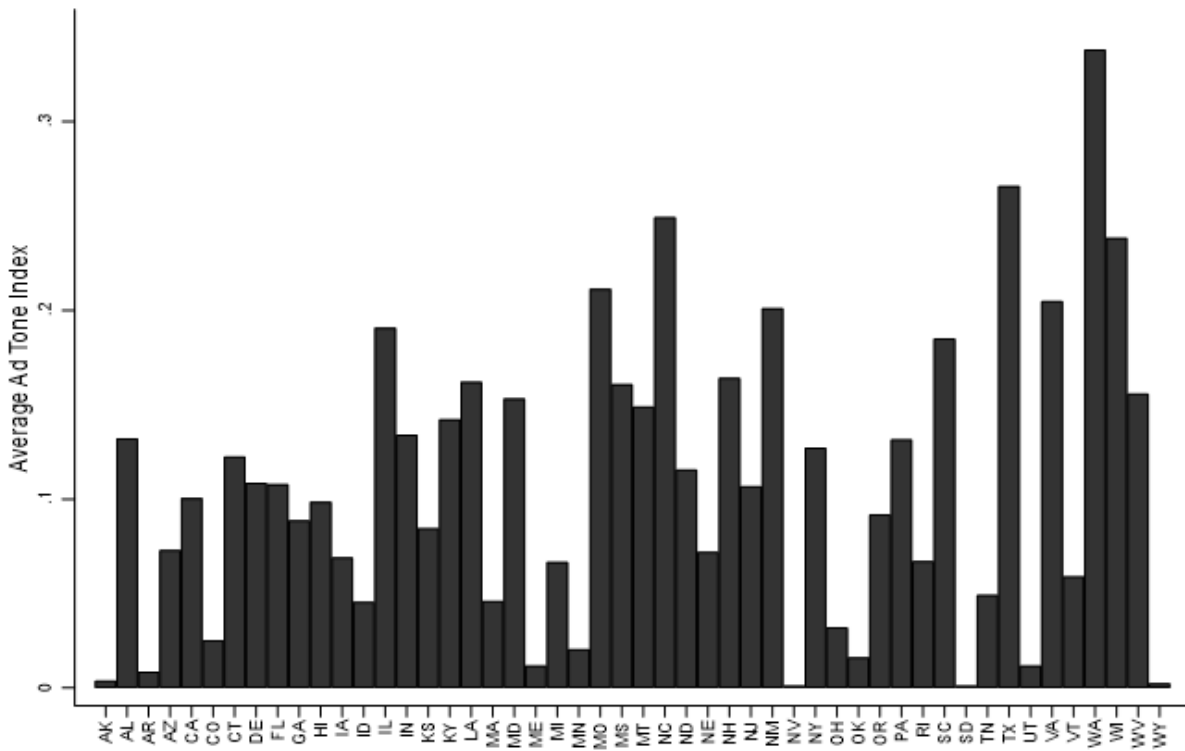


Figure 2: The figure presents the average Ad Tone Index across U.S. states over the period 2002–2020.

4.1.2 Political campaign contributions

Data on political campaign contributions is retrieved from the DIME (Bonica (2024)). Extracting data from campaign finance records, the DIME covers the universe of reported campaign contributions made by individuals and corporations to candidates in U.S. election races, focusing in our case on those participating in gubernatorial election races. The data provide various characteristics of each donation transaction, including, importantly, its amount, date, and recipient.

In an attempt to match these data to the political TV ads data outlined above, we first aggregate the donation transactions at the recipient-date level; i.e., we observe the amount donated to each recipient in each date across our sample period (where dates that do not appear in this aggregation are assumed to have no donation made). With this aggregation we then construct various donation measures, for each recipient, across a number of time frames relevant to the analysis. Specifically, we consider the amount donated to a recipient within the preceding day/preceding week (with the exclusion of the preceding day)/penultimate week/penultimate two weeks/campaign (with the exclusion of the preceding month), representing mutually-exclusive, non-overlapping groups of donation time frames which we consider in the analysis.¹⁸

This time frame division represents a key component in the analysis, because campaign decisions concerning tone characteristics of TV ads are likely to be taken within a certain time frame, which may be relatively short, but not immediate. For instance, it is unlikely that funds received in the day an ad is broadcasted affect its tone, because the latter is set some time in advance. Even in cases where campaigners need to choose between two already-available TV ads with opposite tones (i.e., choosing whether to go positive or negative, out of two available options), such a decision is not likely to be taken within the same day when the ad is broadcasted in the early hours of the day. On the other hand, under longer time spans, such as for instance donations made in the penultimate two weeks, funds may already be channeled to various other causes, and the extent of donations may be indicative of characteristics related to popularity and political dominance, affecting the extent of campaign negativity via other, indirect channels.

¹⁸In each time frame group we only consider the relevant dates, excluding non-relevant ones. For instance, in the latter group, namely donations made since the beginning of the election campaign excluding those made in the preceding month, the relevant time frame is from the 32nd day from the beginning of the election campaign, because the first 31 days belong to the preceding month which is excluded (and is captured under the separate 'preceding month' time frame group). Note that the beginning of an election campaign of a recipient is marked by the date of the earliest donation made to that recipient, within the corresponding election cycle (noting that in the DIME it is reported to which election cycle each transaction belongs).

As will be evident, following an examination of the different time frame groups, our focus throughout the analysis is primarily on the preceding week time frame group; i.e., for each ad, we consider the total amount of political donations received by the ad’s beneficiary (candidate) in the week preceding the ad’s broadcast, with the exclusion of donations made in the preceding day (to make it mutually exclusive to the latter group, examined separately).¹⁹ Evidently, there is ample cross-state variation in the average political donation made in the preceding week. The average donation (in \$10million) is 0.06, with a standard deviation of 0.148; while in NY the average donation is higher than 0.25, in contrast in SD it is close to zero. We exploit this variation in the analysis, most notably its underlying institutional features which stand at the core of our identification strategy, as further outlined in the following section.

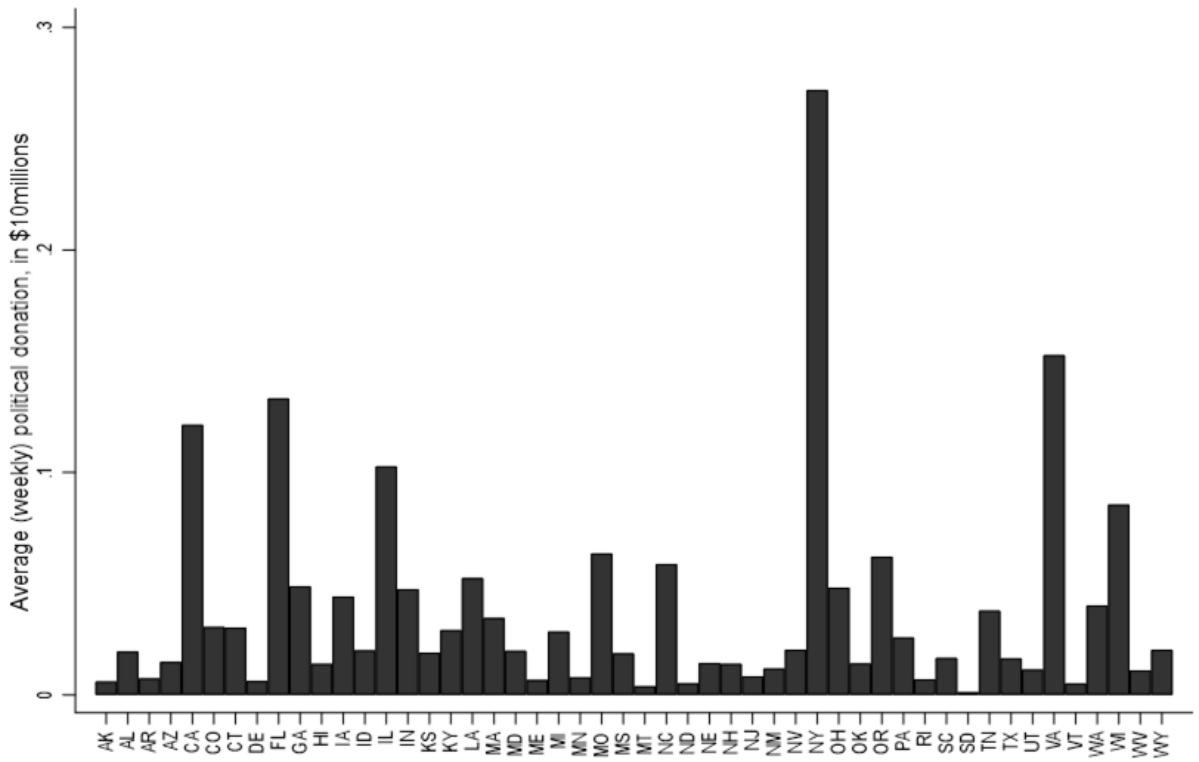


Figure 3: The figure presents the average political donation in the preceding week, in \$10millions, made by individuals and corporations to candidates in gubernatorial races, across U.S. states over the period 2002-2020.

¹⁹Throughout the analysis, for simplicity, we refer to this time frame group as that related to the ‘preceding week’, noting it also excludes the preceding day.

4.1.3 Matching donations and ads

We merge the aggregated donations data to the TV ads data, at the candidate-date level. We do so by matching the names of donation recipients and ad candidates, in conjunction with matching the transaction-ad dates. Notably, the names of recipients in the DIME data appear differently (in terms of format and style) than the names of candidates in the WMP data, in a non-systematic way, hence the recipient-candidate matching was undertaken manually. Altogether, we matched 564 pairs of recipients-candidates, over our sample period; we list them in the Data Appendix. Hence, the ad-level WMP panel data, which we eventually employ throughout the analysis, now also includes donation measures at the candidate-date level, for each of the time frames noted above.²⁰

4.1.4 Methodology

Using these primary measures, in addition to further ad and state level controls noted below, we estimate the impact of political donations on the extent of negative tone in political ads related to gubernatorial elections, across states and over the period 2002-2020, in election years. Throughout the analysis we estimate models of the following type, for ad a , candidate i , date t , and year y :

$$tone_{a,i,t} = \varphi + \alpha(donation)_{i,t} + \beta(\mathbf{X})_{a,t} + \nu_t + \eta_{i,y} + \epsilon_{a,i,t}, \quad (2)$$

where $tone$ is the Ad Tone Index, $donation$ denotes political donation, $\mathbf{X}$ is a vector of controls at the ad-date level which vary across specifications, and η and ν are candidate-by-year and date fixed effects, respectively.

The (daily-level) date fixed effects refer to specific days, marked by their date, across the 2002-2020 period (i.e., non-recurring days within a week, or a month). Hence, they absorb fixed month and year effects as well, including impacts related to campaign seasonality (given that elections are held in November), as well as other time-specific phenomena, ranging from business cycles to technological shocks.

Similarly, candidates are state-fixed (no candidate in the sample participated in election races of more than one state), hence candidate fixed effects also absorb time-invariant state-level effects. Consequently, candidate-by-year fixed effects address all candidate-by-year changes, as well as state-by-year changes, covering a host of time-variant, and invariant, observed and

²⁰I.e., for an ad Z of candidate X at date Y , we have the aggregate donations for which candidate X is the recipient, for each of time frames noted above, relevant to date Y . As an example, in the case of the first time frame, namely the preceding day (call it variable D), the value of D under ad Z would be the total donations made to candidate X at date $Y - 1$ (the preceding day to date Y).

unobserved candidate, state, and institutional features, that are central to the analysis. Key examples include, first, annual state-level controls ranging from Gross State Product (GSP) to corruption and electoral competition, as well as additional state socio-political measures related to, for instance, societal containment of negative campaigning (giving rise to potential "backlash effects"). Second, annual candidate-level factors such as incumbency status (i.e., whether the candidate is an incumbent in office, a returning candidate, or a newcomer) or candidate party affiliation. Last, annual state institutional features, such as for instance campaign contribution limits, which differ considerably across states as well across time and bear direct impact on the extent of political donations (a point further discussed in the following section).²¹

This setting considers a candidate-date perspective, as it examines the impact of candidate-date level donations made in the preceding week on the extent of negativity.²² Nonetheless, to exploit the full extent of variation in the political ads data, we concurrently maintain its daily-level frequency in the baseline analysis.²³ To address the potential correlation of ads within candidate-date cells, we cluster the standard errors at the treatment level.²⁴ Specifically, throughout the analysis we adopt a conservative two-way clustering approach, in which the standard errors are clustered by i and t concurrently.²⁵

Finally, the baseline model focuses on fixed effects at the candidate-by-year and time (date) levels only. This is so given that the identifying variation of our treatment is, as noted, across the i and t dimensions; i.e., we seek to estimate within-candidate effects of political donations across time. Nonetheless, we examine the role of further ad-level and additional fixed effects throughout the analysis. Our focus in the analysis is on the characteristics of α , namely its sign, magnitude and statistical preciseness, which give an estimate for the contemporaneous impact of political donations on the extent of campaign negativity.

²¹Nonetheless, later in the analysis we undertake heterogeneity analyses across these different dimensions, considering various state, candidate, and institutional features.

²²As noted in the description of the donation measures, albeit our (primary) focus is on donations made in the preceding week, this donations measure is an aggregate of daily-level donations; i.e., it bears daily variations.

²³Later in the analysis, we consider a setting in which ads are aggregated at the candidate-date level, illustrating that the main results are robust to this modification.

²⁴This setting, in which standard errors are clustered at the treatment level, is consistent with the approach adopted in related studies that similarly examined the impact of an aggregated treatment on a disaggregated outcome. See e.g., Cust et al. (2019), Ebenstein et al. (2016), Pelzl and Poelhekke (2021), or Topalova and Khandelwal (2011), among many others.

²⁵Importantly, albeit being conservative, this approach yields a relatively large number of clustering groups, mitigating concerns related to potential Moulton bias, and statistical inference under few clustering groups.

4.1.5 Identification

The extent of campaign contributions is dependent on various factors. Albeit considering donations in the days preceding to time t , some of these factors may be endogenous to the extent of negativity in time t . For instance, candidates whose contender went negative in the weeks prior to time t , may seek retaliation at time t , for which they may increase fund raising efforts in the preceding week, in which case donations in the preceding week to t may be endogenous to the extent of campaign negativity at time t .

On the other hand, some of the factors influencing the extent of political donations may be exogenous to candidates' campaign characteristics. Such factors may include, for instance, the underlying institutional setting (as observed, for instance, in Avis et al. (2022)), and partisan-level campaigning (reminiscent of features employed in Bouton et al. (2024)). Considering the former, states differ by the extent to which individuals and corporations may donate to political candidates. Some states present no limitations throughout our sample period (e.g., TX, UT), while others present some (e.g., MA, MT), thus representing a central determinant of cross-state differences in donation levels that is institutionally-entrenched and hence plausibly exogenous to contemporaneous negativity. The latter is also applicable for within-state changes in such limits, as they are the result of major political efforts taken in non-election years, becoming applicable at the beginning of the following calendar year (January).²⁶ As for the latter, a candidate's ability to raise funds is often affected by the candidate's party effort. Successful political rallies, or fundraising schemes, at the party level may be reflective of the candidates' ability to raise their own funds, independent of candidates' personal circumstances (and in particular, of campaign dynamics), inducing plausibly exogenous variation in candidates' political donations.²⁷

We exploit these features for identification, by focusing the analysis on these identifying variations, via an IV approach that excludes the potentially endogenous variation in political donations. The instrument we propose considers both the institutional and partisan dimensions. Both are required because each on its own addresses only part of the candidate-date variation we seek to examine. Specifically, the institutional dimension, which considers cross-state institutional differences in political donation limitations, can explain donation differences across states and years; however, it lacks the within-state and daily-level perspective. Conversely, the

²⁶During our sample period, within-state changes in contribution limits occurred only during non-election years. In addition, in case of changes that passed in a year preceding an election year, the change became applicable in January of the election year, prior to when gubernatorial election campaigned solidified.

²⁷For instance, if a party executes a major funding effort within a certain date, candidates affiliated with that party may be more successful raising their own funds during that time, under the party's effort, irrespective of candidates' demand for specific tone characteristics in their campaigns.

partisan dimension varies by day, yet it is not reflective of donation levels of candidates in states with strict contribution limitation rules. That is, if at a certain date a party runs a major rally, this may induce a positive impact on the ability of candidates affiliated with that party to raise their own funds during that day, yet less so for the subset of candidates from states with strict contribution limitations.

Therefore, we consider an interaction of the two dimensions as a possible IV. For the institutional dimension, we construct a Contribution Regulation Index, which takes the value 1 (2) if the state has some (no) limits imposed on political donations from individuals, within the given year.²⁸ This index varies across states, and within-states across years. For the partisan dimension, we consider the total political donation made to the party with which the candidate is affiliated within the preceding week, with the exclusion of the preceding day. This measure varies by party and date. Interacting them yields an IV that varies by candidate and date, because in within-state races candidates are of different parties.

We conjecture that this proposed IV yields a strong first-stage on one hand, yet meets the exclusion restriction on the other hand. The latter is applicable under the noted plausible exogeneity of the underlying institutional features and aggregate partisan efforts on which the IV is based. In effect, we assume that the proposed IV affects the extent of negativity only via its effect on political donations, under the inclusion of the candidate-by-year fixed effects which capture other potential direct effects. As for the validity of the first-stage, we motivate this first by examining the correlation between candidates' average donation in the preceding week and the aggregate donation of the party with which they are affiliated, highlighting the relevance of the partisan dimension. This is illustrated in Figure 4, pointing at a clear co-movement, and an overall correlation of 0.35.

Second, we consider the relevance of the institutional dimension, by plotting the average political donation in the preceding week in the group of states with some, versus no, contribution limitations. As Figure 5 shows, the average donation in the group of states with no limitations is higher than that in the group of states with some limitations in almost all years in our sample period, illustrating that the institutional dimension matters as expected. Motivated by these initial observations, we posit that their interaction is strongly associated with the donations measure, yielding a viable first-stage, as will indeed be evident in the results presented in the following section.

²⁸We focus in this case on individual donations, as they compose the majority (about 70%) of all donations. Nonetheless, later in the analysis we also consider an extended version of this index, covering limitations on both individuals and corporations, for robustness.

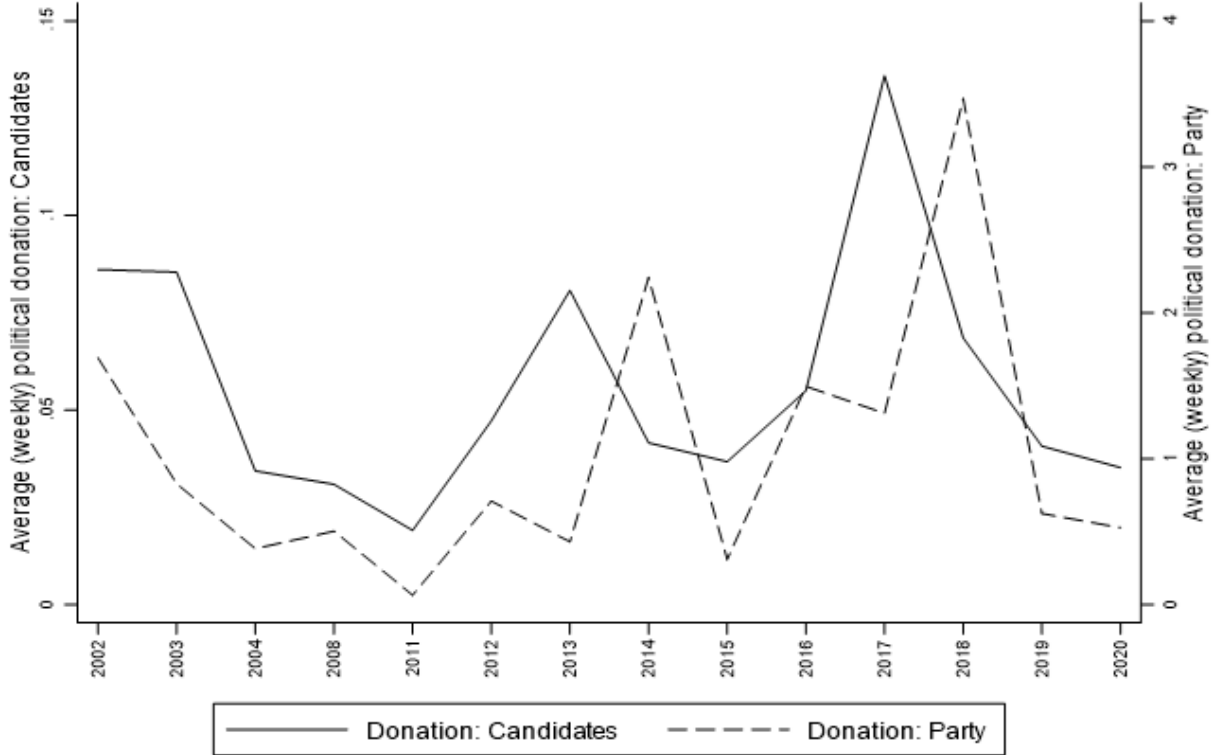


Figure 4: The figure presents the average political donation in the preceding week, in \$10millions, made by individuals and corporations to candidates (left-axis) in gubernatorial races, and its aggregate across each party (right-axis), across U.S. states over the period 2002-2020. The two measures exhibit an overall correlation of 0.35.

4.2 Results

This sub-section outlines the results of the empirical analysis. We start with the baseline results, and continue to additional examinations and robustness tests thereafter.

4.2.1 Political donations and negative political campaigns

We turn to the main analysis. Results appear in Table 1. We start with a direct estimate of Equation (2), using OLS.²⁹ In this initial specification, $\mathbf{X}$ is excluded. As a first step, we examine the association of each of the donation measures with *tone*, in an attempt to discern the time frame's role in potentially channeling donations to campaign tone characteristics. Hence, we consider a specification in which *donation* is a vector of donation measures, covering the day/week/two weeks/month/campaign donation versions, concurrently. The results, reported

²⁹Note that the number of observations vary across cases, in this sub-section as well as throughout the remaining analysis, depending on the availability of the co-variates examined.

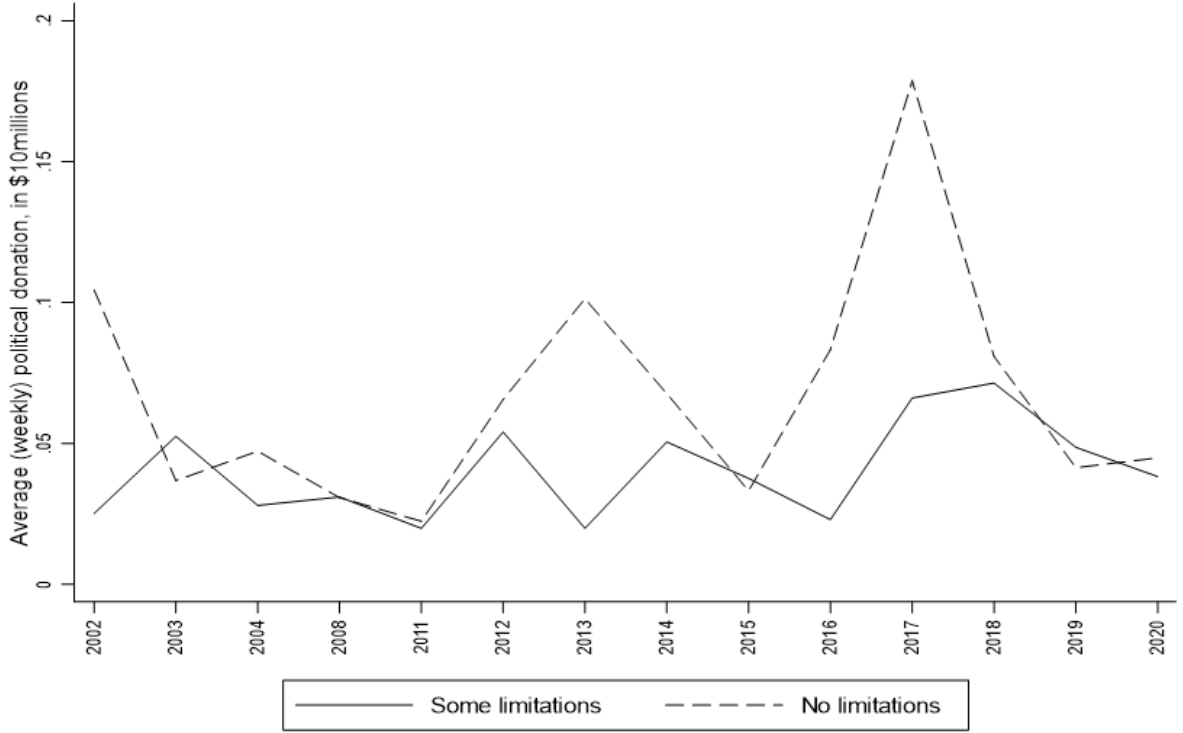


Figure 5: The figure presents the average political donation in the preceding week, in \$10millions, made by individuals and corporations to candidates in gubernatorial races, in U.S. states with some institutional donation limitations versus states with no such limitations, over the period 2002-2020.

in Column 1, and illustrated graphically in Figure 6, indicate that donations made in the preceding day, penultimate week, and penultimate two weeks are not associated with *tone*. Conversely, the cumulative donations made from the beginning of the campaign (with the exclusion of the preceding month) are negatively associated with the extent of negativity. As noted, the total amount raised by candidates since the beginning of a campaign is indicative of their relative popularity and political dominance; indeed, this measure is highly correlated with incumbency status.³⁰ Therefore, this observation is consistent with the standard theoretical prediction on the (lower) extent of sabotage made by dominant contenders, noted in the model as well as in previous analyses (e.g., Skaperdas and Grofman (1995)).

The main observation, however, is over the donations made in the preceding week. The latter represents a relatively short time frame that, unlike other time frames, on one hand does not point at fixed candidate asymmetries, yet on the other is sufficiently long to modify campaign characteristics, including tone. The outcome in Column 1 points at a positive association

³⁰I.e., on average, candidates who are currently in office are able to raise more funds over the campaign relative to others.

between these political donations and the extent of negativity, providing initial suggestive evidence that donations made within this time frame are channeled to fuel negativity, as suggested by the model, motivating a deeper examination, as well as a focus on the weekly time frame.

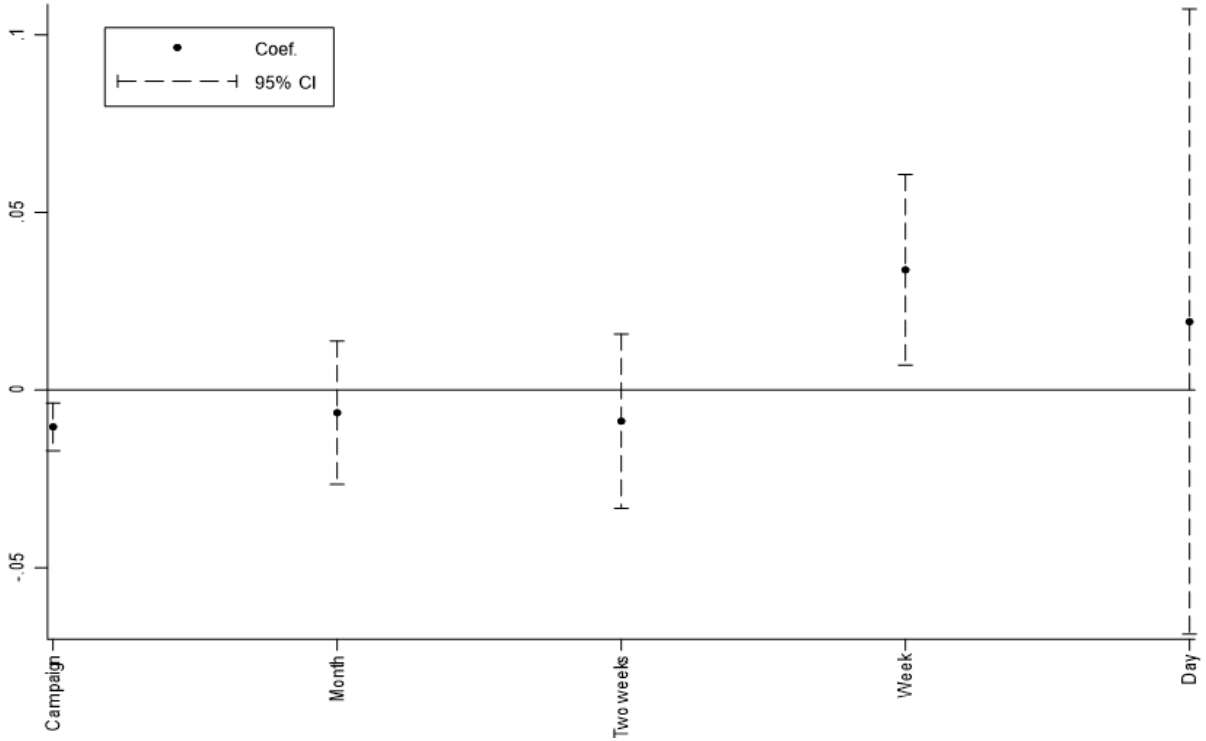


Figure 6: The figure presents the impact of political donations, undertaken over different time-frames, on the extent of negative campaigning, by plotting the estimated coefficients, and their 95% confidence intervals, under the baseline specification, for each of the donation time-frames. The latter, noted on the X-axis as day/week/two weeks/month/campaign, refer to the amount of political donations made to a candidate within the precedent day/ precedent week/penultimate week/penultimate two weeks/the campaign (with the exclusion of the precedent month), respectively.

Hence, the following examinations throughout the analysis largely focus on this time frame, starting with Column 2 in which the preceding week measure is considered on its own under *donation* in Equation 2. This case as well yields a positive and statistically precise association. Next, in Columns 3 and 4 we add $\mathbf{X}$, as we consider additional features of the baseline dimensions. In Column 3 we take a closer look at candidate features. Such features represent potentially key determinants of ad patterns (Dato and Nieken, 2014; Fridkin and Kenney, 2011; Maier and Nai, 2023), and may also raise further asymmetries. As noted, the candidate-by-year fixed effects account for key observable and unobservable candidate characteristics, that may change annually, including for instance incumbency status and party affiliation. However, we consider two additional related features that are not accounted for under these fixed effects.

First, following Dowling and Wichowsky (2015), noting that the extent of a "backlash effect" is largely dependent on the degree of candidate involvement in sponsoring the ad, we control for the type of ad sponsor. Specifically, we add a sponsorship index that measures the extent to which the candidate is involved in sponsoring the ad.³¹ Second, we consider governors' effects. Governors have a potentially prime role in setting the tone of political intra-state political discussions, depending on various time-invariant characteristics, including for instance gender (e.g., Baskaran et al., 2023). Notably, this is different from candidates' incumbency status, because governors may be in office over several election cycles, and may not run for reelection (in case they step down, due to term limits or other reasons). To address that, we add governors' fixed effects to this specification. The estimated α in this case indicates that positive effect remain applicable, under a similar magnitude. In addition, the estimated positive impact of sponsorship lends support to the applicability of a "backlash effect", in line with evidence of previous studies (e.g., Dowling and Wichowsky (2015)), given that ads sponsored by candidates tend to be less negative.

Column 4 examines the impact of ad characteristics. As other research notes, ad features contribute to explaining the patterns of negative campaigns (Haselmayer, 2019). The WMP provides a wealth of information on each ad. We exploit the full extent of the main features, including: ad length, ad cost, and ad issue in broad terms (personal-related, policy-related, both, or neither), as well as the media market (210 markets), TV affiliate (36 affiliates), time of day (8 timeslots), and type of program (85 types) in which the ad aired. Ad length and cost are included in $\mathbf{X}$ as controls, as they are continuous. The remaining features enter as additional fixed effects.³² The results indicate that despite the host of additional ad controls, α retains its characteristics, in similar magnitude. Interestingly, we also observe that relatively longer and costlier ads tend to be less negative.

IV estimation Given the potential noted endogeneity of *donation* to *tone*, the results obtained so far under the OLS procedure point at conditional correlations. To undertake causal interpretations we, next, follow an IV approach, employing the instrument outlined in Subsection 4.1.5. Hence, in Columns 5-8 we estimate the specifications of Columns 1-4 under an IV procedure, respectively, where in each case our proposed IV instruments for our donation measure of interest, namely the total amount of donations made in the preceding week. The first-stage results, reported in Table 1, point at a viable first-stage. Specifically, there is a

³¹The index is coded according to the sponsoring source of the ad as follows: 0 candidate; 1 candidate-party coordination; 2 party; 3 interest group/other.

³²Although ads are aired multiple times, they maintain identical *Ad Tone Index* level across all broadcasts, thus withholding the option of a within-ad analysis. Consequently, ad fixed effects are not included.

Table 1: Political donations and negative political campaigns

Dependent variable: Ad Tone Index	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS				IV (second-stage)			
	Different timeframes	Baseline	Candidate features	Ad characteristics	Different timeframes	Baseline	Candidate features	Ad characteristics
Donation: day	0.0193 (0.045)				-0.01 (0.05)			
Donation: week	0.034** (0.014)	0.033*** (0.011)	0.03*** (0.011)	0.031** (0.013)	0.072** (0.031)	0.069*** (0.023)	0.066*** (0.02)	0.069** (0.029)
Donation: two weeks	-0.009 (0.013)				-0.006 (0.013)			
Donation: month	-0.006 (0.01)				-0.01 (0.011)			
Donation: campaign	-0.01*** (0.003)				-0.01*** (0.003)			
Ad sponsor			0.025*** (0.003)				0.025*** (0.003)	
Ad length				-0.004*** (0.0003)				-0.004*** (0.0003)
Ad cost				-0.008** (0.004)				-0.008** (0.004)
Governor fixed effects	No	No	Yes	No	No	No	Yes	No
Additional fixed effects	No	No	No	Yes	No	No	No	Yes
R-squared	0.35	0.35	0.36	0.38	0.35	0.35	0.36	0.38
Observations	3,512,600	3,567,710	3,567,588	2,773,586	3,512,600	3,567,710	3,567,588	2,773,586
Party X regulation (IV, first-stage)					0.611*** (0.043)	0.69*** (0.037)	0.69*** (0.037)	0.567*** (0.027)
F-statistic (IV, first-stage)					193.08	343.21	342.78	448.96

Standard errors are robust, clustered by candidate and date, and appear in parentheses for independent variables. Superscripts *, **, *** correspond to a 10, 5 and 1% level of significance. The dependent variable is the Ad Tone Index. All regressions include candidate-by-year and date fixed effects, and an intercept. The sample includes TV political ads related to U.S. states' gubernatorial elections, covering the period 2002-2020. 'Donation: day/week/two weeks/month/campaign' is the amount of political donations made to a candidate within the precedent day/ precedent week/ penultimate week/ penultimate two weeks/ the campaign (with the exclusion of the precedent month), respectively. 'Party X regulation' is the total political donation made to the candidate's party within the precedent week, multiplied by the Contribution Regulation Index (taking the value 1 (2) if the state has some (no) limits imposed on political donations from individuals, within the given year), instrumenting for 'Donation: week'. 'Ad sponsor' is an index denoting the ad's main sponsor. 'Ad length' is the length of the ad in seconds. 'Ad cost' is the monetary cost of the ad. 'Additional fixed effects' includes the following ad indicators: media market in which ad aired, television affiliate in which ad aired, time of day during which ad aired, type of television program during which ad aired, and ad's primary issue. For further information on variables see data Appendix.

positive and statistically significant association between the proposed instrument and the endogenous variable, under an estimated F-statistic that is no less than 150 in each case. The second-stage results indicate that α remains positive and significant, and increases in magnitude relative to the OLS cases, in all cases, providing a causal interpretation to the observed positive effect of *donation* on *tone*, consistent with the main prediction of the model, noting that considering a weekly time frame campaign contributions fuel negativity.

Of the different cases, in Columns 5-8, our preferred one, to which we refer to as the baseline case, is Column 6 (the IV equivalent of Column 2), in which *donation* denotes the donations made in the preceding week, without the additional candidate and ad co-variates. The magnitude of the effect in this case is not-trivial. The estimated α indicates that a one standard deviation increase in the extent of the preceding week's donations increases the average negative tone of political ads by 7%.³³

³³A one standard deviation in *donation*, 0.148, multiplied by the estimated α , 0.069, is 0.0102, which is approximately 7% of the mean *Ad Tone Index*, 0.141.

Given the emphasis on a causal interpretation, the next cases in the remaining parts of the analysis follow the instrumental variable approach, using the same instrument.³⁴ The first-stage results in all cases exhibit similar characteristics as presented in the baseline case, despite the different co-variables adopted; specifically, irrespective of the co-variables considered, the proposed IV is negatively associated with *lameduck*, with an estimated F-statistic that is higher than a 100. Therefore, to simplify exposition, we present the second-stage results only.

4.2.2 Potential mechanisms

The baseline results indicate that, consistent with the theoretical analysis, political donations increase the extent of campaign negativity. Next, we consider various potential underlying mechanisms. To do so, we undertake an heterogeneity analysis with respect to potentially key controls, some of which considered in the baseline examinations. Hence, we estimate the following variation of Equation (2):

$$tone_{a,i,t} = \varphi + \alpha(donation)_{i,m} + \beta(z)_{a,t/i,y} + \gamma(donation * z)_{a,t/i,m} + \nu_t + \eta_{i,y} + \epsilon_{a,i,t}, \quad (3)$$

where z is one of the following measures: GSP per capita, state corruption, state government share, state electoral competition, candidate party affiliation, ad sponsor, ad length, ad cost, and incumbent candidate indicator.³⁵

Each of these measures may manifest the impact of political donations on negativity. Some of them have been noted earlier in the analysis. Considering the remaining ones: First, GSP; endogenous economic changes have been shown to induce electoral and political impacts in election years (e.g., Brender and Drazen, 2008; Paltzman, 1992). Second, corruption; a corrupt environment provides more concrete reasons for attacking political candidates, and more opportunities for private gains.³⁶ Third, government size; larger governments are associated with dominant executive branches, which in turn induces asymmetry in the political contest. Fourth, electoral competition; the extent of partisan competition may pronounce the symmetry of the competition, among other things. Last, candidate party; partisanship is associated with negativity as noted by Henderson and Theodoridis, 2018.

Results appear in Table 2. Each column examines each measure, separately, reporting

³⁴In cases that examine interactions of *donation* we follow the standard method for instrumenting interaction terms introduced by Wooldridge (2002).

³⁵The description of each measure is outlined in detail in the Data Appendix.

³⁶Consistent with the literature (e.g., Raveh and Tsur, 2023), we define corruption as “criminal abuses of public trust by government officials”.

α , β , and γ . In cases where $\eta_{i,y}$ absorbs z (relevant to the state and candidate indicators), only α and γ are reported. The estimates point at various outcomes. Under a better state of the economy, larger government, an incumbent candidate, a sponsoring candidate, and a costlier ad, the impact of donations on campaign negativity is mitigated. Conversely, under a corruption environment, intensive electoral competition, and lengthier ads, donations affect negativity more strongly. Put together, we learn that the impact of campaign contributions on the extent of campaign negativity intensifies under corrupt, symmetric, and economically weak environments.

Table 2: Potential mechanisms

Dependent variable: Ad Tone Index	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)
	GSP	Corruption	Government	Electoral Competition	Party	Incumbent	Sponsor	Length	Cost
Donation	0.111*** (0.032)	0.023*** (0.005)	0.23*** (0.073)	0.02** (0.009)	0.129** (0.063)	0.0731*** (0.0226)	0.176*** (0.036)	-0.0367 (0.0390)	0.118*** (0.0377)
Ad sponsor							0.028*** (0.002)		
Ad length								-0.004*** (0.0002)	
Ad cost									-0.009** (0.004)
Donation X GSP per capita	-0.002** (0.001)								
Donation X Corruption		0.113** (0.053)							
Donation X Government			-0.131*** (0.044)						
Donation X Electoral competition				0.09** (0.04)					
Donation X Candidate party					-0.0360 (0.0303)				
Donation X Incumbent						-0.007** (0.003)			
Donation X Ad sponsor							-0.092*** (0.019)		
Donation X Ad length								0.004*** (0.001)	
Donation X Ad cost									-0.041* (0.021)
R-squared	0.36	0.36	0.36	0.35	0.35	0.35	0.37	0.36	0.35
Observations	3,567,710	2,641,986	3,567,710	3,567,710	3,567,710	3,567,710	3,567,588	3,567,710	3,567,710

Standard errors are robust, clustered by candidate and date, and appear in parentheses for independent variables. Superscripts *, **, *** correspond to a 10, 5 and 1% level of significance. The dependent variable is the Ad Tone Index. All regressions include candidate-by-year and date fixed effects, and an intercept. The sample includes TV political ads related to U.S. states' gubernatorial elections, covering the period 2002-2020. All columns present second-stage results of an IV estimation with 'Donation' instrumented via 'Party X regulation'. 'Donation' is the amount of political donations made to a candidate within the precedent week. 'Party X regulation' is the total political donation made to the candidate's party within the precedent week, multiplied by the Contribution Regulation Index (taking the value 1 (2) if the state has some (no) limits imposed on political donations from individuals, within the given year). 'Ad sponsor' is an index denoting the ad's main sponsor. 'Incumbent' is an indicator that captures whether the candidate is an incumbent. 'Ad length' is the length of the ad in seconds. 'Ad cost' is the monetary cost of the ad. 'GSP per capita' is the per capita Gross State Product. 'Corruption' is the normalized state corruption index, as outlined in the text. 'Electoral competition' is a Ranney-Index based measure of state electoral competition. 'Government' is the GSP share of the government sector. The state and candidate level indicators are absorbed by the candidate-by-year fixed effects and hence are not reported separately. For further information on variables see data Appendix.

4.2.3 Heterogeneous institutions

Additional potential political mechanisms relate to cross-state institutional differences, beyond those related to campaign contribution limits. U.S. states present various institutional differences that may be pivotal for our analysis, as they relate to incumbent and voter behavior, which are fundamental for understanding political campaign patterns.³⁷ We, hence, consider

³⁷See, e.g., Herb (2005), James and Rivera (2022), Raveh and Tsur, 2023, and Ross (2004), among others, linking various institutional features to incumbent and voter behavior.

cross-sectional differences in the institutional settings that have been reported in previous research to affect states' incumbent and voter behavior.

While such differences are captured via the candidate-by-year fixed effects, we look into the role of their interaction with *donation*. As before, this is done to identify the channels via which the impact of *donation* on *tone* is manifested, focusing this time on the case of institutions. Hence, we estimate a version of Equation (3) in which z represents an indicator for one of the examined institutional features. We examine the roles of the following cross-state institutional differences: party strength; baseline budgeting rules; strict balanced budget requirements; biennial budgeting; debt limitations; direct democracy; supermajority vote requirement; tax and expenditure limitations; combined tax and spending committees in the legislature; gubernatorial term limits. The descriptions and cross-sectional state divisions of each of the institutional differences are outlined in the Data Appendix, together with their sources.

Results appear in Columns 1-10 of Table 3, examining each of the cases, separately. The results indicate that under some of the institutional features the magnitude of the impact of *donation* on *tone* is reduced; namely, party strength, baseline budgeting rules, direct democracy, and combined tax and spending committees. Under other features the magnitude is rather intensified, as observed in the cases of tax and spending limits, and gubernatorial term limits.

4.2.4 Different measures

The baseline analysis employed specific *donation*, *tone*, and IV measures. In this sub-section we examine the robustness of the results to the adoption of alternatives for each measure. Results appear in Table 4, and follow the baseline OLS or IV specifications (Columns 2 or 6 of Table 1), as noted in the corresponding case, yet with the examined alternative in lieu of either the baseline *donation*, *tone*, or IV.

Starting with *donation*. The baseline measure considers donations from all sources; these, however, are divided to two major groups, namely donations originating from individuals (I), and those received by corporations (C); the latter group includes Political Action Committees (PACs), state parties, corporations, and labor unions. Notably, the majority of donations (around 70%) come from individuals. In our first examination we consider a division of the baseline *donation* measure to these two sub-groups, I and C. For each sub-group, we construct a measure equivalent to the aggregated baseline one, yet restricted to contributions coming only from either I, or C, respectively. Then, similar to the case of Column 1 of Table 1, we include both measures concurrently under a *donation* vector, using OLS. The results in Column 1 indicate that the positive association between political donations and negativity originates

Table 3: Heterogeneous institutions

Dependent variable: Ad Tone Index	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Party strength	Baseline budget	BB strictness	Biennial budget	Debt limit	Direct democracy	Super-majority voting	Tax and spending limits	Combined committees	Term limits
Donation	0.26** (0.119)	0.086*** (0.028)	0.061** (0.025)	0.069*** (0.026)	0.056** (0.024)	0.084*** (0.03)	0.068** (0.027)	0.056** (0.025)	0.378*** (0.099)	0.051** (0.024)
ParStrength * Donation	-0.209* (0.115)									
Baseline * Donation		-0.03*** (0.008)								
Strict * Donation			0.099 (0.098)							
Biennial * Donation				0.025 (0.184)						
DebtLimit * Donation					0.277 (0.175)					
DirDem * Donation						-0.099* (0.058)				
Supermajority * Donation							0.031 (0.088)			
TaxLimit * Donation								0.496*** (0.187)		
Combined * Donation									-0.344*** (0.098)	
TermLimit * Donation										0.169* (0.096)
R-squared	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Observations	3,567,710	3,567,710	3,567,710	3,567,710	3,567,710	3,567,710	3,567,710	3,567,710	3,567,710	3,567,710

Standard errors are robust, clustered by candidate and date, and appear in parentheses for independent variables. Superscripts *, **, *** correspond to a 10, 5 and 1% level of significance. The dependent variable is the Ad Tone Index. All regressions include candidate-by-year and date fixed effects, and an intercept. The sample includes TV political ads related to U.S. states' gubernatorial elections, covering the period 2002-2020. All columns present second-stage results of an IV estimation with 'Donation' instrumented via 'Party X regulation'. 'Donation' is the amount of political donations made to a candidate within the precedent week. 'Party X regulation' is the total political donation made to the candidate's party within the precedent week, multiplied by the Contribution Regulation Index (taking the value 1 (2) if the state has some (no) limits imposed on political donations from individuals, within the given year). 'Ad sponsor' is an index denoting the ad's main sponsor. The various institutional heterogeneities (interacted with 'Donation') are absorbed by the candidate-by-year fixed effects and hence not reported separately. State institutional heterogeneities include: 'Baseline': baseline budgeting rules; 'Strict': strict balanced budget requirements; 'Biennial': semi-annual budget; 'DebtLimit': debt limitations; 'DirDem': direct democracy (voter initiative); 'ParStrength': party strength; 'Supermajority': supermajority vote requirement; 'TaxLimit': tax and expenditure limitations; 'Combined': combined tax and spending committees in the legislature; 'Term limits': The existence of gubernatorial term limits over the sample period. For further information on variables see data Appendix.

mostly from contributions made by individuals. This is seen by the positive and significant estimate over I, as opposed to the imprecise estimate over C; in addition, the magnitude of I's association is similar to that estimated under the baseline OLS case.

Given these results, in Column 2 we focus on I, and estimate the baseline IV specification, in which our proposed IV instruments for the I-donation measure. The first-stage results are qualitatively to those under the baseline case. Specifically, the estimate on the IV is positive and precise, and the F-statistic is higher than 150. The second-stage results indicate that I-donations increase the extent of campaign negativity. Moreover, they do so in a magnitude that is about 20% higher than estimated under the baseline case with the aggregated donations.

In Column 3 we examine an extended version of the baseline instrument. The latter employed a binary Contribution Regulation Index, that focuses on I-related limitations. As noted, this was done because the I-group represents the majority of donations. Next, we consider a variate of the baseline IV that considers also the C-group. We do so by constructing an extended Contribution Regulation Index that can take the value 1/2/3/4 if the state has some constraints on both I and C / some constraints on I but none on C / some constraints on C but

none on I / no constraints on both I and C, respectively.³⁸ We then interact this extended index with the same party-level donation measures employed in the baseline case, to get the modified IV. Employing this modified IV under the baseline IV estimation specification, instrumenting for the baseline *donation*, we get a qualitatively similar outcome in the first-stage, in terms of the association between the IV and the endogenous variable and the F-statistic estimate, as well as in the second-stage, in terms of observing a precise positive impact of donations on negativity, yet in magnitude that is almost three times the one estimated under the baseline case.

Columns 4 and 5 examine two *tone* alternatives. The first alternative (Column 4) is an extended, 3-level, version of the binary baseline Ad Tone Index. This version of the index exploits the full extent of the WMP tone (re)coding by considering the tone-classifications of promoting, contrasting, and attacking, as separate, and in increasing order of negativity. Specifically, this index takes the values 1-3, where 1/2/3 denotes a promoting/contrasting/attacking tone, respectively. The second alternative (Column 5) is a *Target Indicator*, which captures whether a targeted, competing, candidate is identified (i.e. in addition to the favored candidate) in the TV ad. The idea is that if one is indeed identified in the ad then, by definition, the ad is either attacking or contrasting, irrespective of the subjective interpretations of CMAG or WMP. The results in both cases indicate that *donation* increases *tone*, even under various *tone* alternatives.

4.2.5 Additional tests

We undertake various additional robustness tests to the main specification. All cases follow the baseline specification (Column 6 of Table 1), with case-specific modifications as noted below. Results of this sub-section appear in Table 5. First, we examine two restricted samples. In Column 1 we exclude California, New York, and Texas from the sample, to test the robustness of the key results to the exclusion of the three largest states. This restriction addresses the concern that the main results may be driven by the dominant states. In Column 2 we exclude New Hampshire and Vermont, to focus on the sample of states that adopt 4-year term lengths. Under this restriction government durability is fixed. The estimated α in either of the cases indicates that the main result is robust to these restrictions

Second, we test different clustering levels. The baseline analysis follows a conservative two-way clustering approach across the two basic dimensions of the treatment. However, the basic structure of the data enables assuming standard error correlations within various other groups.

³⁸This case as well reflects the size difference between the I and C group, via the difference between the values 2 and 3, weighing the case of some constraints on I more heavily than that some constraints on C.

Table 4: Different measures

	(1)	(2)	(3)	(4)	(5)
	OLS	IV	IV (extended)	IV	IV
Dependent variable:	Ad tone index	Ad tone index	Ad tone index	Extended Ad Tone Index	Target Indicator
Donation: Individuals	0.031*** (0.012)	0.084*** (0.029)			
Donation: Corporations	0.064 (0.041)				
Donation			0.046** (0.022)	0.192*** (0.055)	0.066*** (0.019)
R-squared	0.35	0.35	0.35	0.35	0.35
Observations	3,567,710	3,567,710	3,567,710	3,567,710	3,568,545

Standard errors are robust, clustered by candidate and date, and appear in parentheses for independent variables. Superscripts *, **, *** correspond to a 10, 5 and 1% level of significance. The dependent variable is the Ad Tone Index (Columns 1-3), Extended Ad Tone Index (Column 4), or target indicator (Column 5), the details of which are outlined in the text and the Data Appendix. All regressions include candidate-by-year and date fixed effects, and an intercept. The sample includes TV political ads related to U.S. states' gubernatorial elections, covering the period 2002-2020. All columns present second-stage results of an IV estimation with 'Donation' instrumented via 'Party X regulation' (with the exception of Column 1, which employs OLS, and Column 3 which employs the extended version of 'Party X regulation'). 'Donation' ('Donation: Individuals / Donation: Corporations') is the amount of political donations made to a candidate (by individuals, or corporations, respectively) within the precedent week. 'Party X regulation' is the total political donation made to the candidate's party within the precedent week, multiplied by the Contribution Regulation Index (taking the value 1 (2) if the state has some (no) limits imposed on political donations from individuals, within the given year); the extended version of 'Party X regulation' (employed in Column 3) includes an extended version of the Contribution Regulation Index, considering 4 levels of contribution limits, as outlined in the Data Appendix. For further information on variables see data Appendix.

We examine two such cases, that take a more general perspective; clustering by state, and by year. The results, which appear in Columns 3-4, respectively, indicate that the main effect is robust to these modifications.

Third, we consider the role of potential retaliation. Going negative may be a reaction to previous movements towards negativity by contenders; i.e., candidates facing attacks by contenders may retaliate. To examine that, we consider the average Ad Tone Index for ads aired in the preceding week targeting the current ad's candidate. In effect, this measure provides the average negativity that a candidate faces contemporaneously (by looking back at the negativity targeted specifically at that candidate in the preceding week). Given the required matching between the preceding-week's targeted individual across ads, and the current ad's candidate, the examined sample drops significantly. Nonetheless, the results in Column 5 indicate that the main effect remains to hold. In addition, they illustrate that the magnitude of previous attacks is indeed correlated with a boost in contemporaneous negativity as conjectured.

Fourth, we address the discrete nature of our outcome variable and estimate the baseline specification via Probit estimation, reporting marginal effects in Column 6. The results indicate that the main effect is robust to this estimation procedure. Fifth, in Column 7, we undertake a candidate-date aggregation of the sample. In the baseline analysis, the treatment has daily

frequency and differentiates at the cross-section across candidates, while the outcome's unit of analysis is at the ad level. To examine whether this difference may affect the main results, we aggregate the baseline sample to be at the candidate-date level. This mitigates treatment-outcome differences, while still differentiating between candidates; however, this aggregation comes at a cost of reducing the sample size considerably. The estimated α indicates that the main result remains to hold, and is robust to this aggregation.

Last, we consider the potential role of with-election stage, as periods that are closer to election time may be more campaign-intensive relative to other periods. This bears the question of whether the main result is relevant to periods around election time, or whether it is also apparent in the periods farthest from election time. Hence, in Columns 8-9 we undertake two within-election sample period restrictions. First (Column 8), we restrict the sample to the pre-November post-April months (periods closer to election time). Second (Column 9), we restrict the sample to the post-October pre-May months (periods farther from election time). The results indicate that the main effect is observed strictly in the months closer to election time, highlighting an additional facet of the donations-negativity nexus.

Table 5: Additional tests

Dependent variable: Ad Tone Index	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	CA, NY, and TX excluded	NH, and VT excluded	Clustering by state	Clustering by year	Retaliation	Probit estimation	Candidate-date aggregation	Restricted to pre-November, post-April, months	Restricted to post-October, pre-May, months
Donation	0.127*** (0.037)	0.069*** (0.023)	0.069** (0.03)	0.069*** (0.02)	0.049** (0.022)	0.169*** (0.039)	0.084** (0.034)	0.057** (0.023)	-0.029 (0.071)
Previous attack					0.034** (0.014)				
R-squared	0.36	0.35	0.35	0.35	0.45	0.42	0.68	0.36	0.41
Observations	3,301,187	3,523,666	3,567,710	3,567,710	2,368,816	3,567,710	42,934	3,105,512	462,198

Standard errors are robust, clustered by candidate and date (by state (year) in Column 3 (4)), and appear in parentheses for independent variables. Superscripts *, **, *** correspond to a 10, 5 and 1% level of significance. The dependent variable is the Ad Tone Index. All regressions include candidate-by-year and date fixed effects, and an intercept. The sample includes TV political ads related to U.S. states' gubernatorial elections, covering the period 2002-2020 (CA, NY, and TX (NH and VT) are excluded in Column 1 (2), pre (post) November (October) and post (pre) April (May) are excluded in Column 9 (8)). All columns present second-stage results of an IV estimation (with the exception of Column 6, which employs Probit estimation, reporting marginal effects) with 'Donation' instrumented via 'Party X regulation'. 'Donation' is the amount of political donations made to a candidate within the precedent week. 'Party X regulation' is the total political donation made to the candidate's party within the precedent week, multiplied by the Contribution Regulation Index (taking the value 1 (2) if the state has some (no) limits imposed on political donations from individuals, within the given year). 'Previous attack' is the average Ad Tone Index for ads aired in the precedent week targeting the current ad's candidate. In Column 7 the sample is aggregated at the candidate-date level (state-year). For further information on variables see data Appendix.

5 Conclusion

This work examines, theoretically and empirically, how political donations may influence the extent of political sabotage through patterns of negative campaigning in U.S. gubernatorial elections. We offer a political contest model with endogenous sabotage, vis-à-vis campaigning, with standard impact structures and backlash effects. The model illustrates that while positive campaigning is generally more prevalent, a donation-driven budget increase may lead to a shift towards negative campaigning, in a magnitude that increases with the symmetry in the contest.

The model’s predictions are empirically tested via a highly detailed linkage, at the candidate-date level, of two extensive datasets on campaign contributions and political TV advertisements related to U.S. gubernatorial elections, over the period 2002-2020. Leveraging plausibly exogenous variations in state institutional features related to contribution limits, and party-level fundraising efforts, the analysis points at a significant positive impact of short-term donations, specifically those made within the past week, on the extent of campaign negativity. The results further indicate that these patterns are driven by donations made by individuals, and are intensified in corrupt, symmetric, and recessionary settings.

Our findings shed light on a critical but overlooked externality of political donations: their capacity to fuel sabotage through negative campaigning. These insights contribute to the broader discussion on the unintended consequences of campaign finance. While political donations are often framed as a means of supporting democratic engagement, this study reveals their potential to encourage destructive electoral tactics that may erode voter trust and institutional legitimacy. The observed increase in negativity within a short time frame following donations further suggests a direct and immediate strategic response by candidates, emphasizing the importance of understanding how financial resources shape campaign dynamics. Finally, the analysis points to potential policy interventions that could balance the need for financial resources in campaigns while curbing excessive negativity, offering insights for policymakers seeking to promote fair and constructive political discourse.

References

- ACIR (1987): “Fiscal Discipline In The Federal System: National Reform And The Experience Of The States,” Advisory Commission on Intergovernmental Relations.
- AVIS, E., C. FERRAZ, F. FINAN, AND C. VARJÃO (2022): “Money and politics: The effects of campaign spending limits on political entry and competition,” *American Economic Journal: Applied Economics*, 14, 167–199.
- BARON, D. P. (1994): “Electoral Competition with Informed and Uninformed Voters,” *American Political Science Review*, 88, 33–47.
- BASKARAN, T., S. BHALOTRA, B. MIN, AND Y. UPPAL (2023): “Women legislators and economic performance,” *Journal of Economic Growth*, 1–64.
- BAUMEISTER, R. F., E. BRATSLAVSKY, C. FINKENAUER, AND K. D. VOHS (2001): “Bad is stronger than good,” *Review of General Psychology*, 5, 323–370, place: US Publisher: Educational Publishing Foundation.
- BENOIT, K. AND M. MARSH (2008): “The campaign value of incumbency: A new solution to the puzzle of less effective incumbent spending,” *American Journal of Political Science*, 52, 874–890.
- BOMBARDINI, M. (2008): “Firm heterogeneity and lobby participation,” *Journal of International Economics*, 75, 329–348.
- BOMBARDINI, M. AND F. TREBBI (2011): “Votes or money? Theory and evidence from the US Congress,” *Journal of Public Economics*, 95, 587–611.
- BONICA, A. (2024): “Database on Ideology, Money in Politics, and Elections: Public version 4.0 [Computer file],” Stanford, CA: Stanford University Libraries. <https://data.stanford.edu/dime>.
- BOUTON, L., M. CASTANHEIRA, AND A. DRAZEN (2024): “A Theory of Small Campaign Contributions,” *The Economic Journal*, 134, 2351–2390.
- BRENDER, A. AND A. DRAZEN (2008): “How Do Budget Deficits and Economic Growth Affect Reelection Prospects? Evidence from a Large Panel of Countries,” *American Economic Review*, 98, 2203–2220.

- CACIOPPO, J. T., W. L. GARDNER, AND G. G. BERNTSON (1997): “Beyond Bipolar Conceptualizations and Measures: The Case of Attitudes and Evaluative Space,” *Personality and Social Psychology Review*, 1, 3–25, publisher: SAGE Publications Inc.
- CARPENTER, J., P. H. MATTHEWS, AND J. SCHIRM (2010): “Tournaments and Office Politics: Evidence from a Real Effort Experiment,” *American Economic Review*, 100.
- CHARNESS, G., D. MASCLET, AND M. C. VILLEVAL (2014): “The dark side of competition for status,” *Management Science*, 60, 38–55.
- CHATURVEDI, A. (2005): “Rigging elections with violence,” *Public Choice*, 125, 189–202.
- CHEN, K. (2003): “Sabotage in Promotion Tournaments,” *The Journal of Law, Economics, and Organization*, 19, 119–140.
- CHOWDHURY, S. M. AND O. GÜRTLER (2015): “Sabotage in contests: a survey,” *Public Choice*, 164, 135–155.
- COATE, S. (2004): “Political Competition with Campaign Contributions and Informative Advertising,” *Journal of the European Economic Association*, 2, 772–804, publisher: Oxford University Press.
- CRAIN, M. AND M. CRAIN (1998): “Fiscal Consequences of Budget Baselines,” *Journal of Public Economics*, 67, 421–436.
- CUST, J., T. HARDING, AND P.-L. VÉZINA (2019): “Dutch disease resistance: Evidence from Indonesian firms,” *Journal of the Association of Environmental and Resource Economists*, 6, 1205–1237.
- DATO, S. AND P. NIEKEN (2014): “Gender differences in competition and sabotage,” *Journal of Economic Behavior & Organization*, 100, 64–80.
- DE FIGUEIREDO JOHN, M. AND M. SNYDER JAMES (2003): “Why is there so little money in US politics?” *Journal of Economic Perspectives*, 17, 105–30.
- DEL CORRAL, J., J. PRIETO-RODRIGUEZ, AND R. SIMMONS (2010): “The effect of incentives on sabotage: The case of Spanish football,” *Journal of Sports Economics*, 11, 243–260.
- DEUTSCHER, C., B. FRICK, O. GÜRTLER, AND J. PRINZ (2013): “Sabotage in tournaments with heterogeneous contestants: Empirical evidence from the soccer pitch,” *Scandinavian Journal of Economics*, 115, 1138–1157.

- DINCER, O. AND M. JOHNSTON (2017): “Corruption Issues in State and Local Politics: Is Political Culture a Deep Determinant?” *Publius*, 47, 131–148.
- DOWLING, C. M. AND A. WICHOWSKY (2015): “Attacks Without Consequence? Candidates, Parties, Groups, and the Changing Face of Negative Advertising,” *American Journal of Political Science*, 59, doi: 10.1111/ajps.12094.
- EBENSTEIN, A., M. HAZAN, AND A. SIMHON (2016): “Changing the cost of children and fertility: Evidence from the Israeli kibbutz,” *The Economic Journal*, 126, 2038–2063.
- ELMELUND-PRÆSTEKÆR, C. (2010): “Beyond American negativity: Toward a general understanding of the determinants of negative campaigning,” *European Political Science Review*, 2, 137–156.
- ERIKSON, R. S. AND T. R. PALFREY (2000): “Equilibria in campaign spending games: Theory and data,” *American Political Science Review*, 94, 595–609.
- FOURNAIES, A. AND A. B. HALL (2014): “The financial incumbency advantage: Causes and consequences,” *The Journal of Politics*, 76, 711–724.
- FOWLER, E. F., M. FRANZ, AND T. N. RIDOUT (2022): “Political Advertising in 2010–2020,” Version 1.0 [dataset]. Middletown, Conn.: Wesleyan Media Project, Department of Government at Wesleyan University.
- FRIDKIN, K. L. AND P. J. KENNEY (2011): “The Role of Candidate Traits in Campaigns,” *Journal of Politics*, 73, 61–73.
- GERBER, A. S. (2004): “Does campaign spending work? Field experiments provide evidence and suggest new theory,” *American Behavioral Scientist*, 47, 541–574.
- GIBSON, J. L. (2008): “Challenges to the Impartiality of State Supreme Courts: Legitimacy Theory and “New-Style” Judicial Campaigns,” *American Political Science Review*, 102, 59–75.
- GORDON, S. C., C. HAFFER, AND D. LANDA (2007): “Consumption or investment? On motivations for political giving,” *The Journal of Politics*, 69, 1057–1072.
- GROSSMAN, G. M. AND E. HELPMAN (1994): “Protection for Sale,” *The American Economic Review*, 84, 833–850, publisher: American Economic Association.

- (1996): “Electoral Competition and Special Interest Politics,” *The Review of Economic Studies*, 63, 265–286.
- GROSSMANN, M., M. P. JORDAN, AND J. MCCRAIN (2021): “The Correlates of State Policy and the Structure of State Panel Data,” *State Politics and Policy Quarterly*, 1–21.
- GÜRTLER, O., J. MÜNSTER, AND P. NIEKEN (2013): “Information policy in tournaments with sabotage,” *Scandinavian Journal of Economics*, 115, 932–966.
- HARBRING, C. AND B. IRLENBUSCH (2005): “Incentives in tournaments with endogenous prize selection,” *Journal of Institutional and Theoretical Economics*, 636–663.
- (2011): “Sabotage in tournaments: Evidence from a laboratory experiment,” *Management Science*, 57, 611–627.
- HASELMAYER, M. (2019): “Negative campaigning and its consequences: a review and a look ahead,” *French Politics*, 17, 355–372.
- HENDERSON, J. AND A. THEODORIDIS (2018): “Seeing Spots: Partisanship, Negativity and the Conditional Receipt of Campaign Advertisements,” *Political Behavior*, 40, 965–987.
- HERB, M. (2005): “No representation without taxation? Rents, development, and democracy,” *Comparative Politics*, 297–316.
- HOLBROOK, A. L., J. A. KROSCHKE, P. S. VISSER, W. L. GARDNER, AND J. T. CACIOPPO (2001): “Attitudes toward Presidential Candidates and Political Parties: Initial Optimism, Inertial First Impressions, and a Focus on Flaws,” *American Journal of Political Science*, 45, 930–950.
- IKAN, L., D. LAGZIEL, AND O. RAVEH (2024): “Resource windfalls, Connectivity, and Political Polarization,” Ikan, Lotem and Lagziel, David and Raveh, Ohad, Resource windfalls, Connectivity, and Political Polarization (May 20, 2024). Available at SSRN: <https://ssrn.com/abstract=4738291> or <http://dx.doi.org/10.2139/ssrn.4738291>.
- ITO, T. A. AND J. T. CACIOPPO (2000): “Electrophysiological Evidence of Implicit and Explicit Categorization Processes,” *Journal of Experimental Social Psychology*, 6, 660–676.
- JAMES, A. AND N. M. RIVERA (2022): “Oil, politics, and Corrupt Bastards,” *Journal of Environmental Economics and Management*, 111, 102599.

- KEARNS, P. (1994): “State budget Periodicity: An Analysis of the Determinants and the Effect on State Spending,” *Journal of Policy Analysis and Management*, 13, 331–362.
- KLEIN, J. G. AND R. AHLUWALIA (2005): “Negativity in the Evaluation of Political Candidates,” *Journal of Marketing*, 69, 131–142, publisher: American Marketing Association.
- KONRAD, K. A. (2000): “Sabotage in Rent-Seeking Contests,” *Journal of Law, Economics, & Organization*, 16, 155–165, publisher: Oxford University Press.
- LAGZIEL, D., E. LEHRER, AND O. RAVEH (2023): “Resource Windfalls and Political Sabotage: Evidence from 5.2 Million Political Ads,” .
- LAU, R. R. (1985): “Two Explanations for Negativity Effects in Political Behavior,” *American Journal of Political Science*, 29, 119–138, publisher: [Midwest Political Science Association, Wiley].
- LAU, R. R. AND G. M. POMPER (2004): *Negative campaigning: An analysis of US Senate elections*, Rowman & Littlefield.
- LAU, R. R., L. SIGELMAN, AND I. B. ROVNER (2007): “The effects of negative political campaigns: A meta-analytic reassessment,” *Journal of Politics*, 69, 1176–1209.
- LAZEAR, E. P. (1989): “Pay Equality and Industrial Politics,” *Journal of Political Economy*, 97, 561–580, publisher: The University of Chicago Press.
- LEVITT, S. D. (1994): “Using repeat challengers to estimate the effect of campaign spending on election outcomes in the US House,” *Journal of Political Economy*, 102, 777–798.
- LOVETT, M. J. AND R. SHACHAR (2011): “The Seeds of Negativity: Knowledge and Money,” *Marketing Science*, 30, 430–446.
- MAIER, J. AND A. NAI (2023): “Mapping the drivers of negative campaigning: Insights from a candidate survey,” *International Political Science Review*, 44, 195–211.
- MATSUSAKA, J. (1995): “Fiscal Effects of Voter Initiative: Evidence from the Last 30 Years,” *Journal of Political Economy*, 103, 587–623.
- MAYHEW, D. (1986): “Placing Parties in American Politics,” Princeton University Press.
- MÜNSTER, J. (2007): “Selection tournaments, sabotage, and participation,” *Journal of Economics & Management Strategy*, 16, 943–970.

- NAI, A. (2020): “Going negative, worldwide: Towards a general understanding of determinants and targets of negative campaigning,” *Government and Opposition*, 55, 430–455.
- PALTZMAN, S. (1992): “Voters as fiscal conservatives,” *Quarterly Journal of Economics*, 107, 327–361.
- PELZL, P. AND S. POELHEKKE (2021): “Good mine, bad mine: Natural resource heterogeneity and Dutch disease in Indonesia,” *Journal of International Economics*, 131, 103457.
- PRAT, A. (2002): “Campaign advertising and voter welfare,” *The Review of Economic Studies*, 69, 999–1017.
- PRIMO, D. AND J. SNYDER (2010): “Party Strength, the Personal Vote, and Government Spending,” *American Journal of Political Science*, 54, 354–370.
- RAVEH, O. AND Y. TSUR (2023): “Can Resource Windfalls Reduce Corruption? The Role of Term Limits,” *Journal of Environmental Economics and Management*, 122, 102891.
- RENY, P. J. (1999): “On the Existence of Pure and Mixed Strategy Nash Equilibria in Discontinuous Games,” *Econometrica*, 67, 1029–1056, publisher: John Wiley & Sons, Ltd (10.1111).
- ROSCOE, D. D. AND S. JENKINS (2005): “A meta-analysis of campaign contributions’ impact on roll call voting,” *Social Science Quarterly*, 86, 52–68.
- ROSS, M. L. (2004): “Does taxation lead to representation?” *British journal of political science*, 34, 229–249.
- SCARROW, S. E. (2007): “Political finance in comparative perspective,” *Annu. Rev. Polit. Sci.*, 10, 193–210.
- SCHUSTER, S. S. (2020): “Does campaign spending affect election outcomes? New evidence from transaction-level disbursement data,” *The Journal of Politics*, 82, 1502–1515.
- SHEN, F. AND H. D. WU (2002): “Effects of soft-money issue advertisements on candidate evaluation and voting preference: An exploration,” *Mass Communication & Society*, 5, 395–410, place: US Publisher: Lawrence Erlbaum.
- SKAPERDAS, S. AND B. GROFMAN (1995): “Modeling Negative Campaigning,” *American Political Science Review*, 89, 49–61.

- SOUBEYRAN, R. (2009): “Contest with attack and defense: does negative campaigning increase or decrease voter turnout?” *Social Choice and Welfare*, 32, 337–353.
- STRATMANN, T. (2005): “Some talk: Money in politics. A (partial) review of the literature,” *Public Choice*, 124, 135–156.
- (2006): “Contribution limits and the effectiveness of campaign spending,” *Public Choice*, 129, 461–474.
- (2009): “How prices matter in politics: The returns to campaign advertising,” *Public Choice*, 140, 357–377.
- TA, I., L. JT, S. NK, AND C. JT (1998): “Negative information weighs more heavily on the brain: the negativity bias in evaluative categorizations,” *Journal of personality and social psychology*, 75, publisher: J Pers Soc Psychol.
- THEILMANN, J. AND A. WILHITE (1998): “Campaign tactics and the decision to attack,” *The Journal of Politics*, 60, 1050–1062.
- TOPALOVA, P. AND A. KHANDELWAL (2011): “Trade liberalization and firm productivity: The case of India,” *Review of economics and statistics*, 93, 995–1009.
- VANDEGRIFT, D. AND A. YAVAS (2010): “An experimental test of sabotage in tournaments,” *Journal of Institutional and Theoretical Economics*, 259–285.
- WALKER, D. AND E. L. NOWLIN (2021): “Data-Driven Precision and Selectiveness in Political Campaign Fundraising,” *Journal of Political Marketing*, 20, 73–92, publisher: Routledge
eprint: <https://doi.org/10.1080/15377857.2018.1457590>.
- WOOLDRIDGE, J. M. (2002): *Econometric Analysis of Cross Section and Panel Data*, The MIT Press.

Appendix A Data

We use a panel of U.S. TV political ads over state gubernatorial elections covering the period 2002-2020. The data reports a rich set of characteristics for each ad, including importantly the date in which it was aired, and its beneficiary (candidate). Based on these two latter characteristics, we merge data on political donations to this noted panel of TV political ads.

The political TV ads panel is (bi-)annual post-(pre-)2010. The data spans the universe of TV political ads related to gubernatorial elections, aired in the major TV networks across states and time, as captured and collected by Kantar Media / CMAG, a commercial firm, and processed and coded by the Wesleyan Media Project (WMP), as described in Fowler et al. (2022).

The political donations data is from the Database on Ideology, Money in Politics, and Elections (DIME), as described in Bonica (2024). Merging between the donations and ads data was done based on matching donations' recipients to ads' candidates across dates, as described in the text. Additional standard state variables are derived from the U.S. Bureau of Economic Analysis (BEA). Variables in monetary values are in current \$USD. Descriptive statistics of the key variables are presented in Table A1.

The sample on political ads includes the 50 states; however, participating states alternate in each year, depending on whether gubernatorial elections are undertaken in the given year. The following is a list of participating states in each year. 2002, 2006, 2010, 2014, 2018: AK, AL, AR, AZ, CA, CO, CT, FL, GA, HI, IA, ID, IL, KS, MA, MD, ME, MI, MN, NE, NH, NM, NV, NY, OH, OK, OR (also in 2016), PA, RI, SC, SD, TN, TX, VT, WI, WY. 2004, 2008, 2012, 2016, 2020: DE, IN, KY, LA, MO, MT, NC, ND, NH, UT, VT, WA, WV. 2011, 2015, 2019: KY, LA, MS. 2013, 2017: NJ, VA.

Ad/Candidate-related variable definitions (source: WMP, unless specified otherwise)³⁹

Donation – day/week/two weeks/month/campaign: The amount of political contributions made by individuals and corporations to a candidate in a gubernatorial election race within the preceding day/preceding week preceding week (with the exclusion of the preceding day)/penultimate week/penultimate two weeks/the campaign (with the exclusion of the preceding month), respectively; in \$10million. Source: DIME.

Donation – individuals/corporations: The amount of political contributions made by individuals, or corporations, to a candidate in a gubernatorial election race within the preceding week; in \$10million. Source: DIME.

Party X regulation: The total political donation made to the candidate's party within the preceding week, multiplied by the Contribution Regulation Index (taking the value 1 (2) if the state has some (no) limits imposed on political donations from individuals, within the given year). Employed as an instrumental variable for political donations throughout the analysis. Source: DIME and the U.S. Federal Election Commission.

Party X regulation - extended: The total political donation made to the candidate's party within the preceding week, multiplied by the Extended Contribution Regulation Index (taking

³⁹Variables in this group are at the ad/candidate level.

Table A1: Descriptive statistics

	Mean	Std. Dev.	Min.	Max.
Donation: week (candidate; date; in \$10million)	0.06	0.148	0	3.929
Ad length, seconds (ad)	30.29	5.793	5	120
Ad sponsor (ad)	1.338	0.874	1	4
Ad tone index (ad)	0.141	0.348	0	1
Donation: two weeks (candidate; date; in \$10million)	0.059	0.183	0	5.027
Donation: month (candidate; date; in \$10million)	0.112	0.287	0	5.088
Donation: campaign (candidate; date; in \$10million)	0.843	1.364	0	16.28
Donation: day (candidate; date; in \$10million)	0.0084	0.0444	0	2.809
Party X regulation (candidate; date; in \$10million)	3.2	9.01	0	28.84
Corruption index, z-normalized (state; annual)	-0.054	0.993	-2.486	3.73
Incumbent (ad)	0.0686	0.253	0	1
Ad cost (ad; in \$10000)	0.687	0.622	0.009	18.47
Gross State Product per capita (state; annual; in \$1000)	50.35	10.45	26.96	84.59
Electoral competition (state; annual)	0.354	0.473	0	1
Government share (state; annual)	0.174	0.0311	0.127	0.329
Candidate party (ad)	1.989	0.993	1	3
Target indicator (ad)	0.458	0.498	0	1
Extended ad tone index (ad)	1.558	0.726	1	3
Donation: Individuals (candidate; date; in \$10million)	0.0376	0.133	0	3.929
Donation: Corporations (candidate; date; in \$10million)	0.0204	0.0544	0	0.909
Previous attack	0.151	0.283	0	1

See Appendix for detailed description of variables.

the value 1/2/3/4 if the state has some constraints on both individuals (I) and corporations (C) / some constraints on I but none on C / some constraints on C but none on I / no constraints on both I and C, respectively). Employed as an instrumental variable for political donations in Column 3 of Table 4. Source: DIME and the U.S. Federal Election Commission.

Ad Tone Index: A binary index that measures the extent to which the TV ad reflects a non-negative (promoting the candidate, or contrasting between candidates) or negative (attacking contenders) tone. It takes the values 0-1, as follows: 0 non-negative; 1 negative.

Extended Ad Tone Index: An index that measures the extent to which the TV ad promotes a specific candidate, attacks a candidate, or contrasts the candidates. It takes the values 1-3, and coded by the WMP as follows: 1 promote; 2 contrast; 3 attack.

Target indicator: A binary indicator that captures whether a targeted, competing candidate is identified (i.e. in addition to the favored candidate) in the TV ad.

Candidate party: An index, taking the values of 1-3, that records the party with which

the candidate is affiliated, coded as follows: 1 Democrat; 2 Other (including unaffiliated); 3 Republican.

Incumbent: A binary indicator that captures whether the candidate is an incumbent.

Ad sponsor: An index, taking the values of 1-4, that measures the extent to which the candidate is involved in sponsoring the ad, coded as follows, according to the sponsoring source of the ad: 1 candidate; 2 candidate-party coordination; 3 party; 4 interest group/other.

Ad length: Length of the ad in seconds.

Ad cost: Cost of the ad, in \$10000.

Media market: Media market where ad aired (usually at the metropolitan level). The sample (AK and HI included) includes 210 media markets.

Television affiliate: TV affiliate. The sample includes the following 36 TV affiliates: AB, ABC, ABC/UPN, AZT, AZTA, CAB, CBS, CNN, CW, FOX, FOX/UPN, IND, ION, MFX, MNT, MNTV, Mund, MundoFox, NA, NBC, ND, PAX, SYN, TEL, TLF, UMA, UNI, UPN, UPN/WEB, WB, WB/UPN, WTVT, WV, WVEA, WWSB, and WXPX.

Time of day: The part of day during which ad aired, including: Daytime, Early Fringe, Early Morning, Early News, Late Fringe, Late News, Prime Access, and Prime Time.

Type of program: Type of television program during which ad aired. The sample covers 85 types of television programs.

Primary issue: The primary focus of the ad, in broad terms. Options include: Personal-related issues, policy-related issues, both personal and policy related issues, neither personal nor policy related issues.

State-related variable definitions⁴⁰

GSP per capita: Gross State Product, normalized by state population. Source: BEA.

Corruption index: An index that merges two corruption indices from the Institute for Corruption Studies at Illinois State University. The first is the Corruption Convictions Index, which provides a measure of per capita federal convictions relating to corruption (“criminal abuses of public trust by government officials”), available up to 2014 for our sample period. For 2016 and 2018 we employ the Corruption Perceptions Index, which measures reporters’ perceptions on the extent of corruption. Further descriptions are provided in Dincer and Johnston (2017). We z-normalized each index to construct a unified corruption index for 2010-2020. Source of underlying measures: Institute for Corruption Studies, Department of Economics, Illinois State University.

Electoral competition: A binary indicator that takes the value 0 if both the state House and Senate have a majority affiliated with the same party, and 1 otherwise. Source: Grossmann

⁴⁰Variables in this group are at the U.S. state level.

et al. (2021) and expanded manually.

Government share: The GSP share of government expenditures. Source: BEA.

State political institutions

Baseline budgeting rules: States are divided based on a binary variable that is 1 for states that use current services baseline, and 0 if they use last year's dollar budget as a baseline. The former group includes: AR, AZ, CT, CO, DE, HI, ME, MA, NV, NC, OH, PA, VT, VA, WV, WY. Source: Crain and Crain (1998).

Biennial budget: States are divided based on a binary variable that is 1 for states that have an annual budget, and 0 if they have a biennial budget. The former group includes: AR, HI, IN, KY, ME, MN, MT, NE, NV, NH, NC, ND, OH, OR, TX, VA, WA, WI, WY. Source: Kearns (1994).

Strict balanced budget requirements: Cross-sectional measure of strict balanced budget requirements based on the Stringency Index of ACIR (1987). The index is a number between 1 (low stringency) and 10 (high stringency) States with a measure below 5 are indexed at 0, whereas the remaining group are marked with 1. States included in the former group are: AK, AR, CA, CT, IL, LA, MA, MD, ME, MI, MN, MS, ND, NH, NV, NY, OR, PA, TX, VA, VT, WA, WI, WY.

No debt limitations: States are divided based on a binary variable that is 1 for states that have no debt limitations, and 0 otherwise. The former group includes: AR, CT, DE, FL, HI, IL, LA, MA, MD, MI, MT, NC, NH, NY, NV, OK, PA, TN, VT. Source: ACIR (1987).

Direct democracy: States are divided based on a binary variable that is 1 for states that have voter initiatives, and 0 otherwise. The former group includes: AK, AR, AZ, CA, CO, FL, ID, IL, MA, ME, MI, MO, MT, NE, NV, ND, OH, OK, OR, SD, UT, WA, WY. Source: Matsusaka (1995).

Party strength: States are divided based on a binary variable that is 1 for states with relatively stronger parties based on the Mayhew Index (Mayhew (1986)), and 0 otherwise. The latter group includes: CT, DE, IL, KY, MD, MO, NJ, NY, OH, PA, RI, WV. Source: Primo and Snyder (2010).

Gubernatorial term limits: States are divided based on a binary variable that is 1 for states that had gubernatorial term limits over the sample period, and 0 otherwise. The former group includes: AK, AL, AR, AZ, CA, CO, DE, FL, GA, HI, ID, IN, KS, KY, LA, MA, MD, ME, MI, MO, MS, MT, NC, NE, NJ, NM, NV, OH, OK, OR, PA, RI, SC, SD, TN, UT, VA, WA, WV, WY. Source: National Governors Association.

Supermajority vote requirement: States are divided based on a binary variable that is 1 for states that have supermajority vote requirement, and 0 otherwise. The former group includes:

CA, DE, FL, GA, LA, MS, SD. Source: ACIR (1987).

Tax and expenditure limitations: States are divided based on a binary variable that is 1 for states that have tax and expenditure limitations, and 0 otherwise. The former group includes: AK, AZ, CA, CO, HI, ID, LA, MI, MT, NV, OR, RI, SC, TN, TX, UT, WA. Source: ACIR (1987).

Combined committees: States are divided based on a binary variable that is 1 for states that have combined tax and expenditure committees, and 0 otherwise. The former group includes: AK, AL, CA, FL, HI, KS, KY, MA, ME, NJ, NY, OK, SC, TN, WI, WV. Source: ACIR (1987).

Appendix B Matched Recipients-Candidates

The following is a list, in alphabetical order, of the 564 matched donation recipients and ads' beneficiaries (candidates): Abbott, Greg; Abercrombie, Neil; Abraham Jr, Ralph Lee; Abrams, Stacey Yvonne; Adkins, Rocky J; Ahlquist, John Thomas; Aiona, Duke; Alley, Allen; Anderson, Arden; Angelle, Scott A; Apodaca, Jeff; Astorino, Rob; Baker Iii, Rushern; Baker, Charles D; Baker, Charles D; Baldacci, John E; Ballantine, Patrick J; Balukoff, A J; Barbour, Haley; Barnes, Clark; Barnes, Roy; Barnett, Jim; Barrett, Charles Daniel; Barrett, Thomas M; Battle, Tommy; Bayless, Betsey; Beauprez, Robert L; Bebout, Eli; Begich, Mark P; Bennett, Kenneth Roy; Benson, Craig R; Bentley, Robert Julian; Berwick, Donald M; Beshear, Andy; Beshear, Steven L; Bevin, Matthew G; Birmingham, Thomas; Biss, Daniel; Black, Diane; Blagojevich, Rod R; Blanco, Kathleen Babineaux; Block, Kenneth J; Blossman Jr, Jack; Blunt, Matt; Bonior, David E; Boughton, Mark D; Boulton, Nathaniel R; Boyd, Randy; Brady, Bill; Branstad, Terry; Bredesen, Phil; Brewer, Carl; Brock, Randy; Brogdon, Randall; Brown, Anthony Gregory; Brown, Kate; Brown, Roy; Brownback, Sam; Bruning, Jon C; Brunner, John; Bryant Ii, William Lee; Bryant, Kevin L; Bryant, Phil; Buehler, Knute C; Bujak, John T; Bullock, Steve; Buono, Barbara; Burgum, Douglas J; Burke, Mary P; Burningham, Jeff; Burris, Roland W; Bush, John Ellis; Bustamante, Cruz M; Byrne, Bradley R; Cagle, Casey; Calley, Brian Nelson; Carcieri, Donald L; Carlson, Tom; Carney Jr, John; Caron, Alan; Carter, Jason J; Cervantes, Joseph; Chandler Iii, A B; Chiang, John; Christie, Christopher J; Cianchette, Peter; Cilley, Jackie; Clavelle, Peter; Coakley, Martha; Cobey, Bill; Cole, Bill; Coleman, Curtis W; Colyer, Jeff; Comer Jr, James R; Condon, Charlie; Connolly, Mark; Conway, John William (Jack); Cooke, Peter S; Cooney, Mike; Corbett, Tom; Cordray, Richard A; Cornett, Mick; Cote, Adam Roland; Cox, John H; Cox, Spencer J; Crist, Charlie; Cuccinelli, Kenneth T Jr.; Culp, Loren; Cuomo, Andrew M; Curtright, W Ames; Cutler, Eliot; Dahlin, William; Dalton, Walter H;

Daniels, Mitch; Dardenne, Jay; Davis, Gray; Davis, Jeff; Davis, Paul; Davis, Wendy R; Dawson, Scott; Dayton, Mark; Deal, Nathan J; Dean, Karl; Dennis, Dave; Desantis, Ronald D; Dewine, Mike; Dillard, Kirk W; Dorman, Joseph Earl; Douglas, James Holley; Downer, Hunt; Doyle, Jim; Ducey, Douglas A; Dunegan, James H; Dunleavy, Michael J; Dunne, Matt; Dupree, Johnny L; Duval, Fred; Easley, Mike; Eastin, Delaine; Edelblut, Frank; Edelen, Adam H; Edmondson, Drew; Edwards, John Bel; Ehrlich Jr, Robert L; Ellsworth, Laura; El-Sayed, Abdulrahman M; Erhart, Milt; Ervin, Tom J; Etheridge, Bob; Evans, Stacey Godfrey; Evers, Anthony Steven; Ewing, Randy; Falchuk, Evan J; Falk, Kathleen; Fallin, Mary; Farley, Steve; Feliciano, Daniel; Feltes, Daniel; Fernald, Mark; Fisher, Dan; Fitzgerald, Edward; Fitzhugh, Craig; Fletcher, Ernie; Flynn, Matt; Foley, Mike; Foley, Thomas C; Folk, Michael Craig; Forest, Dan; Fortunato, Philip D; Fox, Timothy C (Tim); Freed, Joshua; Friess, Foster Stephen; Fulcher, Russell M; Fung, Allan W; Gabrieli, Christopher F; Galbraith, Peter W; Galeotos, Sam E; Galloway, Nicole; Ganim, Joseph P; Gansler, Douglas Friend; Garcia, David R; Garcia, Raul; Gatsas, Theodore L; George, Ronald A; Gessler, Scott; Geyer, Dick; Gianforte, Greg; Gillespie, Edward W; Gillum, Andrew D; Giunchigliani, Christina; Glass, Kathie; Glasson, Cathy; Goforth, Robert; Golisano, B Thomas; Gonzalez, Jay; Goodwin, Robert Booth; Gordon, Mark; Graham, Bill; Graham, Gwen; Granholm, Jennifer M; Greene, Jeff; Greenstein, Mark Stewart; Gregg, John R; Gregoire, Christine; Greitens, Eric; Griebel, Richard Nelson; Griffith, Parker; Grisham, Michelle Lujan; Grossman, Steve; Guadagno, Kim; Hagan, Timothy; Haley, Nikki; Hallquist, Christine David; Hanabusa, Colleen Wakako; Hanaway, Catherine; Haney, Enoch Kelly; Hanemann, Muliufi; Harwell, Beth; Haslam, Bill; Hassan, Margaret Wood; Hassebrook, Chuck H; Hatch, Jack; Havenstein Sr, Walter P; Hawkins, Howie; Hayes, Terry; Heiner, Harold L; Henderson, Jared K; Herbert, Gary R; Herbst, Timothy M; Herzog, Nate; Hickenlooper, John; Hightower, Bill; Hill, Hunter Bradley; Hill, Richard; Hilleary, Van; Hines, James R; Hirono, Mazie K; Hlatcu, Merica; Hodges, Jim; Hoeven, John; Hogan, Lawrence Joseph; Holcomb, Eric; Holcombe, Rebecca; Holden, Bob; Hollis, Tara; Honour, Scott M; Hood, Jim; Hubbell, Frederick Shelton; Huckabee, Mike; Huffington, Arianna; Hughes, Greg; Hulshof, Kenny; Humphrey, William; Hunt, Andrew T; Huntsman Jr, Jon M; Hutchinson, Asa; Ieyoub, Richard; Ige, David; Inslee, Jay R; Ireland, Betty; Ives, Jeanne M; Ivey, Kay; Jackson, Lloyd; Jackson, Rebecca; James, Jim; Jealous, Benjamin Todd (Ben); Jindal, Bobby; Johanns, Mike; John Henry; Johnson, Jeff R; Johnson, Jim; Johnson, Jonathan; Johnston, Michael; Jones, Christine N; Jordan, Paulette E; Jumonville Jr, J E; Justice Ii, James C; Karras, Nolan E; Kashkari, Neel; Kasich, John; Kelly, Laura J; Kelly, Molly; Kemp, Brian P; Kempthorne, Dirk; Kennedy, Cary; Kennedy, Chris; Kennedy, Christopher G; Kenney, Joseph D; Keough, Bruce; Kernan, Joseph E; Kerr, Dave; Kessler, Jeffrey V; Kessler, Melvin; Kinder, Peter; King, Gary; King,

Thomas Christopher; Kitzhaber, John; Knight, Bob; Kobach, Kris; Kohl-Riggs, Arthur Louis; Koster, Chris; Krist, Bob; Kucinich, Dennis John; Kulongoski, Ted; Labrador, Raul Rafael; Lamb, Todd Griffin; Lamont Jr, Edward Miner; Lamontagne, Ovide; Landrieu, Gary; Largent, Stephen Michael; Lawrence, Ike; Laxalt, Adam; Leach Jr, Claude A; Lee, Bill; Lee, William S; Lees, Jim; Lepage, Paul R; Levine, Philip Louis; Libby, James; Lingle, Linda; Lisman, Bruce M; Little, Brad; Livingstone Jr, Neil C; Lowe, Joe; Luckett, Bill; Lunsford, W Bruce; Lynch, Jim; Lynch, John; Lynne, Donna; Madaleno Jr, Richard Stuart; Maddox, Walter; Mahoney, Richard D; Malloy, Dannel P; Maloney, Bill; Manchin, Joe Iii; Mango, Paul David; Mannix, Kevin L; Markell, Jack A; Marshall, Robert; Martinez, Susana; Mason, Garrett Paul; Mathern, Tim; Matheson Jr, Scott M; Mcauliffe, Terry; McBride, Bill; Mccall, H Carl; Mccallum, Scott; Mccann, Sam; Mccaskill, Claire; Mcclintock, Tom; Mccord, Robert M; Mccormick, Jeffrey S; Mccoy, Beau; Mccrory, Pat; Mcginty, Katie; Mcguire, Andrea H; Mcintosh, David; Mckenna, Robert M; Mckinney, John P; McMaster, Henry; Michaud, Michael H; Miles, Jim; Miller, Eric; Mills, Janet; Milne, Scott; Minner, Ruth Ann; Minter, Susan M; Mitchell, Mahlon; Mitchell, Victor S; Mizeur, Heather; Moe, Roger D; Molinaro, Marcus; Moody, Shawn H.; Moore Ii, Richard H; Moore, Dan R; Morales, Dan; Morgan, Patricia L; Morrill, Michael; Murphy, Erin P; Murphy, Philip; Musgrove, Ronnie; Napolitano, Janet; Neely, James W; Newsom, Gavin; Nixon, Cynthia Ellen; Nixon, Jeremiah W; Noem, Kristi Lynn; Norris, John; Northam, Ralph Shearer; Nunn, Steve; Obrien, Shannon P; Obsitnik, Stephen A; Ohara, Jim; Omalley, Martin J; Orman, Gregory J; Orza Jr, Vincent F; Osterloh, Mark; Otter, C L Butch; Owens, Bill; Parnell, Sean R; Parson, Michael L; Pataki, George E; Pawlenty, Timothy J; Pearce, Stevan E; Peeler, Bob; Pell Iv, Herbert Claiborne; Pence, Mike; Pennington, David E iii; Penny, Timothy J; Pentel, Ken; Perdue, Beverly Eaves; Perdue, John D; Perriello, Thomas Stuart Price; Perry, James Richard; Peterson, Chris; Pierce, William C; Pires, Antonio J; Polis, Jared S; Pollina, Anthony; Posthumus, Richard E; Pritzker, Jay Robert; Pritzker, Jb; Protack, Michael; Putnam, Adam; Quinn, Pat; Racine, Douglas A; Rael, Lawrence; Raimondo, Gina M; Rainwater Ii, Donald G; Rauner, Bruce Vincent; Reeves, Tate; Reich, Robert; Rendell, Edward; Reno, Janet; Reynolds, Kim K; Richards, Jody; Richardson, Dennis M; Richardson, Gary L; Ricketts, John Peter; Riordan, Richard J; Rispone, Eddie; Robinson, Doug; Romney, Mitt; Ross, Alec; Ross, Mike; Rossi, Dino; Rounds, Marion Michael; Rowland, John G; Roy Asberry; Roys, Kelda Helen; Rutherford, Dan; Ryan, George H; Salango, Carlos Benjamin; Salmon, Matt; Sandoval, Brian; Sanford, Mark; Sarvis, Robert Christopher; Saxton, Ron; Schauer, Mark; Schellinger, Jim; Schrenko, Linda; Schuette, William D; Schwartz, Allyson Young; Schwartz, Daniel; Schwarzenegger, Arnold; Schweitzer, Brian; Scott, Phil; Scott, Richard L; Sebelius, Kathleen; Seifert, Marty; Selzer, Ken; Shallenburger, Tim; Shea Jr, James L; Sheheen, Vincent;

Shumlin, Peter; Siegelman, Don; Sims, Ronald C; Sisolak, Steve; Slater, Vicki Lynn Robinson; Slone, Bryan; Smith Jr, Fred J; Smith Jr, James E; Smith, Scott; Smith, Stephen Noble; Snyder, Richard Dale; Soglin, Paul R; Spence, David; Springer, Carol; Stapleton, Corey; Stapleton, Walker R; Steelman, Sarah; Stefanowski Jr, Robert V; Stemerman, David I; Stenehjem, Wayne K; Stewart, Corey Alan; Stitt, Kevin; Stollings, Ronny Douglas; Stried, Christopher Ryan; Sukup, Steve; Sununu, Christopher; Swanson, Lori; Sweet, Elizabeth Ann; Symington, Gaye; Taft, Bob; Taveras, Angel; Taylor, Mary; Taylor, Ryan M; Templeton, Catherine Brawley; Tennant, Natalie E; Thanedar, Shri; Thomas, Andrew P; Thompson, Jill Long; Thompson, Rick; Thrasher, Henry Wood; Tippetts, Mark Jay; Tippins, Clay; Tolman, Warren E; Tomblin, Earl Ray; Townsend, Kathleen Kennedy; Treadwell, Louis Mead; Trillo, Joseph A; Tripp, Bob; Trivedi, Hariprasad; Tupola, Andria P; Turilli, Lester Jr; Tyner Sr, Mitchell H; Valdez, Lupe; Vallas, Paul G; Vander Plaats, Bob; Vignarajah, Krishanti (Krish); Villaraigosa, Antonio; Vilsack, Tom; Vinroot, Richard; Vitter, David; Volinsky, Andru H; Wagner, Scott R; Walker, Bill; Walker, Scott; Wallace, Jim; Waller Jr, William L; Walz, Timothy J; Warner, Monty; Warren Jr, John S; Webber, Alan; Weinholtz, Michael; White, Robert Andrew; Whitehouse, Sheldon; Whitmer, Gretchen; Williams, David; Williams, Ron; Williams, Whitney; Willis, Marguerite Smith; Wilson, Albert; Winburn, Patrick; Winder Newton, Aimee; Windom, Stephen R; Wingate, Ken; Winn, Jennifer; Wolf, Tom; Wright Sr, Thomas E; Wrigley, Drew; York, Myrth; Zellers, Kurt; Zuckerman, David.