Polarization and Campaign Spending in Elections\textsuperscript{1}

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Abstract

We develop a Downsian model of electoral competition in which candidates with both policy and office-motivations use a mixture of platforms and campaign spending to gain the median voter’s support. The unique equilibrium involves randomizing over both platforms and spending, and exhibits the following properties consistent with U.S. legislative elections — (i) ex-ante uncertainty in the election winner, (ii) platform divergence, (iii) inefficiency in spending and outcomes, (iv) polarization, and (v) voter extremism. We also show that platform polarization and campaign spending move in tandem, since spending is used by candidates to gain support for extreme platforms. Factors that contribute to both phenomena include the candidates’ desire for extreme platforms, and their capability at translating campaign spending into support for them. The latter insight generates new hypotheses about the potential causes of both rising polarization and spending in the United States. Finally, we show that strong incumbents parlay an advantage into a more extreme policy position – this finding is consistent with the classic “marginality” hypothesis, but contrasts with a now-large theoretical literature in which candidates with an (exogenous or endogenous) valence advantage tend to moderate their platforms.
Two of the most prominent features of American elections are the growing polarization in federal and state legislatures (Hall (2019); McCarty et al. (2019)) and the ever-increasing amounts of campaign spending, leading several scholars to speculate that these phenomena are linked (e.g., McCarty, Poole and Rosenthal (2006); Meirowitz (2008)). In this paper we develop a simple model that organizes a collection of empirical regularities about US elections, offers a plausible rationale for this link, and generates new hypotheses about the potential causes of both phenomena.

To do so we build on the classic Downsian model of electoral competition. In the Downsian model, two candidates simultaneously offer policy platforms to an electorate with known preferences. The well-known prediction is the “median voter theorem” – the inescapability of winning as the “proximate goal” necessary to achieve all other goals (including policy) inexorably pushes both candidates to the ideal point of the median voter. This result holds even if the candidates are partially or wholly ideologically motivated. To this baseline model we simply add the ability to make costly campaign expenditures. Specifically, in our model each candidate simultaneously chooses how much to spend alongside her choice of policy platform. Spending improves the voters’ evaluation of her non-policy attributes or valence (e.g. Ashworth and Bueno de Mesquita (2009); Meirowitz (2008); Serra (2010); Wiseman (2006)), in keeping with previous works studying the effects of campaign spending.

The central strategic force in our model is that candidates with ideological motivations try to exploit campaign spending to gain electoral support for more extreme platforms. We show that this force produces five striking equilibrium effects. The first is platform divergence – both candidates always position strictly away from the median voter. The second is electoral uncertainty – both the platforms of candidates, and the behavior of voters, are ex-ante unpredictable. The third is inefficiency – candidates always waste money trying to win, and there is ex-ante uncertainty over the winning platform that harms both voters and candidates. The fourth is platform polarization – candidates are more likely to take extreme positions far from the median, and outcomes are more likely to be far from the median as well. The fifth is voter extremism – the median voter always paradoxically selects the candidate with the most extreme platform, due to that candidate’s significantly-higher spending. This last finding, while surprising, is consistent with recent empirical evidence suggesting that voters’ evaluations of Congressional candidates exhibit a positive association between candidates’ perceived ideological extremism and “valence” attributes like integrity and competence (Simas (2020)).
After establishing these basic properties, we next examine how the candidates’ platform polarization and spending are affected by the candidates’ motivations, the voters’ motivations, and the cost both of raising funds and influencing voters with them. We find that across all comparative statics, polarization and spending covary positively, suggesting a simple but plausible rationale for the empirical relationship between them; polarization simply reflects the candidates’ motivation to exploit campaign spending to gain electoral support for more ideologically-extreme platforms. Two key factors in the model, in turn, jointly determine this motivation.

The first factor is the candidates’ desire to influence policy outcomes. This desire in turn is determined by both the extremism of their ideal policies, and the intensity of their ideological preferences relative to non-policy factors such as winning. Our model thus reproduces an intuitive hypothesis generated by the classic Calvert-Wittman model (Wittman (1983), Calvert (1985)), but without resorting to its assumption that candidates are uncertain about the electorate’s preferences – strategic candidates will adopt more ideologically-extreme platforms when they have more extreme underlying policy preferences (Fiorina (1999)). Thus, campaign spending competition dampens the centripetal force of the electoral imperative, thereby creating a link between candidates’ true policy preferences and their platforms that is absent in the classic Downsian model.

The second factor is the candidates’ capability at translating spending into support for more-extreme platforms; as the candidates become more capable, both increased spending and increased polarization result. This capability, in turn, derives from three parameters in the model. The first is the marginal cost of a dollar of campaign spending. The second is the marginal impact of a dollar of spending on voter behavior. The third is the intensity of the voters’ policy preferences, which determines how much spending is needed to “buy” their support for more extreme platforms. In terms of testable implications, a variety of real word factors plausibly affect candidates’ capability at translating spending into votes through one or more of these channels. The most obvious is the technology of electoral campaigns; recent years have seen dramatic improvements in the ability of candidates to target donors for fundraising, effectively reducing the marginal cost of fundraising and thereby a dollar of spending (Hassell and Monson (2014)), and to target individual voters through a growing variety of methods including online advertising and social media, effectively increasing the marginal impact of a dollar of spending (Nickerson and Rogers (2014)). A less obvious example is the
legal environment of campaign finance; restrictions on “soft money” fundraising by political parties have made it easier for donors to channel funds to individual candidates relative to party organizations, potentially raising the marginal return to candidate effort on fundraising (Raja and Schaffner (2015)).

We next examine the welfare of voters and candidates. Our results about voter welfare hinge crucially on how we interpret the influence of campaign spending on voters. If campaign spending is interpreted as a phenomenon that simply biases voters’ decisionmaking away from their “true” preferences (consistent with a literature showing that the effects of spending on voter evaluations are transient (Gerber et al. (2011); Iaryczower, Lopez-Moctezuma and Meirowitz (2021))), then spending competition harms voters; moreover, factors that increase polarization also reduce voter welfare, in line with the conventional wisdom about the harmful effects of polarization. Conversely, if campaign spending is interpreted as a genuinely benefitting voters (if, for example, the candidates spend to improve “character valence” attributes like competence and expertise (Stone and Simas (2010))) then spending competition actually helps voters; moreover, factors that increase polarization also increase voter welfare (despite inferior policy outcomes) due to the higher candidate valence that also results (see also Ashworth and Bueno de Mesquita (2009)). In such an environment, a surprising implication is that constraints on fundraising and spending would harm voters despite observably reducing polarization.

In contrast, we show that the candidates are unambiguously harmed by their ability to compete through campaign spending, in line with frequent and growing complaints by members of Congress about the excessive time spent fundraising.¹ Moreover, they become increasingly worse off as either their interest in policy, or capability at influencing voters via spending, go up. For them, “dialing for dollars” is thus a wasteful race to the bottom that both would prefer to avoid, but neither can commit to. Moreover, general improvements in the technology of campaigns merely accelerate that race, to the detriment of both candidates. A potential implication is that the chronic failure of effective campaign finance reform may have less to do with a desire by candidates to continue raising and spending ever-increasing amounts, and more to do with difficulty of designing and enforcing regulatory constraints that candidates from both parties can trust will bind.²

Lastly, we extend our model to reexamine the influential “marginality hypothesis,” which states

²See also Hall (2019), pp. 62-64.
that “marginal (i.e. electorally weak) incumbents will tend to moderate more than nonmarginal incumbents” because a nonmarginal (i.e. strong) incumbent will “parlay the advantage into a policy position that is closer to her ideal point” (Groseclose (2001)). Consistent with this hypothesis, we show that an incumbent whose marginal cost of campaign spending is lower (i.e., she has a fundraising advantage) will both win more often, and take more ideologically-extreme platforms closer to her ideal. While both intuitive and consistent with recent empirical evidence (Iaryczower, Lopez-Moctezuma and Meirowitz (2021)), this result contrasts sharply with an existing literature of both exogenous and endogenous valence models in which strong office-motivated incumbents tend to moderate more more than weak ones (e.g. Aragones and Palfrey (2002); Casas, Balart and Troumpounis (2020)).

Divergence, Models, and Mechanisms

The literature on the causes and consequences of polarization in US legislatures is too vast to review here (see McCarty (2019) for a comprehensive and accessible treatment). However, two generally accepted findings are worthy of note. First, whether it be through sorting or opinion change, the underlying preferences of political elites (including candidates) have become increasingly polarized across the two major parties. Second, a considerable share of polarization in the observed behavior of US legislators can be attributed to candidates’ platform divergence – that is, to differences in how Democrats and Republicans represent the same constituency. Any comprehensive explanation for rising polarization must therefore address this platform divergence.

It remains frequently asserted that divergence is a puzzle in light of the median voter theorem, as the centripetal force of the median voter is strong enough to overwhelm even the most ideologically-motivated candidates in the classic Downsian model (Duggan (2017)). However, the theoretical literature has long offered a simple and plausible explanation for platform divergence – in the Calvert-Wittman model (Wittman (1983), Calvert (1985)), candidate uncertainty about the electorate’s preferences weakens the centripetal force of the median voter enough to make ideologically-motivated candidates diverge. This explanation is attractively parsimonious, predicting that greater divergence in candidate platforms merely reflects greater divergence in elites’ underlying preferences. However, this extreme parsimony is also something of a weakness, as it simply regresses the empirical puzzle back one level to explaining the underlying causes of elite preference divergence. The only other potential predictor
in the theory is the candidates’ degree of uncertainty about the electorate’s preferences; but such uncertainty is clearly a difficult quantity to both measure and theorize about, although recent work has made progress doing so at the state level (McCarty et al. (2019)).

**Divergence and Exogenous Valence** More recently, scholars have considered whether candidates being endowed with non-policy or “valence” advantages, such as charisma or competence, could fruitfully explain platform divergence. These analyses often attributed valence advantages to incumbency, and frequently focused on considering the “marginality hypothesis,” which states that “marginal (i.e. electorally weak) incumbents will tend to moderate their platforms more than nonmarginal incumbents” (Groseclose (2001)). The marginality hypothesis is premised on the intuitive idea that a policy-motivated candidate with a valence advantage will want to “parlay the advantage into a policy position that is closer to her ideal point” (Groseclose (2001)). Formal analysis, however, uncovered another important force for divergence that ran counter to the marginality hypothesis. Strong candidates might want to “chase” their weak competitor to overwhelm them with their valence advantage (pulling them closer to the political center), while weak candidate would therefore seek to “evade” the strong by hiding in the extremes of the policy space (where the median voter might nevertheless serendipitously appear (Aragones and Palfrey (2002); Aragonès and Xefteris (2012))).

As it turns out, whether the marginality hypothesis holds or fails in any given model depends crucially on its assumptions about the knowledge and preferences of candidates, and how they tie into these competing forces. In particular, candidate uncertainty about the preferences of the electorate is a crucial driver of “chase and evade” incentives; absent this uncertainty, the strong will still chase the weak, but the weak will be unable to evade the strong. Consequently, in “exogenous valence” models without uncertainty, the stronger candidate will always position somewhere that is best for her among the platforms that ensure victory. This yields the marginality hypothesis if candidates are policy-motivated (Peress (2010)) and inconclusive predictions otherwise (Ansolabehere and Snyder (2000)). Conversely, in models where candidates are both uncertain about the electorate and purely office-motivated, there are only chase-and-e evade incentives; consequently, equilibria are only in mixed strategies, and the marginality hypothesis unambiguously fails (e.g. Aragones and Palfrey (2002); Aragonès and Xefteris (2012)). Finally, in Groseclose (2001) both forces are present. He restricts attention to equilibria in which the candidates’ policy motivations weaken the strong candidate’s
incentive to chase *enough* to yield pure strategy equilibria, and shows that even in such equilibria, chase-and-evade incentives may remain sufficiently strong to contradict the marginality hypothesis.\(^3\)

**Divergence and Endogenous Valence** Most recently, scholars have studied candidates who can *endogenously* increase their valence through costly effort (e.g. Ashworth and Bueno de Mesquita (2009); Casas, Balart and Troumpounis (2020); Serra (2010); Wiseman (2006); Zakharov (2009)). In some models (like ours) this effort is interpreted as campaign spending, whereas in others it is interpreted as a personal investment in productive attributes like policy expertise.\(^4\) While most such models predict platform divergence, they differ starkly in the mechanisms that drive it, again due to differing assumptions about the candidates’ preferences and information.

One class of models considers office-motivated candidate who are uncertain about the electorate’s preferences (e.g. Ashworth and Bueno de Mesquita (2009) and Zakharov (2009)). Unsurprisingly, the underlying mechanism that drives divergence in these models is closely connected to chase-and-evade incentives; the candidates strategically “evade each other” so that valence will be a smaller component of the voters’ calculus, which reduces the intensity of spending competition and ultimately benefits both candidates.\(^5\) To explain increasing divergence, these models point to changes in the technology of campaigns (Casas, Balart and Troumpounis (2020)); as candidates become more capable of influencing voters with spending, spending competition becomes more intense *ceteris paribus*, which leads the candidates to further “evade each other” to try and tamp it down.

While theoretically interesting, there are several reasons to doubt this mechanism as a primary driver of platform divergence in US legislative elections. First, if candidates are increasingly diverging to try and avoid wasteful spending competition, they are not doing a very good job of it; the cost of running a Congressional campaign has nearly doubled since 1980 (Hall (2019), p. 58), and if anything extreme positions encourage donations from the extreme individuals who have come to increasingly dominate candidate fundraising (Ansolabehere, de Figueiredo and Snyder (2003); Barber (2016)).

\(^3\) An additional critical assumption in Groseclose (2001) is that the median voter has quadratic (rather than linear) utility; this makes valence loom larger in the median voter’s calculus the closer are the candidates, which strengthens chase-and-evade incentives (see pp. 870-74 for an illuminating discussion).

\(^4\) The natural interpretation depends in part on the timing of the game – see Serra (2010)

\(^5\) This effect also requires a particular type of uncertainty about the electorate’s preferences, as pointed out by Ashworth and Bueno de Mesquita (2009). Specifically, the “stochastic partisanship” model considered in related work by Herrera, Levine and Martinelli (2008) (in which the candidates are uncertain about the median’s bias rather than her ideal point) cannot generate this effect because there is no way for a weak candidate to “evade” a strong one.
Second, this explanation assumes away policy goals, which both anecdotal and empirical evidence suggest is a central motivation of US legislators (Fenno (1995); Gagliarducci, Paserman and Patacchini (2019); Iaryczower, Lopez-Moctezuma and Meirowitz (2021)). This is problematic to the extent that most theoretical predictions depend on whether office-seeking is truly legislators’ only goal, or their “proximate” goal necessary to achieve all other goals, including policy.6

Another class of models (which includes ours) considers policy-motivated candidates who know the electorate’s preferences (e.g. Serra (2010), Wiseman (2006)). In these models, the underlying mechanism that drives platform divergence is the same as that underlying the marginality hypotheses; candidates seek to parlay a (now endogenous) valence advantage into support for a more ideologically-appealing platform. Our model has two key differences with previous works. First, we model candidates with a mixture of policy and office motivations, which allows us to explore the differences between them. Second, the sequencing of our model is different; candidates choose both platforms and spending simultaneously, while in Serra (2010) candidates first choose spending levels (simultaneously) and then platforms (simultaneously), and in Wiseman (2006) candidates move in an exogenous order. Our sequencing turns out to generate a much more tractable model (despite the apparent difficulty of working with mixed strategies), and exhibits equilibrium properties that better fit real-world elections. For example, in both Serra (2010) and Wiseman (2006) voters and candidates know ex-ante where candidates will position and who win, whereas the unique equilibrium of our model reflects the uncertainty of real-world election outcomes. In addition, in Serra (2010) the losing candidate always converges to the median, and polarization depends on the asymmetry in candidates’ underlying extremism – as candidate preferences become similarly extreme, polarization vanishes. Our model, in contrast, does not rely on asymmetric preferences to generate divergence, and captures the empirical regularity that candidates from opposing parties appear to “leapfrog” over the district median voter, often in an approximately symmetric fashion (Bafumi and Herron (2010)).7

6This class of models also exhibits tractability issues. Ashworth and Bueno de Mesquita (2009) features very complex and discontinuous strategies as well as equilibrium multiplicity, and lacks general comparative statics results. Zakharov (2009) does not solve for Nash equilibria. Casas, Balart and Troumpounis (2020) requires voters to have non-standard “lexicographic” preferences in which they are randomized between caring only about policy and only about spending.

7Footnote 9 of Wiseman (2006) correctly observes that simultaneity eliminates pure strategy equilibria, but mistakenly describes our model as a (vastly more difficult) Colonel-Blotto type problem. The symmetric version of our model has a unique, continuous, easily expressed equilibrium, with analytical comparative statics in all parameters and outcomes, across the full parameter space. In contrast, Serra (2010) only explores the part of the parameter space with pure strategy equilibria, and Wiseman (2006) derives equilibria and performs comparative statics computationally.
The Model

Two candidates $i \in \{-1, 1\}$ simultaneously choose ideological platforms $\gamma_i \in \mathbb{R}$ and costly spending levels $q_i \in [0, \infty) = \mathbb{R}^+$. A median voter ($V$) then votes for her preferred candidate and the game ends. Platforms are commitments to spatial policies that will be implemented in office. Spending is a reduced-form representation for costly actions that make voting for a given candidate more appealing to the voters, holding platforms fixed. The median’s ideal point is normalized to 0, and her utility for selecting candidate $i$ is $\mu q_i - \lambda_v \gamma_i^2$. She thus places a weight of $\lambda_v$ on ideological outcomes, and a candidate spending $q_i$ generates a *valence* return of $\mu q_i$; $\mu$ thus reflects the *sensitivity* of the voter’s valence perception to a dollar of campaign spending. For now we are agnostic about the interpretation of valence. Interpreted literally, valence makes the voters better off. However, valence could instead proxy for how spending biases voters without increasing welfare (e.g. uninformative campaigning). We further note that the model analysis and equilibrium would be unchanged if candidates could allocate their spending freely between increasing their own valence, i.e. “positive campaigning,” and reducing their opponent’s valence, i.e., “negative campaigning” (see Appendix D).

Candidates may have both policy and office motivations. Letting $w$ denote the election winner (and $\gamma_w$ the winning platform), candidate $i$’s final utility from the election outcome is $1_{i=w} \theta - \lambda_c (x_i - \gamma_w)^2$. $x_i$ is candidate $i$’s ideal ideology. As in the canonical model by Calvert (1985), candidates have policy goals, but must first achieve the “proximate” goal of election to achieve those goals. $\theta$ represents office-holding benefits such as ego rents or salary. $\lambda_c$ is the candidates’ weight on ideology. Candidates prefer to avoid spending, which costs $aq_i$ and enters additively into their utility. We consider candidates who are equidistant from the median ($|x_i| = |x_{-i}| = x$) on opposite sides, so candidate $i$’s ideal is $x_i = ix$.

Discussion of Assumptions

Our model is a variant of an all-pay contest (Siegel (2009)), and is closely related analytically to the policy development model of Hirsch and Shotts (2015). In both models, players’ strategies consist of a costly up-front component alongside a “spatial” policy proposal, and they care directly (at least in part) about the proposal of the winning player. In this paper a candidate’s strategy is a two-dimensional “bid” $(\gamma_i, q_i)$ consisting of a policy platform and spending level in a “contest” to win the median’s support. The median voter’s utility $s_i = \mu q_i - \lambda_v \gamma_i^2$ for candidate $i$ is the “score” of candidate
's “bid,” meaning it is the quantity that determines who wins. A candidate can increase her score in two ways. First, she can increase spending – this is costly up front, but has no effect on the benefit from winning for either player. Second, she can position closer to the median – this is “free” up front, but makes winning less valuable for both players.

Despite several similarities, our model has a number of key differences that complicate the equilibrium analysis and yield different equilibrium properties. First, in the policy-development model the “decisionmaker” (analogous to the median voter) has an “outside policy option” that she may select if she finds all of the endogenously-developed proposals unappealing; here the median voter has no alternative to the two candidates, and it is only the disciplining effect of competition that bounds the harm she might suffer from divergence. Second, in the policy-development model the “developers” (analogous to the candidates) are purely policy-motivated; here the candidates may have a mixture of policy and office motivations, allowing us to explore the differences between them. Third, in the policy-development model the developers put costly effort into “policy quality” that benefits all players (including their competitors); here spending only influences the electorate, consistent with the prior campaign spending literature. In addition to yielding different predictions about equilibrium platforms, this property also allows our model to be easily extended to permit both “positive” and “negative” campaigning without perturbing the analysis and main results (excluding voter welfare).

**Equilibrium**

Our model exhibits a simple and unique equilibrium that is in symmetric mixed strategies; candidates randomize over both platforms and spending. Candidates must randomize for similar reasons as in a classic all-pay contest; a candidate who is spending something but losing for sure has an incentive to instead spend nothing, a candidate who is winning by a strictly positive margin has a strict incentive to spend less, and candidates who are tied both have an incentive to spend a little bit more and win.

**Proposition 1.** The probability that a candidate positions closer to the median voter than distance $y$ is $F_Y(y) = \min\left\{\left(\frac{\alpha}{\mu \lambda}\right) \left(\frac{x}{x-y}\right), 1\right\}$. When positioning at distance $y$, candidate $i$ selects platform

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\[ \gamma_i(y) = iy \text{ and spends } q_Y(y) = \frac{1}{\mu} \left( s_Y(y) + \lambda v y^2 \right), \text{ where } s_Y(y) = \int_0^y \lambda v \frac{x}{(x-y)^2} \left( \frac{2}{\lambda c} + 4xy \right) dy. \]

Strategies are depicted in Figure 1. The left panel shows the platforms (on the x-axis) and spending (on the y-axis) that the left (purple) and right (blue) candidate mix over. The median’s indifference curves, i.e., the pairs of platforms and spending that she is equally willing to vote for, are in gray. The right panel shows the density (PDF) over the left (purple) and right (blue) candidates’ platforms, as well as the density (in gray) of the final policy outcome (i.e., the platform of the winning candidate).\(^\text{10}\)

**Properties of Equilibrium**

**Uncertainty** Although the game is of complete and perfect information, in the unique equilibrium both candidates and voters are uncertain about where candidates will position, how much they will spend, and who will win. This unpredictability is a unique feature of the model that arises from the candidates’ need to remain electorally competitive in the presence of campaign spending.

**Divergence** The unique equilibrium exhibits divergence – both candidates position away from the median with probability 1 (\( F_Y(0) = 0 \)). The reason is similar to the classic Calvert model, but that model requires candidates to be uncertain about the median’s preferences. This induces them to gamble on sometimes winning with a divergent platform. In our model both the median’s preferences and the effect of spending are known. However, the *strategic* uncertainty produced by campaign

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\(^{10}\)See Appendix D for details on calculating the distribution over the final policy outcome.
spending, and the resulting uncertainty in platforms, serves a similar role – platforms away from the median’s ideal may still win the election, and are therefore sometimes adopted.

**Inefficiency** The unique equilibrium is inefficient in both spending and policy outcomes. Spending is inefficient in two senses. First, it is pure waste if assumed to only affect the voters “behaviorally.” Second, the losing candidate always wastes money trying to win. Equilibrium policy outcomes are efficient “on average” because they are centered on the median. However, they are also uncertain ex-ante, harming both candidates and voters due to risk aversion. The root of these inefficiencies is the nature of campaign spending itself. Spending allows the candidates to bias policy outcomes away from the median. However, unlike a promised transfer in exchange for a voters’ support, a candidate must pay for campaign spending before she knows whether it will yield an electoral victory.

**Polarization** The unique equilibrium exhibits polarization in candidate positions – each candidate is more likely to take extreme positions closer to her own ideal point than moderate ones closer to the median \( f_Y(y) > 0 \) in the support), and places vanishing weight on platforms near the median. The reason is that candidates are risk averse over policy, so the marginal benefit of “buying” support for a more extreme platform with spending is largest for platforms near the median.

**Voter Extremism** In equilibrium candidates spend more, and have higher valence, when taking extreme platforms \( q_Y'(y) > 0 \). This differs with models of exogenous valence, where high-valence candidates position near the median to have their advantage overwhelm their opponent (see Stone and Simas (2010) p. 373 for a review). This difference is partially due to the endogeneity of valence – candidates choose to invest in valence in order to allow positioning away from the median.

More surprising is that candidates spend so much more when taking extreme platforms that the median actually evaluates their overall candidacy more favorably. (In the left panel of Figure 1 the candidates’ spending functions are steeper than the median’s indifference curves). The median thus appears to have a preference for extremism! Consequently, policy outcomes (i.e., the platform of the winning candidate) are even more polarized than the policy platforms (see the right panel of Figure 1). The reason for this counterintuitive effect is as follows. To win, candidates trade off spending against ideological concessions in their platforms. When a candidate aims to be more competitive (that is, more likely to win), ideological concessions become costlier to make because the platform is
more likely to actually win and be implemented. Reversing the statement, a strategy that makes fewer ideological concessions (i.e. that is more extreme) must also be more likely to win.

**Comparative Statics**

We next analyze how changes in the model parameters affect various outcomes. Because strategies are uncertain, this involves analyzing *first-order stochastic* changes in the distribution of these outcomes. Recall that a candidate’s spending is $q_i$ while her valence is $\mu q_i$; we analyze the median voter’s equilibrium welfare both including valence $\mu q_i$ (i.e., interpreting valence literally as a productive attribute) and excluding it (i.e., interpreting valence “behaviorally” as a bias).

**Proposition 2.** The six model parameters (in columns) first order stochastically increase (+), decrease (-), or have no effect on (0), the six equilibrium outcome quantities (in rows).

<table>
<thead>
<tr>
<th>Proposition 2.</th>
<th>$x$</th>
<th>$\lambda_c$</th>
<th>$\theta$</th>
<th>$a$</th>
<th>$\lambda_v$</th>
<th>$\mu$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Extremism</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>−</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td>Spending</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td>Valence</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>+</td>
<td>*</td>
</tr>
<tr>
<td>Candidate Welfare</td>
<td>−</td>
<td>−</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td>Voter Welfare (Behavioral)</td>
<td>−</td>
<td>−</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td>Voter Welfare</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>+</td>
</tr>
</tbody>
</table>

**Platforms, Spending, and Valence** The model predicts a positive association between platform polarization and spending. The reason is simple: polarization reflects the candidates’ motivation to spend to gain support for more extreme platforms. To interpret how the model parameters influence this willingness (and thus both polarization and spending), we divide them into three categories.

The first is the candidates’ *desire for extreme policies*, determined by their ideological strength $\lambda_v$ and extremism $x$. Unsurprisingly, increasing the candidates’ desire for extreme policies magnifies their willingness to spend to gain support for them, generating both more extreme platforms and greater spending and valence. The second is the candidates’ *capability* at translating spending into support for extreme policies, jointly determined by (i) the candidates’ marginal cost $a$ of spending, (ii) the effectiveness $\mu$ of a dollar of spending on valence, and (iii) the median’s ideological strength $\lambda_v$, which determines how much spending is needed to “compensate” her for extreme platforms. Increasing

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11 Starred results further require $\frac{a}{\mu} \geq \frac{\lambda_c}{\lambda_v}$. This states that the marginal cost generating valence – that is, of influencing voters via spending – is sufficiently high, and specifically exceeds the candidates’ (relative) valuation of ideology. When this condition fails, the indicated parameters do not cause a first-order stochastic change in the indicated outcomes.
capability through any of these channels also generates more extreme platforms and polarization. The third is the candidates’ nonideological officeholding benefits $\theta$. Higher officeholding benefits increase spending and valence, but surprisingly, have no effect on candidate platforms despite the greater benefit to winning. The reason is that the level of officeholding benefits does not influence the calculus of using spending to gain support for more extreme platforms, which is what drives divergence.

**Welfare**  Candidates spend to both pull policy toward their ideal when they win, and to prevent losing to something ideologically unappealing. On average, however, they do not move the policy outcome away from the median, and waste money and generate policy uncertainty trying to do so. They are thus clearly harmed by spending competition. Interestingly, the degree of platform polarization indicates by how much. Thus, they become worse off when their own desire for extreme policies (higher $x$ or $\lambda_v$), or capability at translating spending into support (lower $a$, higher $\mu$, or lower $\lambda_v$), go up. (They are unaffected by changes in officeholding benefits $\theta$, because they compete all these away through campaign spending.) Thus, for the candidates campaign spending competition is a wasteful race to the bottom that both would prefer to avoid, but neither can commit to.

Whether the voter benefits from or is harmed by spending competition depends on whether her “revealed preference” for spending is a behavioral bias or a true reflection of greater welfare, confirming a conjecture in Serra (2010). With the former assumption the median is harmed; the degree of platform polarization indicates by how much. With the latter assumption the median benefits, and the level of spending indicates by how much. That is, she becomes better off when the candidates become more extreme (higher $x$), or are better able to translate spending into valence (higher $\mu$), even though platforms further polarize. Moreover, she would be harmed by constraints or a ban on fundraising and spending (which also sometimes holds in Ashworth and Bueno de Mesquita (2009)).

**Incumbency Advantages and the Marginality Hypothesis**

We conclude by extending the model to reexamine the marginality hypothesis, i.e., that “marginal (i.e. electorally weak) incumbents will tend to moderate their platforms more than nonmarginal incumbents” (Groseclose (2001)). In the exogenous valence literature, a strong incumbent is modeled as one endowed with greater valence. Here we model a strong incumbent as one with a greater ability at spending to generate valence (as in Meirowitz (2008)), an arguably more appropriate formalization
given the well-documented fundraising advantage of US incumbents (Fournaiies and Hall (2014)).

The marginality hypothesis is of particular interest because in classic valence models it helps to differentiate office-motivated candidates from policy-motivated ones; while models assuming either candidate motivation can predict platform divergence, the marginality hypothesis fails in the former due to “chase and evade” incentives. Similarly, our endogenous valence model with policy-motivated candidates yields several common predictions with endogenous valence models with office-motivated candidates, despite very different underlying forces; these include platform divergence and a correlation between the effectiveness of campaign spending and polarization (Ashworth and Bueno de Mesquita (2009); Casas, Balart and Troumpounis (2020)). Can the marginality hypothesis again help differentiate these classes of models?

Although a complete analysis of an asymmetric version of our model is beyond the scope of this paper, we can preliminarily answer this question in the affirmative. Specifically, in the endogenous valence literature with (uncertain) office-motivated candidates, the marginality hypothesis fails; a technologically-advantaged candidate uses her advantage to spend more and (to some extent) chase her opponent (Casas, Balart and Troumpounis (2020)). In contrast, in our model the marginality hypothesis holds; a technologically-advantaged incumbent with ideological motives exploits that advantage to both win more often, and do so with a more ideologically-extreme platform. To show this result analytically we consider a simple extension of our model in which an incumbent \((I)\) with a mixture of policy and office motives faces a challenger \((C)\) who is purely office-motivated.

**Proposition 3.** Suppose that an incumbent \((I)\) and challenger \((C)\) have different abilities and weights on ideology; the incumbent is cost-advantaged \((0 < a_I \leq a_C)\) while the challenger is purely office-motivated \((0 = \lambda_C < \lambda_I)\). As the incumbent becomes stronger \((\text{lower } a_I)\), both her probability of winning and the ideological extremism of her platforms \((\text{first-order stochastically})\) increase.

Thus, when an incumbent’s technological advantage increases (in the sense of a lower marginal cost of spending), she spends more, wins more, and does so with more extreme platforms.

**Conclusion**

In this paper we develop a simple and tractable Downsian model of electoral competition with campaign spending, show that the model exhibits equilibrium properties consistent with several empirical
regularities of US legislative elections, and use the model to develop further insight into the causes and consequences of polarization. We conclude by discussing several issues we believe to be worthy of greater consideration in light of our results.

First, our model yields surprising predictions about the endogenous relationship between a candidate’s platform extremism, spending, valence, and electoral prospects; they will all be positively associated. However, validating these predictions with empirical data is a challenging exercise. While a growing empirical literature examines the relationship between extremism and votes (e.g. Hall (2015); Shor and Rogowski (2018); Tausanovitch and Warshaw (2018)), in general these works do not distinguish between candidates’ preferences and their platforms. This presents a difficulty because strategic candidates’ true preferences are likely correlated with other characteristics that would substantially impact both their platform and electoral prospects (for example, fundraising ability), rendering cross-candidate comparisons suspect. Indeed, this difficulty may explain why the literature has yielded such conflicting results, with some works finding the absence of an electoral penalty to extremism (Tausanovitch and Warshaw (2018)) and others finding a strong one (Hall (2015)). Recent work by Iaryczower, Lopez-Moctezuma and Meirowitz (2021) comes closest to addressing these issues by examining within-candidate variation in roll-call votes over time (as a proxy for changing platforms), but in a dynamic setting very different from that studied in our model. Nevertheless, they do find support for two central premises of our model; that candidates position strategically to trade off personal ideology and electoral success, and use campaign spending to “buy” support for more ideologically-extreme platforms. Finally, recent work by Simas (2020) finds a positive association between candidate extremism and voters’ valence evaluations, although they propose a very different mechanism (in which voter’s draw favorable inferences from extreme platforms) than in our model.

Second, a perennial topic of interest in the literature on polarization is how to reform electoral and governmental institutions to reduce it. For example, Hall (2019) plausibly argues that polarization has risen in part due to a devaluation of public service, and proposes making officeholding more valuable to draw in less ideologically-motivated candidates. However, our model illustrates the weakness of antidotes that fail to account for the complex and sometimes surprising interaction between candidates, parties, donors, and voters. In this particular case, our model suggests that candidates would simply compete away any new benefits of officeholding through campaign spending; leaving unchanged both
the value of moderation to extreme candidates, and the value of candidacy to moderate ones.

Finally, it is not clear from extant work whether and by how much voters are actually harmed by polarization. A now-large literature documenting candidate divergence implicitly or explicitly assumes that it is prima facie evidence of a failure of representation (Ansolabehere, Snyder and Stewart (2001); Burden (2004); Fowler and Hall (2016); McCarty, Poole and Rosenthal (2006)). However, even if the substantial measurement issues associated with placing representatives and voters on a common scale can be surmounted (Hill and Tausanovitch (2015)), it remains unclear whether the failure of median convergence indicates a failure of representation broadly conceived. In our model and valence models generally, voters sometimes choose the more distant candidate because they are getting something “in exchange,” which may be welfare-enhancing attributes like governance skill, competence, and integrity (Stone and Simas (2010)). Determining how much voters are genuinely harmed by rising polarization thus requires a more nuanced understanding of its causes and consequences.

References


