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Campaign Cost and Electoral Accountability*

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The increasing cost of political campaigns and its impact on the electoral process are issues of paramount importance in modern democracies. We propose a theory of electoral accountability in which candidates choose whether or not to commit to constituency service and whether or not to pay a campaign cost to advertise their platform. A higher campaign cost decreases voter welfare when partisan imbalance is low. However, when partisan imbalance is high, a higher campaign cost is associated with a higher expected level of constituency service. More costly campaigns can thus have a rebalancing effect that improves electoral accountability. We discuss the implications of our findings for campaign finance regulation and present empirical evidence consistent with our key predictions.

In February of 1912, while addressing the Ohio Constitutional Convention, Theodore Roosevelt stated: "We hold it a prime duty of the people to free our government from the control of money in politics" (1912). Over a century later, the role of money in politics is no less important, nor less debated. According to the Center for Responsive Politics, in the last four decades the cost of electoral campaigns has grown significantly faster than inflation: in the 2012 electoral cycle, candidates spent $1.5 billion in Congressional races and $1.8 billion in the presidential race, over 60 percent more than eight years before.[1]

In the 21st century, Roosevelt's view that money in politics hampers accountability is still a widely held belief. According to recent polls, more than 75 percent of Americans support limits to electoral spending.[2] Several scholars (Jacobson 1980; Abramowitz 1991; Sorauf 1992; Gross, Goidel and Shields 2002; Meirowitz 2008), however, have warned against the unintended consequences of existing regulatory solutions. Limiting the use of money in politics can have anti-competitive effects (Smith 1996; Sullivan 1998): by preventing candidates from publicizing their policy commitments, regulation can mute *cash's powerful megaphone* (Cohen 2012)—that is, money's ability to disseminate valuable political information across the electorate.

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[1] Even in countries where political advertisement is publicly funded, political spending can be significant: for example, in the 2007 French presidential run-off alone, Nicolas Sarkozy and Ségolène Royal spent a combined total of roughly 40 million euros (JORF 2008). In his subsequent reelection campaign, Sarkozy's campaign exceeded the legal maximum. This resulted in a loss of about 11 million euros in foregone subsidies for his party (the UMP).

[2] Gallup Poll. June 15–16, 2013. Available at www.pollingreport.com/politics.htm, accessed 3 November 2014.

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This paper studies how the cost of political advertising, which we refer henceforth as "campaign cost" (ignoring other costly campaign activities such as get-out-the-vote), affects electoral accountability. Using a stylized model of electoral competition, we show that the effect of campaign cost depends critically on the level of partisan imbalance (defined as the *ex ante* competiveness of the electoral race). When partisan imbalance is low—that is, *ex ante* electoral competitiveness is high—an increase in the campaign cost always reduces politicians' effort toward their constituents. In contrast, when partisan imbalance is high—that is, *ex ante* electoral competitiveness is low—an increase in the campaign cost can benefit voters. Greater campaign cost increases the incentives of the trailing candidate (i.e., the candidate who is electorally disadvantaged *ex ante*) to commit to a policy beneficial to voters. The trailing candidate is then more likely to win—this is the *rebalancing effect*—and voters more likely to obtain their preferred policy. We find empirical support for our core predictions when testing the model using data from the US House of Representatives.

Our theory of electoral accountability and campaign cost is predicated on two basic notions: (i) electoral communication has an informative role—that is, political advertising helps voters learn about candidates' platforms—and (ii) in the absence of electoral incentives, voters' and candidates' objectives are not fully aligned. Building on a long tradition in formal theory, we study a parsimonious and tractable formal model satisfying those requirements.

The model features a representative voter, who is faced with the choice between two candidates running for a political office. Each candidate can commit to a low-effort policy or to a high-effort policy. The high-effort policy is a *specific* and *verifiable* activity that, relative to the low-effort policy, is beneficial for voters but costly for the politician (because it requires, e.g., mobilizing scarce resources like influence, time, and staff, or seeking expertise across traditional party lines). The low-effort policy can be interpreted as a commitment to the candidate's party traditional platform, while the high-effort policy corresponds to a commitment to high level of constituency service.[3] Constituency service enhances a candidate's electoral prospects, but requires communication through a costly advertising campaign, which we model as a discrete choice.[4] Unlike the cost of implementing the high-effort policy, which is paid only if a candidate is elected, the campaign cost is paid independently of the electoral outcome.

Our theoretical framework is best illustrated with an example. A congressional district is eligible for federal funds for repurposing an old industrial site and revamping its local economy. Candidates can either be vague about the issue and run a campaign focused on their party's traditional platform (e.g., social justice or economic liberty), or tackle the issue by making specific, verifiable promises about exploiting the opportunity (e.g., obtaining permits or attracting public funds). The electoral success of the latter strategy crucially hinges on the candidate's ability to spend time on the campaign trail and money on advertising to publicize his commitment. Its viability depends on the size of the costs associated with fulfilling such campaign promise once in office. How does a politician's incentive to make these commitments depend on the campaign cost?

As voters get the benefit and none of the associated cost, they always would like candidates to commit to constituency service. In contrast, since commitment to the high-effort policy, in equilibrium, needs to be advertised, the presence of a positive campaign cost incurred regardless

[3] In our framework, constituency service should be understood as any non-partisan activity which imposes a cost on the politician performing it and is beneficial to voters. One example among others is appropriation of federal funds. It should be noted that our definition of constituency service is more encompassing than, for example, Cain et al. (1984).

[4] Given that we model advertising campaign as a binary choice, the campaign cost can be understood as the total cost of informing voters. It can also be interpreted as the fixed cost of political advertising.

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of the electoral outcome reduces candidates' incentives to commit to voters' preferred policy. As a consequence, voters are always better off when candidates could freely advertise their commitment. Furthermore, other things equal, a higher cost of advertising deepens the misalignment of interests between voters and politicians. Intuition thus suggests—against the idea of cash's powerful megaphone—that there should always be a negative relationship between the campaign cost and electoral accountability, as measured by commitment to constituency service.

The main theoretical contribution of this paper is to show that the above intuition is correct only when the level of partisan imbalance is low. In that case, a higher campaign cost always reduces the likelihood that the high-effort policy is implemented. When, in contrast, imbalance is high, a greater campaign cost reduces the leading candidate's incentive to commit to constituency service, as it becomes more costly to do so. As a result, the trailing candidate, who has little chance of winning the election if he chooses the low-effort policy, faces better electoral prospects when he promises a high level of constituency service. This increases his willingness to commit to the high-effort policy. Greater campaign cost then has a rebalancing effect: it improves the electoral chances of the trailing candidate.

Greater campaign cost can also improve electoral accountability. Voters benefit from the high-effort policy whenever at least one candidate commits to it. Therefore, the leading candidate's commitment to constituency service matters only when the trailing candidate does not propose the high-effort policy. As the campaign cost increases, the trailing candidate is more likely to promise high effort, thereby limiting the impact of the leading candidate's reduced commitment to constituency service. For high campaign cost, the increased probability of commitment by the trailing candidate dominates the reduced probability of commitment by the leading candidate, and voters are on average more likely to obtain their preferred policy.

The rebalancing effect of greater campaign cost has important implications for campaign finance regulation. Recent polls have shown that a majority of voters favors a publicly funded campaign finance system.[5] Our results, however, suggest that the electorate would not always benefit from subsidizing candidates' campaign cost. When partisan imbalance and the campaign cost are low, candidates always propose high level of constituency service. Any public subsidy then can only reduce voter welfare: voters would bear part of the campaign cost without changing candidates' behavior. When the campaign cost is high, a subsidy is very beneficial as it increases the likelihood one candidate commits to the high-effort policy. For intermediate levels of partisan imbalance and campaign cost, the effect is more subtle. Due to the rebalancing effect, when the campaign cost is relatively high, the trailing candidate is already very likely to promise constituency service so the cost of subsidizing campaigns tends to outweigh the benefit. When the campaign cost is relatively low, the leading candidate is likely to propose the high-effort policy, but the cost of incentivizing more effort is low so the benefit of a subsidy tends to outweigh its cost. Voters, however, may be better off taxing campaign expenditures to increase the campaign cost and benefit fully from the rebalancing effect at no cost.

Our theory generates novel and clear testable predictions regarding the relationship between politicians' effort to secure benefits for their constituents, campaign cost, and partisan imbalance. Following established practices in the empirical literature on political accountability (Ansolabehere et al. 2003; Strömberg 2004; Albouy 2009; Berry et al. 2010; Snyder and Strömberg 2010), we provide a first assessment of our theory using data from the US House

[5] See, for example, Gallup Poll. June 15–16, 2013. Available at www.pollingreport.com/politics.htm, accessed 3 November 2014.

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of Representatives. In particular, we study the relationship between the per-unit price of political advertising (our proxy for the cost of informing voters) and district-level discretionary federal outlays (our proxy for constituency service) as a function of the difference in presidential candidates' vote shares (our proxy for partisan imbalance). While federal outlays are an imperfect measure of a representative's effort, the amount of resources expended by legislators to communicate such accomplishments to their constituents points to the importance of this type of activities (Druckman et al. 2009; Grimmer et al. 2012; Grimmer 2013a; Grimmer 2013b).

We find evidence in favor of our theory. When the level of partisan imbalance is low, more expensive political advertising is associated with lower federal discretionary spending. As partisan imbalance increases, however, the statistical association becomes weaker, and its sign eventually switches. In the top quartile of partisanship, an increase in the price of political advertising is associated with *higher* federal discretionary spending. This relationship is robust to the inclusion of key determinants of federal spending (e.g., seniority and committee assignment), as well as alternative specifications of the main variables of interest. We also provide suggestive evidence consistent with the proposed mechanism. Controlling for the level of imbalance, the marginal effect of greater campaign cost on constituency service is larger and more likely to be positive for "trailing" candidates (i.e., candidates from the relatively less popular party in the district) than for "leading" candidates (i.e., candidates from the relatively more popular party). These differences, however, are not statistically different at conventional level.

We conclude this introduction by connecting our work to the most closely related literature. A long tradition in formal theory studies how electoral incentives and partisan imbalance influence politicians' behavior (Downs 1957; Wittman 1983; Calvert 1985; Persson and Tabellini 2000; Groseclose 2001; Aragonès and Palfrey 2002; Ashworth and Bueno de Mesquita 2006; Aragonès and Xefteris 2012). We depart from this literature by assuming that political communication is costly. Although we are not the first to introduce this assumption (Austen-Smith 1987; Grossman and Helpman 1996; Prat 2002; Bailey 2004; Coate 2004; Ashworth 2006; Meirowitz 2008), there are important differences between the existing literature and this paper.

First, the cost of electoral campaigns is usually assumed to be borne by Special Interest Groups (SIGs) in exchange for political favors. Motivated by the idea that candidates, and not donors, choose the allocation of their electoral funds (and face the associated opportunity costs), and in light of the empirical evidence that direct campaign contributions *per se* do not affect policy stances (Ansolabehere et al. 2003), we assume that communicating with voters imposes a cost on candidates themselves.[6] In addition to its empirical foundations, this approach has substantive theoretical implications.[7]

Second, the existing literature on costly campaigns focuses on adverse selection and/or ideological differentiation among candidates. In the present work we instead focus on constituency service, building on empirical evidence that the benefits received by districts (Druckman et al. 2009) and politicians' activism (Egan 2014) play an important role in candidates' communication strategies and electoral appeal. While we do not deny the importance of

[6] Even when the campaign cost is financed by SIGs, fund raising should still represent an important source of opportunity cost for a candidate (Daley and Snowberg 2009).

[7] The traditional model of election, featuring commitment and costless communication, can be thought as a first-price auction, where policy commitments play the role of bids. In our model, due to the introduction of campaign costs, electoral competition is more similar to an auction with participation costs (Samuelson 1985; McAfee and McMillan 1987).

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ideology in determining political outcomes, this paper shows how focusing on common value attributes leads to novel—and equally important—implications for campaign finance regulation.

The rest of the paper is organized as follows. First section describes our model of electoral accountability. Second section studies the effect of changes in campaign costs on the model's key observables as well as on voter welfare. Third section discusses the model's implication for campaign finance regulation. Fourth section presents a first empirical assessment of our theory's key implications. Fifth section concludes.

A MODEL OF ELECTORAL ACCOUNTABILITY

We consider a one-period model with two candidates and one representative voter (for which we reserve the pronoun "she"). Candidates (labeled L and R) compete for an elected office, which they value. Each candidate $j \in \{R, L\}$ can either commit to a low-effort policy ($p_j = 0$), or to a high-effort policy ($p_j = 1$). Relative to a low-effort policy, the high-effort policy benefits the voter and entails an implementation cost ($k > 0$) for the politician. This simple dichotomy captures the misalignment of incentives between politicians and voters when it comes to the provision of constituency service versus other activities (such as the pursuit of partisan goals, or undertakings associated with private returns for politicians). Electoral accountability in our setting is thus measured by commitment to the high-effort policy.

The voter learns a candidate's policy platform (p_j) if and only if the candidate actively advertises it ($y_j = 1, j \in \{L, R\}$). While this assumption can be weakened (see Appendix B2), it allows us to focus on the informative role of political advertising in its starkest form. Communicating his platform ($y_j = 1$) is costly for a candidate (with symmetric cost $c > 0$), as it requires time and effort on the campaign trail as well as spending on political advertising.

The voter's payoff is normalized to 0 and 1 when the elected politician implements the low-effort and high-effort policy, respectively. The voter's utility also depends on partisan shocks $\{\varepsilon_R, \varepsilon_L\}$, revealed to the voter before the election, but after candidates' platform and communication choices. The partisan shocks capture the voter's evaluation of candidates' party label.[8] The shocks ε_j are drawn from two (common knowledge) cumulative distribution functions with support $[0, \overline{\epsilon}], j \in \{L, R\}$. Let $\Pi_j = \Pr(\epsilon_j \geq \epsilon_{-j})$. Without loss of generality, we assume that $\Pi_R \in [1/2, 1)$.[9] The difference between Π_R and Π_L captures the level of *partisan imbalance* in favor of the right-wing candidate, to whom we then refer as the *leading candidate* (L is thus the trailing candidate). To simplify the derivation of the results, we also assume that the value of the partisan shocks cannot be too large: $\overline{\epsilon} < 1$. The voter's utility, as a function of the elected candidate $e \in \{R, L\}$, is

$$u_v(e) = p_e + \epsilon_e. \tag{1}$$

Candidates care about holding office.[10] If candidate j is elected and implements the low-effort policy, he enjoys a payoff normalized to 1. Such payoff is reduced by an amount $k > 0$ if the elected politician chooses the high-effort policy $p = 1$. We normalize the value of being out of

[8] To adhere to the empirical tests that follow, we refer to (ε_L, ε_R) as partisan shocks. More generally, these shocks capture valence components that are exogenous with respect to the electoral race. Technically, the preference shocks eliminate equilibria that rely on peculiar belief structures associated with voter's indifference.

[9] For simplicity, the distribution of partisan shocks constitute the only source of imbalance among candidates ($\Pi_R \geq \Pi_L$). However, the model's predictions would be very similar if we were also to assume asymmetries in the cost of raising funds ($c_R < c_L$).

[10] All the results in this paper are robust to the introduction of policy motivation in candidates' preferences as long as this weight is not too large. Especially, our main result (the rebalancing effect) is stronger when politicians are partially policy motivated (see Appendix B1 for more details).

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office to 0. After choosing their platform, candidates choose whether to advertise it (at the incremental cost $c > 0$) or not. Candidate j's payoff is then given by

$$u_j(p_i, y_i) = I_{\{e=j\}}(1-kp_j)-cy_j. \quad (2)$$

The policy cost k captures three possible aspects of an elected official's job: (i) time and resources for constituency service (e.g., in the example developed in the introduction, time to secure subsidies, and attract private investors), (ii) the political capital required to build consensus and overcome veto players (Hall and Deardorff 2006), and (iii) the opportunity cost of pursuing committee assignments linked to constituency interests (rather than their more suitable or desirable ones—for a ranking of committees, see Groseclose and Stewart 1998; Stewart and Groseclose 1999; Stewart 2011).

The timing of the game is as follows:

1. Candidates choose a platform: low-effort ($p_j = 0$) or high-effort ($p_j = 1$) policy.
2. Candidates choose whether or not to advertise their platform: $y_j \in \{0, 1\}$.
3. For each of the two candidates, the voter observes p_j if and only if $y_j = 1$.
4. The voter observes the realization of the partisan shocks (ε_L, ε_R).
5. The voter elects one of the two candidates, that is, $e \in \{L, R\}$.
6. The elected candidate implements p_e, payoffs are realized.

In this model, candidates commit to the policy platform they choose.[11] We believe that, in this context, the commitment assumption can be justified on empirical grounds: campaign promises have strong predictive power on future behavior in the legislature (Sulkin 2009), especially on relatively more "common value" issues such as attracting new job-creating industries (Ringquist and Dasse 2004), even when these positions are implicitly embedded in highly symbolic campaign images (Sulkin and Swigger 2008). A direct (and technically convenient) implication of this assumption is that communication can only affect a candidate's chance of being elected. It does not change his payoff once elected.

Our equilibrium concept is perfect Bayesian equilibrium, with the additional restriction of excluding weakly dominated strategies. When multiple equilibria arise, we select the one associated with the highest payoff to the voter. In what follows, the term "equilibrium" refers to this class of equilibria.

Before proceeding to the analysis, we remark that due to the costs associated with the high-effort policy, a candidate commits to $p = 1$ only if he has sufficient electoral incentives to do so. To make electoral accountability at least theoretically possible, we assume throughout that the implementing cost (k) and the campaign cost (c) are not too high compared with the benefit from office: $c < 1 - k$.

CAMPAIGN COSTS AND ELECTORAL ACCOUNTABILITY

We first study candidates' advertising choice. Our model predicts a strong correlation between commitment to the high-effort policy and political advertising: a candidate pays the campaign cost if and only if he commits to $p = 1$.[12] Candidates thus face a double cost of committing to

[11] In particular, we assume that a candidate still implements his platform when he does not communicate with the voter. Removing this assumption does not change any of the results. The critical assumption is that the voter, when hearing (respectively, not hearing) a candidate's policy stance rationally expects the candidate to act on his promise (respectively, on what she though he initially committed to).

[12] This strong correlation is a consequence of our assumption that political advertising is a discrete choice. The main implication that candidates communicate more when they commit to a policy the voter values would

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TABLE 1 *The Electoral Game Induced by the Voter's Behavior*

*L**R*	$p = 0$	$p = 1$
$p = 0$	Π_L, Π_R	$0, 1-k-c$
$p = 1$	$1-k-c, 0$	$\Pi_L(1-k)-c, \Pi_R(1-k)-c$

the high-effort policy: the cost of implementing it (borne only if elected) and the cost of advertising this commitment to the voter (borne regardless of the electoral outcome).

LEMMA 1: *A candidate* $j \in \{L, R\}$ *pays the communication cost* ($y_j = 1$) *if and only if he commits to the high-effort policy* ($p_j = 1$).

The intuition behind Lemma 1 is clear. A politician incurs the implementation cost k only if he commits to the high-effort policy. Hence, the low-effort policy can be understood as a candidate's default option: he has no incentive to pay a cost to reveal that he proposes the low-effort policy. But this implies that, when choosing the high-effort policy, a candidate must advertise his platform.

A direct implication of Lemma 1 is that each candidate has effectively two feasible strategies: high-effort policy with a costly advertising campaign or low-effort policy without advertising campaign. When candidates commit to the same strategy, the voter's electoral decision is driven by the partisan shocks (i.e., vote for R when $\varepsilon_R > \varepsilon_L$ and vice versa—we can ignore draws which are 0 probability event). When candidates choose different policies, the voter always elects the candidate who proposes the high-effort policy due to our assumptions that the shocks are not too large. Table 1 represents the strategic interaction between the two candidates, and Proposition 1 describes the equilibrium of this electoral game.

PROPOSITION 1: *Let* $k^* := 1-\frac{\Pi_L}{\Pi_R}$. *In equilibrium*,

(i) If $k \geq k^*$, both candidates commit to the high-effort policy ($p_j = 1$, $y_j = 1$) if $c \leq (1-k)\Pi_L$, and to the low-effort policy ($p_j = 0$, $y_j = 0$) otherwise.

(ii) If $k < k^*$, both candidates commit to the high-effort policy if $c \leq (1-k)\Pi_L$ and choose the low-effort policy if $c > \Pi_R - k$. When, instead, $c \in ((1-k)\Pi_L, \Pi_R - k]$, candidate j commits to the high-effort policy with probability α_j, where

$$\alpha_L := \frac{k+c-\Pi_L}{\Pi_R-\Pi_L(1-k)}; \quad \alpha_R := \frac{1-k-c-\Pi_L}{(1-k)\Pi_R-\Pi_L}. \tag{3}$$

As pointed out above, a candidate commits to the high-effort policy if and only if the electoral reward is greater than the combined implementation (k) and campaign (c) costs. When these costs are very small, committing to the high-effort policy is a strictly dominant strategy for both candidates. Conversely, when these costs are very large, committing to the high-effort policy is a strictly dominated strategy for both candidates. The case of intermediate costs is more subtle. First, it is important to notice that the leading candidate R has an incentive to choose the same policy as L to take advantage of the favorable partisan shock. L, on the other hand, would prefer distinguishing himself from R (either to gain electorally or to avoid the costs

(F'note continued)

hold in a more general model where candidates' advertising expenditures are a continuous variable (for a model along these lines, see Prato and Wolton 2015).

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of high effort with little electoral reward). This "hide-and-seek" game implies that the equilibrium can only be in mixed strategies.[13]

The mixed strategy equilibrium can only arise when candidate R has a strong incentive to imitate L; that is, when partisan imbalance is sufficiently high. The range of the (c, k) space associated with a mixed strategy equilibrium thus depends on the degree of partisan imbalance: as Π_R approaches 1/2, the support of the mixed strategy equilibrium converges to the empty set. Conversely, as Π_R approaches 1, the area defined by $c \in ((1-k)\Pi_L, \Pi_R - k]$ approaches the whole parameter space.

Having characterized the equilibrium, we now discuss how candidates' behaviors are affected by the campaign cost c. When the equilibrium is in pure strategies, an increase in the campaign cost can only decrease candidates' probability of committing to the high-effort policy. The reason is that the opportunity cost of committing to the high-effort policy increases, while the associated electoral reward remains unchanged. Consequently, voter welfare cannot be improved from $c = 0$. When the equilibrium is in mixed strategies, the relationship between campaign cost and candidates' incentives to commit to the high-effort policy depends on their *ex ante* electoral standing: the leading candidate R's probability of commitment to high effort decreases with c, while it increases for the trailing candidate L.

COROLLARY 1:

(i) The voter welfare is maximized when $c = 0$.
(ii) When the equilibrium is in mixed strategies, $\partial\alpha_L/\partial c > 0$ and $\partial\alpha_R/\partial c < 0$.

In a mixed strategy equilibrium (when imbalance is large enough), the two candidates' decisions to commit to $p = 1$ are affected by fundamentally different forces. The leading candidate R has an incentive to choose the high-effort policy only when the trailing candidate L chooses high effort with sufficiently large probability. In that case, choosing low effort is likely to result in a defeat, while matching the L's platform allows him to exploit the favorable partisan shock. Conversely, the trailing candidate, who gains from distinguishing himself from the leading candidate, has a stronger incentive to choose high effort when his opponent chooses *low effort* with sufficiently large probability. As the campaign cost increases, equilibrium requires that the incentive to choose the high-effort policy increases for both candidates. For that to happen, it must be that the trailing candidate' probability of choosing $p = 1$ increases *and* that the leading candidate's decreases. As a result, the overall probability that the trailing candidate wins the election increases with the campaign cost. This is the *rebalancing effect.*

What are the implications of the rebalancing effect for electoral accountability and voter welfare? When partisan imbalance is low, a greater campaign cost can only lower the probability that candidates commit to high effort and, therefore, can only reduce voter welfare. When partisan imbalance is large and the equilibrium is in mixed strategies, greater campaign cost affects L and R's strategies in opposite directions, so the effect of higher c at first seems ambiguous. But it is important to notice that the voter benefits from the high-effort policy whenever *at least one* candidate commits to $p = 1$. So R's commitment to high effort matters only if the trailing candidate L *does not* promise the high-effort policy. For campaign cost close to $(1-k)\Pi_L$, candidate L does not commit to $p = 1$ with high probability so any reduction in R's probability to commit to the high-effort policy decreases electoral accountability. For campaign cost close to $\Pi_R - k$, candidate L commits to $p = 1$ with high probability so a reduction in R's probability to commit to the high-effort policy has little effect.

[13] A similar phenomenon occurs in Bhattacharya's (2014) adverse selection model where information about candidates' quality can only be revealed to voters when candidates use different messages.

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As L's probability to commit to $p = 1$ increases with c, greater campaign cost improves electoral accountability for sufficiently large c (i.e., $c \in \left[\frac{1-k}{2}, \Pi_R - k\right)$).[14]

Better electoral accountability then translates into higher voter welfare whenever the size of the partisan shocks is not too large.[15] This last condition ensures that the gain from obtaining the high-effort policy with greater probability dominates the loss in term of partisan shock from electing the trailing candidate L with higher probability.

PROPOSITION 2:

(i) An increase in the campaign cost strictly increases the probability that the high-effort policy is implemented if and only if $c \in ((1-k)/2, \Pi_R - k)$ and $k < 1 - 2\Pi_L$, and weakly decreases it otherwise.

(ii) There exists $\hat{\epsilon} > 0$ such that for all $\overline{\epsilon} < \hat{\epsilon}$, there exists $\underline{c}(\overline{\epsilon}) \in ((1-k)/2, \Pi_R - k)$ such an increase in the campaign cost increases the voter welfare if and only if $c \in (\underline{c}(\overline{\epsilon}), \Pi_R - k)$ and $k < 1 - 2\Pi_L$.

To summarize, our results show that an increase in the campaign cost (i) can only hurt the voter when partisan imbalance is low, but (ii) can also improve accountability when partisan imbalance is high, due to the rebalancing effect of higher c. To our knowledge, this result provides novel and qualified formalization of the notion of cash as a "powerful megaphone." It is important to stress that these results do not rely on equilibrium selection: in the relevant range ($c \in ((1-k)\Pi_L, \Pi_R - k]$), the mixed strategy equilibrium that we consider is the unique equilibrium.

IMPLICATIONS FOR CAMPAIGN FINANCE REGULATION

After having studied how exogenous changes in the campaign cost affect platforms and accountability, it seems natural to study the model's implication for campaign finance regulation. Specifically, we characterize the optimal subsidy when, for a given c (determined by market forces in the media markets included in candidates' district), the voter pays directly a portion $s \in [0, c]$ of a candidate's advertising cost, while leaving $c - s$ to the candidate's own fund-raising efforts.

To study the most favorable setting for campaign finance regulation, we assume that the subsidy enters linearly in the voter's utility (i.e., there is no deadweight loss of taxation). Under this assumption, her objective function becomes $p_e + \varepsilon_e - s(y_L + y_R)$. To simplify the analysis and focus on the effect of campaign cost, we also assume (without significant loss of generality) that (i) k is arbitrarily close to 0 and (ii) the partisan shocks are perfectly negatively correlated and have binary support $(\epsilon_R, \epsilon_L) \in \{(\overline{\epsilon}, 0), (0, \overline{\epsilon})\}$.[16] The voter's *ex ante* expected utility as a function of the subsidy s can be written as

$$W(s) = \overline{\epsilon} + \alpha_R(1 - \overline{\epsilon}\Pi_L) + \alpha_L(1 - \overline{\epsilon}\Pi_R) - \alpha_R\alpha_L(1 - \overline{\epsilon}) - s(\alpha_L + \alpha_R). \quad (4)$$

[14] More formally, the probability that at least one candidate proposes the high-effort policy is $\Pr(p_e = 1) = \alpha_R + \alpha_L - \alpha_R\alpha_L$. As α_L and α_R are linear in c, $\Pr(p_e = 1)$ is convex. Therefore, $\Pr(p_e = 1)$ increases if and only if greater c leads to a more *asymmetric* strategy profile (which happens if and only if $c > (1-k)/(2)$). More asymmetry in the probability of choosing high effort improves the efficiency of the overall outcome: the chances that neither candidate chooses high effort are lower.

[15] This is only a sufficient condition, a stronger condition is available upon request.

[16] Adding a positive implementation cost would change the thresholds determined below, but would not affect the reasoning as long as $\overline{\epsilon}$ is sufficiently low and $k < 1 - 2\Pi_L$ so the rebalancing effect can be welfare improving. The second point allows us to ignore problems associated with conditional expectations that significantly complicate the analysis without adding substantive insights on the issue of campaign finance regulation.

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When c is already low enough so that both candidates already commit to high effort with probability 1 (in this simplified environment, when $c < \Pi_L$), any positive subsidy would simply transfer utility from the voter to the candidates without affecting their behavior. When, instead, the cost is large enough, the voter might gain from a positive subsidy. However, as Proposition 3 shows, the optimal subsidy (for the voter) is not always positive.

PROPOSITION 3: *Let* $\tilde{c} = \Pi_R - (\Pi_R - \Pi_L)^2$. *The voter's optimal campaign subsidy is*

$$s^*(c) = \begin{cases} 0 & c \leq \Pi_L \\ c - \Pi_L & c \in (\Pi_L, \tilde{c}] \\ 0 & c \in (\tilde{c}, \Pi_R] \\ c - \Pi_R & c \in (\Pi_R, 1] \end{cases}.$$

The voter obtains the high-effort policy whenever at least one candidate proposes it. As the voter must subsidize any candidate who engages in costly political advertising, when $c > \Pi_L$, the best scenario for the voter is that one candidate commits to high effort with probability 1, whereas the other does so with probability 0.

This optimal scenario arises in two cases. First, when the campaign cost faced by candidates is Π_R (i.e., $c - s = \Pi_R$), so that the rebalancing effect is strongest and the trailing candidate chooses high effort with probability 1. Second, when the campaign cost faced by candidates is Π_L, so that the rebalancing effect is weakest and the leading candidate chooses high effort with probability 1. Whenever the initial campaign cost satisfies $c > \Pi_R$, both $c - \Pi_L$ and $c - \Pi_R$ result in the same expected policy payoff, and the voter has a strict preference for the lowest of the two subsidies, $c - \Pi_R$.[17]

When the initial cost is below Π_R, the rebalancing effect cannot be fully exploited. However, the trailing candidate L chooses the high-effort policy with high probability whenever c is close enough to Π_R, while the subsidy $c - \Pi_L$ required to induce the advantaged candidate to choose high effort with probability 1 is very large. As a result, a campaign subsidy can only reduce voter welfare and the voter prefers 0 subsidy. When c is close to Π_L, the gain from inducing greater effort by the leading candidate outweighs the cost, and the optimal subsidy is again positive.

Interestingly, our theory suggests that the voter would always prefer a tax on campaign spending rather than a subsidy for relatively large c. By raising the campaign cost by an amount $\Pi_R - c$, the voter can take full advantage of the rebalancing effect (the probability of getting the high-effort policy increases) without using public resources. This negative subsidy is effectively a form of Pigouvian taxation: the voter would be better off even if she did not enjoy any direct benefit from the associated tax revenues.

COROLLARY 2: *There exists* $c^t \in (\Pi_L, \Pi_R)$ *such that for all* $c \in (c^t, \Pi_R)$, *a tax* $t = \Pi_R - c$ *on campaign spending is optimal for the voter even if she does not enjoy the proceeds from it.*

In our model, reducing the campaign cost improves the voter welfare because it increases the probability the voter's preferred policy is implemented. As such, our theoretical framework develops an argument in favor of campaign finance even in the absence of SIGs exchanging

[17] This entails a loss in term of partisan shock ($\Pi_L \bar{\varepsilon}$ instead of $\Pi_R \bar{\varepsilon}$), but this loss is always lower than the gain in term of lower subsidy.

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contributions for political favors (as in Prat 2002; Coate 2004; Ashworth 2005). To the best of our knowledge, the logic behind our results is novel. Our theoretical framework, however, also points out to the difficulty to design an optimal campaign finance reform: the welfare-maximizing subsidy (for the voter) depends critically on the current campaign cost and, under some condition, takes the form of a tax.

TESTABLE IMPLICATIONS AND EMPIRICAL EVIDENCE

We now return to the positive implications of our model of electoral competition. Our theory predicts that the probability that the elected representative implements the high-effort policy should be as follows:

- negatively correlated with the campaign cost for low levels of partisan imbalance;
- positively correlated with the campaign cost for high levels of partisan imbalance;
- negatively correlated with the degree of partisan imbalance, holding constant the campaign cost.

In this section, we combine existing data sources from the US House of Representatives to present a *prima facie* cross-sectional empirical assessment of our theory. To perform this exercise, we need to find adequate empirical analogues for our three key variables: candidates' effort, campaign cost, and partisan imbalance.

Drawing on a large body of research on the determinants of distributive politics in the United States (De Figueredo et al. 2003; Stromberg 2004; Albouy 2009; Berry et al. 2010; Snyder and Strömberg 2010), our proxy for a congressman's effort is the amount of discretionary federal spending received by his home district (precisely, high variation non-defense federal outlays for the fiscal years 2006 and 2007).[18] It is indisputable that securing federal outlays captures only one dimension of electoral accountability. Furthermore, other political actors can influence the allocations of those funds (Berry et al. 2010). Nonetheless, we believe that this approach has important advantages over alternative measures.

Theoretically, securing federal funds captures important aspects of our notion of high-effort policy. First, it is a relatively non-partisan activity for which the attribution of credit is simpler than other accomplishments (e.g., drafting legislation, or assembling a coalition supporting it), as witnessed by the fact that legislators from both parties heavily advertise these achievements (Druckman et al. 2009; Grimmer et al. 2012; Grimmer 2013a; Grimmer 2013b). Second, there is robust evidence that voters tend to electorally reward these activities (Levitt and Snyder 1997). Third, securing federal funds is a source of opportunity cost for politicians and is correlated with other forms of constituency service. Snyder and Strömberg (2010) document how representatives who are relatively more sheltered from electoral pressures due to exogenously low levels of media coverage are less likely to serve in committees representing their constituents' interests, less likely to vote against their party, and less successful at securing federal funds (while they spend more time pursuing their broad political goals).

Empirically, federal outlays are easily measurable and display a large cross-sectional variance (a great virtue, given the limited availability of data on advertising cost). Moreover, as looking at federal outlays is a very common approach in the literature, our investigation can be guided by established practices and informed by clear benchmarks.

In line with existing literature, we measure partisan imbalance by the absolute distance in the vote share of the two presidential candidates in 2004.[19]

[18] See Berry et al. (2010, 788) for a precise definition and description of this variable.
[19] Source: the Swing State Project. Data available at http://www.swingstateproject.com/diary/4161/

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For the campaign cost, we use data from the Wisconsin Advertising Project (Goldstein and Rivlin 2007), which includes information on the number, length, and price of a large number of political TV ads aired during the 2004 congressional, gubernatorial, and presidential campaigns. Specifically, we approximate the campaign cost with the per-unit price of political advertising (30-second spot). It is important to point out that this variable captures only part of the cost of informing voters, which is determined by prices (taken as given) as well as quantities of ads necessary for a candidate's message to reach the electorate (which depends on district characteristics). This is clearly a limitation of our empirical exercise.[20] However, we do not believe this limitation is too severe as (i) using per-unit average prices allows us to focus on an exogenous variable (not candidates' strategic decisions), and (ii) total advertising expenditures are positively correlated with the per-unit cost of ads (see Evidence on the Mechanism section, where we also perform our analysis with total expenditures as a robustness check). Using per-unit price of ads also has some advantages. Indeed, we observe a candidate's advertising expenditures only when he chooses to advertise. But our core comparative statics rely on all candidates, whether or not they advertise. With the per-unit price of ad, we approximate the campaign cost faced by candidates who chose not to advertise.

Due to data availability, our analysis is limited to the 109th Congress.[21] Drawing on our theory (and in line with the existing literature), we estimate the following model:

$$y_{is} = \beta_0 + \beta_1 c_{is} + \beta_3 \pi_{is} + \delta \pi_{is} \times c_{is} + X_{is}^{'} \beta_4 + \gamma_s + u_i.$$

In our baseline specification, y_{is} is the log of total federal outlays from "high variation programs" awarded to congressional district i in State s. This variable, described in detail in Berry et al. (2010), captures the amount of discretionary spending received by each district. c_{is} measures the average price of a 30-second political ad for the 2004 electoral campaign in district i. It is constructed from a population-weighted average of the mean cost in each media market contained in district i. π_{is} is the partisan imbalance in district i. X_{is} is a vector of congressman-specific and district-specific controls: information on party, seniority status, membership and chairmanship of various committees, membership of party leadership from Berry et al. (2010), and on median income, population, shares of urban and minority population from the 2005 American Community Survey. γ_s is a state fixed effects. Table 3 displays summary statistics for the main variables employed in our analysis. We restrict our baseline specification to the 295 congressional districts for which the available measure of ad cost covers at least 90 percent of the district population.

Table 4 reports the estimated coefficients from our baseline specification. Columns 1–4 show that partisan imbalance is not statistically associated with the level of federal outlays without the inclusion of the interaction term. Once the data are organized according to our theory, the coefficient of partisan imbalance and advertising cost are indeed negative and statistically significant, *and* the interaction term is positive and statistically significant (all three results are robust to the inclusion of district and congressman-specific covariates, as well as state fixed effects, as shown in columns 5 and 6).

Figure 1 displays the marginal effect of ad cost on federal outlays (and its 95 percent confidence interval) implied by column (4) of Table 4. Consistent with our theory, the marginal

[20] In addition, the quantity of ads could also be affected by candidates' strategic considerations. This would introduce omitted variable biases, which would likely affect our estimates. Unfortunately, data availability makes it very hard to tackle this important issue.

[21] Our main constraints are the availability of data on political ads and the redistricting after the 2000 Census. See Table 2 and Appendix C for detailed information on the source of each variable.

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TABLE 2 *Description of Variables*

Variables	Source	Description
Outlays	Berry et al. (2010)	Log of combined discretionary federal spending (see Berry et al. 2010, for details and classifications of different items) over the 2006 and 2007 fiscal years
Ad cost	WiscAds	Log of the average TV ad cost during the 2004 congressional campaign. When congressional district d spans multiple media markets, we use information on zipcodes to construct a weighted average as follows: $\sum_{z \in d} pop_z cost_{m(z)}/pop_d$, where $m(z)$ is the media market to which zipcode z belongs to and pop_z the total population in zipcode z
Imbalance	Swing State Project	Log of $(1 + margin)$, where *margin* is the absolute value of the difference between the Democratic and Republican presidential candidates in the 2004 election
Median income	2005 ACS	Log of district median household income
Population	2005 ACS	Log of district population
Minority	2005 ACS	Percentage of population belonging to a minority
Urban population	2010 Census	Percentage of the population living in an urban area
Party	Berry et al. (2010)	Dummy equal to one if the district's representative belongs to (or caucuses with) the Republican party
Leader	Berry et al. (2010)	Dummy equal to one if the district's representative is a party leader
Freshman	Berry et al. (2010)	Dummy equal to one if the district's representative is in his/her first term
Chair	Berry et al. (2010)	Dummy equal to one if the district's representative is chair in a committee
Ranking member	Berry et al. (2010)	Dummy equal to one if the district's representative is a ranking member of a committee
Committee membership	Berry et al. (2010)	Set of dummies, each equal to one if congressman belongs to Committee X, which is one of the House's Standing Committees: Appropriations, Agriculture, Armed Services, Banking, Budget, Education and Workforce, Energy and Commerce, Government Reform, Homeland Security, House Administration, International Relations, Judiciary, Resources, Rules, Science, Small Business, Standards of Official Conduct, Transportation, Veterans' Affairs, Ways and Means

Note: ACS = American Community Survey.

TABLE 3 *Summary Statistics*

	Mean	SD	Unique observations
Federal outlays (millions of USD)	824	1470	435
Ad cost (USD/30 seconds)	1026	633	346
Imbalance (absolute %)	23.16	16.83	435
Median income (ACS) (USD)	49,255	13,069	435
Population (ACS)	66,1754	53,792	435
% Population minority (ACS)	0.254	0.182	435
% Urban population	0.799	0.187	435

Note: ACS = American Community Survey.

TABLE 4 *Federal Outlays, Campaign Costs, and Partisan Imbalance*

	(1)	(2)	(3)	(4)	(5)	(6)
Ad cost	−0.456**		−0.456**	−2.474***	−2.433***	−2.714***
	(−2.53)		(−2.52)	(−5.61)	(−3.99)	(−3.46)
Imbalance		−0.001	0.007	−4.725***	−4.346***	−4.725***
		(−0.01)	(0.05)	(−4.09)	(−3.23)	(−2.78)
Imbalance × ad cost				0.687***	0.624***	0.673***
				(4.30)	(3.32)	(2.78)
Congressman and district covariates					✓	✓
State FE						✓
Observations	295	295	295	295	295	295

Note: Congressman and District covariates include median income, population, minority, urban population, party dummy, leadership dummy, freshman dummy, chair dummies, ranking dummies, and committee membership dummies. *t*-Statistics in parentheses (standard errors clustered at state level).
FE = fixed effects.
*, **, *** Significant at 10%, 5%, 1%, respectively.

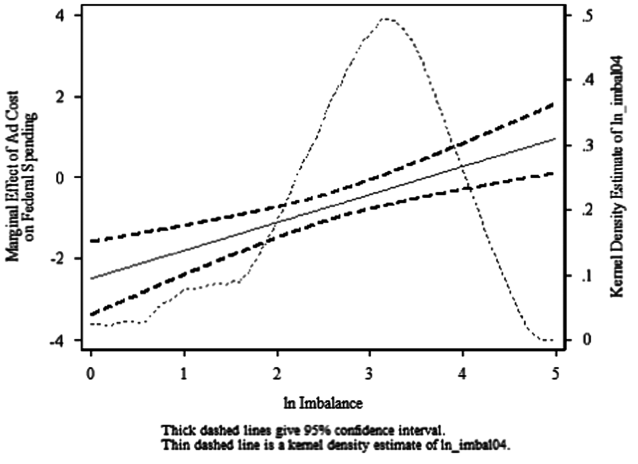


Fig. 1. Marginal effect of ad cost

effect is negative for low levels of partisanship and positive for high levels of partisanship, as illustrated by Figure 2, which displays the linear prediction of federal outlays as a function of ad cost for various percentiles of partisan imbalance.

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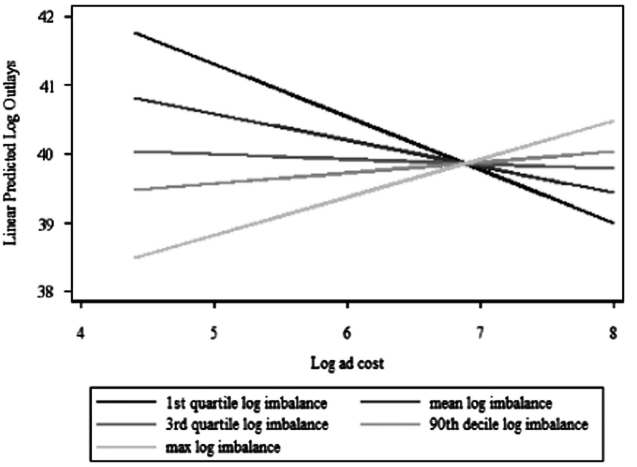


Fig. 2. Predicted value of federal outlays, by percentile of partisan imbalance

Evidence on the Mechanism

Our theory also has implications regarding the *source* of the joint effect of imbalance and campaign cost on accountability. In particular, under the assumptions of Proposition 2, an increase in the campaign cost should result in (i) higher constituency service (conditional on being elected) from the trailing candidate and (ii) lower constituency service (conditional on being elected) from the leading candidate.[22]

To look for evidence of these differential effects, we create a dummy variable, *Trailing*, which equals 1 in districts where the representative comes from a different party than the presidential candidate who received the most votes in either of the two previous presidential elections.[23] Our theory predicts that

- the marginal effect of ad cost on constituency service should always be negative in the sub-sample of leading candidates (i.e., for all levels of imbalance);
- compared with the baseline estimates, the threshold level of imbalance above which the effect of ad cost is positive should be lower in the sub-sample of trailing candidates.

Figures 3(a) and 3(b) (as well as Table 5) show that the estimated marginal effects are larger for trailing than for leading candidates.[24] Specifically, in the sub-sample of trailing candidates, the (point estimate of the) marginal effect is positive for values of imbalance slightly above the median level in the overall population. In contrast, in the sub-sample of leading candidates, the (point estimate of the) marginal effect is positive only above the 88th percentile of imbalance.

[22] While it is immediate to verify these claims for the unconditional probability of committing to constituency service, in the data we only observe constituency service conditional on an electoral victory. However, the probabilities of commitment to high-effort conditional on winning exhibit similar relationships with respect to c as α_L and α_R. Details available upon request.

[23] The results are quantitatively the same if we use only the 2004 presidential election. The number of observations for trailing candidates shrink to 43, however, which is why we use both 2000 and 2004 presidential elections.

[24] Due to the small number of observations, there is not enough power to condition on state fixed effects or the full set of 25 congressman-specific covariates in Table 5. Instead, we run one regression controlling for party and leadership positions and another regression controlling for committee membership. Due to sample size issue, we also use a more generous cut-off for the measurement of ad cost (75 percent of the population covered).

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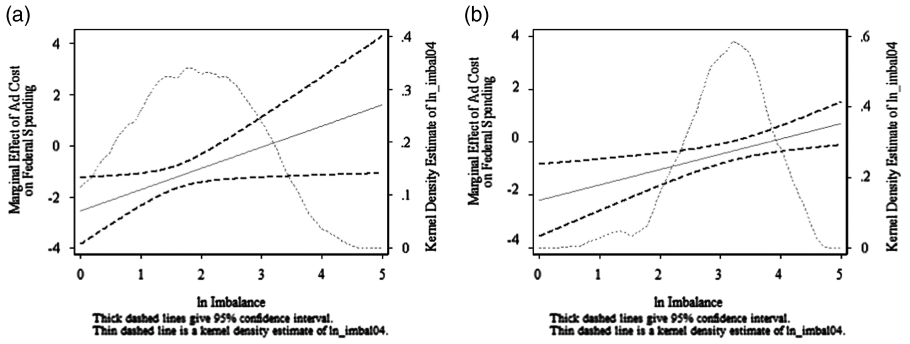


Fig. 3. Marginal effect of cost for (a) trailing candidates and (b) leading candidates

TABLE 5 *Separating Trailing and Leading Candidates*

	Leading			Trailing		
Samples	(1)	(2)	(3)	(4)	(5)	(6)
Ad cost	−2.190***	−2.008**	−2.470***	−2.536***	−2.323**	−1.788***
	(−3.28)	(−2.47)	(−2.76)	(−4.03)	(−2.75)	(−2.78)
Imbalance	−3.931***	−3.116*	−4.239**	−5.552**	−6.259**	−4.387*
	(−2.75)	(−2.02)	(−2.49)	(−2.18)	(−2.20)	(−1.75)
Imbalance × ad cost	0.579***	0.445*	0.614**	0.829**	0.900**	0.636
	(2.88)	(2.00)	(2.45)	(2.21)	(2.16)	(1.62)
District Covariates		✓	✓		✓	✓
Ranking dummies		✓			✓	
Committee dummies			✓			✓
Observations	295	295	295	51	51	51

Note: District covariates include median income, population, minority, urban population. Ranking dummies include party dummy, leadership dummy, freshman dummy, chair dummies, ranking dummies. *t*-Statistics in parentheses (standard errors clustered at state level).
*, **, *** Significant at 10%, 5%, 1%, respectively.

It is important to stress that in a triple-interaction model, the estimated coefficient of *Ad Cost* × *Imbalance* × *Trailing* is positive, but not statistically different from 0 (see Table D1 in the Supplemental Appendix). Moreover, we cannot reject the hypothesis that the marginal effects of *Ad Cost* depicted in Figures 3(a) and 3(b) are equal across sub-samples.[25] While the lack of statistical significance can be due to the small sample size of the trailing sub-sample (only 51 observations), we can only claim that the evidence presented in this sub-section is on balance consistent with our theory, and only suggestive.

An Alternative Measure of Campaign Cost

In this sub-section, we consider total advertising expenditures as our measure of campaign cost, taking advantage of the fact that the Wisconsin Advertising Project contains data on the number of ads bought by candidates (provided by the Campaign Media Analysis Group, henceforth CMAG). The data set, however, contains only 129 districts with a positive number of recorded

[25] Due to the imbalance in covariates among sub-samples, the evidence would have to be interpreted with caution even if the marginal effects were statistically different.

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ads. This is an issue if the lack of observation is due to non-random missing data. This concern is mitigated by Hagen and Kolodny (2008), who argue that the CMAG data are reliable when it comes to the presence of advertising by candidates (however, they also argue that it is quite unreliable when it comes to total TV expenditures).

Consequently, we can use the presence of advertising to test another core prediction of our theory: candidates who advertise more should also secure more federal outlays for their district (Lemma 1). We thus construct a dummy variable called *ads_dummy* which equals 1 when we observe a positive level of political advertising, and 0 otherwise. Table D2 in the Appendix shows that *ads_dummy* has a statistically significant and economically meaningful association with federal outlays: in races with positive spending, federal outlays are between 55 and 95 percentage points higher than in districts without positive observed levels of spending.[26]

We can also use data on the number of ads to test whether the per-unit price of ads is positively correlated with total advertising expenditures. We find that it is indeed the case: the quantity of ads decreases with price, but the associated elasticity is below unity when controlling for the quantity of ads by the opposing candidate (evidence available upon request). Finally, we use price and quantity to approximate candidates' total advertising spending by each winning candidate (recall that this estimate is quite imprecise) and replicate the baseline analysis of Table 4 (on the restricted sample with positive advertising). Despite some loss of statistical significance (the loss in power is also substantial: the sample size no longer allows us to use state fixed effects), total expenditure, imbalance, and their interaction display a correlation pattern with federal outlays that is similar to the one documented in our baseline specification (Table D3 in the Appendix).

Discussion and Robustness Checks

Measurement of the advertising cost. The measurement of the cost of 30-second spots, has limitations that are widely acknowledged, despite the debate around their severity (Prior 2001; Monson and Curtis 2003; Franz et al. 2007; Hagen and Kolodny 2008). In particular, Hagen and Kolodny (2008) find that within Pennsylvania, the cost figures reported in the CMAG data are likely to be overestimated and, more generally, suffer from measurement error. This problem is particularly severe when estimating *total expenditures* for each candidate. Our specification, however, is based on the average ad cost and, as a consequence, should be less sensitive to this issue. We also try to address this problem using an alternative measure of ad costs based on a larger sample that includes local and presidential races (see Appendix C and Table D4). We acknowledge, however, that the measurement issue is a limitation of any empirical analysis of the effect of campaign costs using CMAG data. Unfortunately, there is no alternative data source for advertising cost for the time period we consider.

Endogeneity concerns. One might suspect that the price of ads paid by candidates is correlated with the closeness of a race, and the statistical association that we find purely reflects demand shifts that resulted in higher price. We do not believe that this is a serious concern, for four reasons. First, and most important, our variable is constructed as a population-weighted average of the average ad price in each media market included in the district. Due to the imperfect geographic overlap between media markets and congressional districts, there must be an implausibly large geographic clustering of competitive races for the above described problem to

[26] To compute the effect of advertising, we use the formula provided in Kennedy (1981), the effect in percent is $100[\exp(\hat{b}-1/2(\hat{b}/t)^2)-1]$, where $\hat{b}$ is the estimated coefficient from Table D2 and t its associated t-statistic.

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be a serious concern. Second, in our regressions we always condition on partisan imbalance. Third, by Federal Communications Commission's (FCC) regulation, the price of political advertising is the lowest unit rate, which depends on overall demand for advertising in the media market. Fourth, in Appendix D, we explicitly test whether the closeness of a race affects ad prices. We find that the predictive power of partisan imbalance on ad costs is not statistically significant at any conventional level (see Table D6). If, in light of this evidence, one concludes that ad cost, but not partisan imbalance, is an exogenous variable for the purpose of our study, then the interaction term between ad cost and partisan imbalance can also be shown to be exogenous under certain conditions.[27]

Sample selection. Our analysis could be affected by sample selection, as our baseline specification covers only 68 percent of the congressional districts. In Appendix D, we adopt a more generous cut-off for missing data on political ads (75 percent of the population), which allows us to cover almost 82 percent of the districts. The estimates are robust and almost unchanged (Table D7).

Additional robustness tests. In Appendix D, we report the result of several additional robustness tests. Our estimates are fully robust to the use outlays from each of the two fiscal years separately, as well as the use of a larger set of district-specific covariates from the 2000 Census.[28] Moreover, when we employ an alternative definition of partisan imbalance based on the 2000 presidential vote share or include designated market areas fixed effects (an extreme test, given that there are over 200 media markets), the point estimates lose statistical significance at conventional levels, but are relatively unchanged in size. Our estimates are similarly robust to the exclusion of outliers with respect to partisan imbalance (Table D12).

To conclude, our analysis uncovers robust and previously undocumented empirical patterns and shows that our theory provides a novel way to organize existing data sources. It is important to stress, however, that our estimates should be seen as a first pass which, we hope, will spark a more systematic and extensive empirical assessment. A clear answer as to whether these newly discovered patterns can be interpreted causally is left for future research.

CONCLUSION

In this paper, we study a model of electoral accountability where acting in voters' interests once in office and advertising policy commitments during the campaign are both costly for politicians. We study how campaign cost affects politicians' incentives to provide constituency service.

Our theory shows that higher campaign cost reduces electoral accountability and voter welfare when partisan imbalance is low. In contrast, we find that voters can benefit from a higher campaign cost when the level of partisan imbalance is high. Greater campaign cost has a rebalancing effect, which can result in higher expected level of constituency service, to the benefit of the electorate. We provide a *prima facie* empirical assessment of our theory. Evidence from the US Congress are consistent with our predictions and show that the mechanism we uncover is deserving of further empirical investigation.

[27] The necessary assumption is that $E(\pi_i u_i | c_i) = E(\pi_i u_i)$; that is, the degree of endogeneity of partisan imbalance does not depend on the ad cost. In this case, the assumptions necessary for the *interaction* term to be consistently estimated are significantly relaxed (see Proposition 1 in Bun and Harrison 2014).

[28] Here, we use 13 variables instead of four, with the disadvantage of additional noise due to redistricting.

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This paper rationalizes the idea of "cash's powerful megaphone," whose pro-competitive effect on electoral races can be muted by campaign regulation. Indeed, we uncover circumstances under which voter welfare can only decrease as a result of a partial or full public financing of campaigns. More generally, our theory highlights that federal regulation of electoral campaigns can have highly heterogeneous effect on candidates' choices and, ultimately, electoral accountability. In particular, and given its importance in the US context, widespread gerrymandering might systematically change the welfare consequences of campaign regulation.

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