Party Discipline in Elections and Latent Policy Ideals

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Abstract

Individual politicians can have different policy preferences from their party leadership or special interest groups (SIGs), and the latter two may pressure politicians to shift their positions. To study this tension, we develop and estimate a multi-stage election model that incorporates discipline with election spending. First, we uncover the unobserved "ideal" policies of these different political agents. Second, we estimate disciplining constraints and the importance of "policy gaps" with candidates to parties and SIGs. We then study various dimensions of discipline: the conditions under which politicians become responsive to SIGs, the effects of seat competitiveness on disciplining, and the limits of discipline in the U.S. We find significant differences in policy ideals across party lines. We also find that a lack of electoral competition for a given Congressional seat makes discipline less effective and that voter preferences are more influential than party or SIG efforts in explaining candidate policy positions.

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1 Introduction

In many democracies, a candidate running for office belongs to a political party but may campaign with policies that do not perfectly align with the preferred policies of that party. In the United States, a member of Congress is elected based on the voters in their single district. The political party leadership wants the party to acquire or maintain majority control in Congress, which is based on votes across the country. Thus, the party needs an agenda that is popular nationwide. If voters are geographically heterogeneous, then there is an obvious tension between the agenda an individual member is willing to support and what the leadership wants for the entire party.

For example, the Democratic party leadership wanted to pass stimulus spending after the 2020 election, and the Democratic senator Joe Manchin from West Virginia opposed the blanket increase in spending without concessions for cuts. His constituency had enough conservative voters to make him unwilling to go along with the mainstream party line. On the opposite end, most Republicans opposed any raising of taxes during the Bush Presidency. One reason was that they faced significant pressure from an influential anti-tax special interest group called the Club for Growth. Those who supported tax increases were more likely to face heavily funded challengers within their own party in the "primary" elections; these are the first round of elections within each party to determine the party's candidate for the "general" election against the opposition party.

We study these various pressures on the candidate by analyzing the divide in policy preferences between candidates and party leadership. We consider the case of a one dimensional left-to-right policy dimension, a common framework for elections with only two significant parties. We formalize the policy gap along that dimension, defined as the distance between two given policies. To calculate the policy gap between what a candidate chooses and what the party prefers, we must know the leadership's ideal policy based on nationwide voter preferences. However, this is effectively unobserved. Our strategy to uncover it is to formalize and solve the leadership's nationwide electoral program. The solution to this for each party is their latent policy ideal and is a function of district and voter characteristics from many districts. Using this we calculate the policy gap between the leadership and members of Congress, and study how variation in this gap relates to actions taken by both the party and the member. In particular, we measure the policy gap penalty that the party leadership puts on members who stray from the party's ideal, and while the party

does not choose a candidate's policy for them, they do pressure candidates, called party discipline.

The form of party discipline we study is party committee election spending, which affects the candidate's probability of winning. We focus on independent expenditures, which are not limited like donations, and allow party committees to compete with Super PACs. The ability of party leadership to influence members through spending depends on the safety of the incumbent's seat. Very safe incumbents are increasing (Epstein and Corasaniti 2022) and cannot be easily influenced. For example, Republicans voted 70 times to repeal President Obama's signature Affordable Care Act when they were in opposition. But this was largely cheap-talk as once the Republicans controlled both chambers of Congress and the Presidency starting in 2017, they could not do it either. The right-wing Freedom Caucus members in safe seats refused to vote for replacement bills that centrist Republicans in competitive seats supported and vice-versa (Graetz and Shapiro 2020). Those in safe seats are relatively more responsive to partisan primary voters, making discipline more difficult. Also, the party may not be interested in whipping them as unpopular policy could threaten the seat through primary voter pressure. This complicates the narrative because discipline can have downsides for the party.

The party leadership and voters are not the only forces pressuring candidates. Special interest groups (SIGs) also "discipline" the candidates through campaign donations and spending. In particular, political action committees (PACs) and Super PACs spend millions of dollars on election advertising supporting or attacking candidates. They spend in both primary and general elections, potentially hurting the party's general election chances if they support radical primary challengers. These SIGs likely have different ideal policies to the party leadership and thus it is key to measure the policy gap for them, contrasting their influence with that of the party.

To capture these dynamics, we build a novel election model with party discipline spanning the entire election cycle. We consider the party's ideal policy calculation, candidate entry and policy decisions, and spending strategy by the candidates, party, and special interest groups (SIGs) in both the primary and general elections. We utilize data from the 2002-2018 House elections. We first estimate voter preferences with a discrete choice setup extending recent literature (Gordon and Hartmann 2016; Cox 2021). Using these estimated voter preferences, we solve for the latent ideal policies for the party leadership from their optimization. Then we estimate the election committee and SIG preferences from regression equations derived from their optimality conditions. In other

words, we find the parameters that rationalize the observed spending. Finally, we estimate entry constraints with a regression derived from the model to rationalize observed entry by challengers.

We find that the party leadership's ideal policy position is more moderate than the average of their individual members with a larger gap for Democrats. The Republican leadership has a more partisan ideal position than the Democratic leadership (relative to the median voter nationwide), which is partially due to seats being on average safer for Republicans. We also find that voters care more about the policy gap between voters and candidates than election spending or congressional committee assignments, and that Republican (Democratic) PACs have more moderate (extreme) ideal policies than political party leadership. Finally, the Republican party places a higher penalty on policy deviation than Democratic leadership.

Using the estimated parameters, we resolve the model to show how equilibrium policies change under different counterfactual scenarios. We find that making seats safer weakens discipline. Candidates become more extreme in safe seats as the primary election is relatively more important. As a consequence, parties do not reward safe seat incumbents with election spending in either the primary or general. Not only does the incumbent not need the support as much, but also their shift in policy reduces the willingness of the party to spend. Changing the effectiveness of party or SIG spending does not significantly change candidate positions. The party can also attempt to change positions by being stricter, but this is ineffective as party spending matters less than candidate and outside-group spending. Overall, we find that a party's inability to discipline is due primarily to the strong influence of voter preferences across districts combined with the relative ineffectiveness of swaying candidates with electoral support. This highlights a downside of party to increase the number of safe districts via tactics like gerrymandering: safer seats make the members in those seats less influenced by discipline, making the party weaker and governing more difficult.

We contribute to the literature by estimating leadership and SIG policy ideals, formally analyzing the policy gap, and quantifying the relationship between Congressional seat safety and discipline. Furthermore, we allow for heterogeneous interest groups, primaries and general elections, and challenger entry in the model. This rich environment provides a novel setup that allows us to estimate campaign finance and party discipline counterfactuals. Our work is at the inter-

section of party discipline (Krehbiel 2000; Pearson 2015[1]; Curry and Lee 2020), interest groups (Bennedsen and Feldmann 2002; Ceron, Curini, and Negri 2019; Epstein, Mealem, and Nitzan 2013), and the estimation of strategic party decision-making (Incerti 2018; Canen et al. 2021; Frey et al. 2021). The existing papers have not analyzed the policy gap between leadership and candidates in an election context; our framework lets us characterize how electoral pressures contribute to this gap. We thus speak to the work on dysfunction in Congress (Iaryczower and Katz 2016; Iaryczower, Lopez-Moctezuma, and Meirowitz 2022b) with an explanation informed by the structure of elections and the role of SIGs.

The discipline we consider is a loyalty reward via party spending, controlling for committee assignments, and is motivated by recent literature (Grimmer and Powell 2013; Pearson 2015; Thomsen et al. 2019; Adler and Cayton 2020; Provins, Monroe, and Fortunato 2021).[2] The existing work has not considered spending as a function of the policy gap, nor allowed incumbents to internalize the effects of their policy decisions on the the party leadership's strategy. We use election spending to measure SIG interest, which works for groups that use independent expenditures, but some may only give campaign contributions or lobby.[3] By jointly considering party and SIG spending, we can contrast their effects on candidate decisions.

Our election-seeking model (Mayhew 2004) is distinct from others which look at discipline (Bawn et al. 2012).[4] Polborn and Snyder Jr. (2017) (and Krasa and Polborn (2018)) consider a model where candidates care about candidate valence and the national party policy and they study the party incentives to moderate or not. This setup is similar to our party ideal's optimization program, but we allow for the candidate and party to have different positions. Curto-Grau and

[1]She studies US House the decision-making of party leaders and how they balance party control and majority control, finding that moderates are less likely to be party loyalists and the party punishes those candidates, which leads to them exiting and may help explain the rise in polarization. This leads to party discipline strengthening over time.

[2]Pearson (2015) finds committee assignments to be a major influencing instrument, but the trend in party leadership taking a bigger role in campaign finance to be geared more towards electoral incentives rather than discipline. Adler and Cayton (2020) find a growing trend in the importance of committee assignments for campaign fundraising. Earlier research found mixed results on the effects of Party electoral support on candidate loyalty (Cantor & Herrnson 1997).

[3]Dominguez and Skinner (2014) use campaign contributions to characterize alignment, and study why so few SIGs get involved in party politics. Candidates can also strategically use contributions, as there is evidence of committee assignment rewards for incumbents who transfer campaign funds to assist other candidates (Heberlig 2003).

[4]They develop a theory of how political parties are affected by activist groups. In their framework, the activist interest groups develop agendas and screen candidates in the primaries. They argue their model is distinct from an election-seeking politician centric model; in the latter model, politicians respond primarily to voter preferences and use interest groups for funding. Their model argues for less-responsive politicians via voter blind-spots to policy specifics.

Zudenkova (2018) consider a model of party discipline where the party rewards loyal candidates with district spending; the trade-offs for the candidate are similar to our model as the candidate must choose between voters and the party. We parallel this analysis and also incorporate the party's ideal optimization, SIGs, different kinds of rewards, and model-based counterfactual analysis. Finally, we focus on SIGs influencing elections with campaign spending, rather than lobbying in Congress (Figueiredo and Silverman 2006; Kang 2016). Our goal is to characterize the policy tensions between parties, SIGs, and candidates within an election environment.

2 Model

We present a formal model to capture the salient aspects of the campaign finance disciplining environment. Voters, donors/SIGs, and the party leadership all have ideal policies that may differ from the candidate's selected position. The key object that political agents have preferences over is the policy gap: the absolute difference between a candidate's policy position and the ideal policy of the political agent in question. Each political agent can sway the candidate to narrow the policy gap through pressure. A candidate wants votes to win the election in their district. To win the general election, the candidates must first win a primary election. The primary involves the candidate facing off with an opponent within that party; the primary election is closed and only voters aligned with the party vote in the primary. The winners of the primaries face off in the general election.

Voters' decisions are influenced by their policy gap, election (ad) spending, and exogenous factors including congressional committee assignments. Spending can be done by the candidate, "outside" groups like PACs (SIGs), and the party leadership. The ability of a candidate to spend is based on fundraising from donors, who are affected by their policy gap and committee assignments. SIGs and the party spend to help a candidate, and how much they spend is influenced by the candidate's win probability and their policy gap. The candidate chooses policy incorporating all of these factors. The whole game is solved by backward induction. While we include committee assignments as a control, we abstract away from modeling how the party leadership allocating assignments across members as that induces correlation across all districts and greatly complicates the formal analysis. In addition, we do not model the spillovers across districts as that would make it intractable; we assume voters and candidates are primarily concerned about their own district.

2.1 Stage 1: Party Leadership Ideal Policy

There are two parties g, Democrat D and Republican R. There are N districts/seats with candidates $c \in \{D_1, D_2, R_1, R_2\}$ for each district $i \in \{1, ..., N\}$.[5] Candidates choose a policy $p_{ci} \in [-1, 1]$ on a left to right spectrum.[6] Suppose the (national) party leadership has an ideal national agenda captured as a single policy $p_g \in [-1, 1]$ per party.

Consider a hypothetical situation in which party leadership could determine what single party agenda would be most popular nationwide among voters, ignoring special interest spending. In this scenario, the party could enforce one policy for all candidates to use as their policy agenda, meaning all members vote in exact alignment with party leadership: $p_{ci} = p_g$ for each party. What policy would the party prefer in this infeasible ideal case? Consider a seat maximizing party's objective, where P^*_{ci} is the chance of winning the election, taking both the primary and general election into account and setting all special interest group influence to zero:

$$\max_{p_g} \sum_{i \in \{1,...,N\}} P^*_{ci}(p_g, p_{-g}) \tag{1}$$

In the objective above, the party wants policy that is popular nationwide but must also be weary of alienating primary voters as they do not want extremist candidates winning primaries.[7] The program in equation (1) is solved simultaneously by both parties.[8] The summation is over all districts in the sample per election; this differs from the party only considering districts in which they have incumbents.[9] Note that the party is assumed to be seat maximizing; this is not innocuous as they could be majority seeking or weight seats differentially. We choose the seat maximizing approach in part because Incerti (2018) finds that this model fits the data better in the context of spend-

[5] We consider two candidates per party as most primaries only have two with non-trivial spending (Cox 2021).

[6] We do not study multi-dimensional policy given the lack of sufficient panel data on district level voter opinions on individual issues; current methods rely on combining surveys with census information (Warshaw and Rodden 2012). Furthermore, issue specific analysis is too large of a space to study candidate-decision making, but the multi-dimensional policy space can be simplified (Curry and Lee 2020; De March et al. 2021).

[7] If the party considers spending in their ideal policy calculation, then ideal policy could change as spending can compensate for unpopular policy in a given district.

[8] See Appendix A for a discussion on how we address possible multiple equilibria.

[9] This latter approach is reasonable as only those districts are relevant to the party's decision-making. Considering all districts is appropriate if we think the party attempts to influence same-party "mainstream" challenger positions.

ing.[10] We believe such a strategy in this hypothetical party decision is an adequate approximation to long-run equilibrium behavior. There are many options for modeling party objectives and for the purpose of analyzing national elections, a simple seat maximizing approach allows us to make other aspects of the environment more rich. We abstract away from modeling agenda control, platform formation, and the specifics of voting in Congress. Our model aims at characterizing policy ideals driven by revealed voter preferences from election outcomes.

Why would the party be interested in imposing a single policy as opposed to letting each incumbent choose the policy that maximizes their chance of winning their local district? A nationally popular congressional policy agenda may help the party in multiple ways (Rosenbluth and Shapiro 2018). The overall effectiveness of the party may also influence elections in the future, an aspect we do not formally model. Finally, the party leadership's ideal policy will affect the candidates via a "loyalty weight" $\omega_g(p_g, p_{ci})$ influencing how much party committees support candidates in the election, which we elaborate on later.

2.2 Stage 2: Incumbent Policy

The incumbent (say $c = R_1$) chooses a policy p_{ci} to maximize their chance of winning the election P_{ci}. Candidates cannot change policy throughout the election. The other players in the game have not made choices at this point yet, hence P_{ci} is just a function p_{ci}; the incumbent takes their planned actions into account via backward induction.

$$\max_{p_{ci}} P_{ci}(p_{ci}) \tag{2}$$

This policy can be interpreted as either a promise on which they are elected or as the revealed position that the candidate takes the two years up to the election, where the voters reward them for what they have done. This latter retrospective voting approach is common and empirically grounded (Campbell, Dettrey, and Yin 2010; Healy and Malhotra 2013). The two different interpretations can affect how one conceptualizes party discipline. The candidate commits to the same policy throughout the election cycle.

[10]There are other considerations, such as differences in the objective when the party holds a majority vs minority, or the difference between keeping a seat vs picking one up. Implementing such heterogeneity would be either ad-hoc or require additional parameters not separately identifiable from the parameters of interest given available data.

2.3 Stage 3: Challenger Entry

Next, challengers decide to enter $e_{ci} \in \{0, 1\}$. To rationalize non-entry, we allow challengers to have entry costs $F_{ci} > 0$. Let $\mathbf{e}_i$ be the vector of positions for all candidates in district i.

$$\max_{e_{ci}} e_{ci} \cdot \left(P_{ci}(\mathbf{e}_i | p_i^I) - F_{ci} \right) \tag{3}$$

This stage occurs after the incumbent's policy p_i^I (equal to $p_{R_1,i}$ in this case) to capture how challengers may enter based on the incumbent's decision. Without any entry costs, every primary would be challenged, which does not match the data.[11] The number of challengers is fixed and their characteristics are drawn from the available data on challengers. We do not follow a citizen-candidate model and instead assume a challenger's sole priority is to win the election.

2.4 Stage 4: Challenger Policy

Then the entrants choose a policy p_{ci} knowing the set of entrants (and the incumbent's policy), where the entry cost is now sunk. Let $\mathbf{p}_i$ be the vector of positions for all candidates in district i.

$$\max_{p_{ci}} P_{ci}(\mathbf{p}_i | e_{ci}, p_i^I) \tag{4}$$

The challenger's policy is more akin to a promise as they have no record on which voters can hold them accountable.

2.5 Stages 5 and 6: Primary Election Spending and Voting

After the set of candidates and their policies are known, the committees spend to influence voters and the voters choose their preferred candidates. We describe these stages together as the committee's objective is based on the voter's utility. Stage 5 is primary spending and stage 6 follows with voting decisions.

There are many voters v in district i. The primary voters registered to a given party have preferences on the policy gap between their own ideal p_i^P and the candidate's choice p_{ci}, the candidate's

[11] We ignore costs for the incumbent as the vast majority of incumbents run for re-election until retirement.

congressional committee assignments d_{ci}, additional covariates X_{ci}^P, unobserved characteristics ξ_{ci}^P (valence), and individual specific unobserved idiosyncrasies ε_{vci}^P. For each candidate in the primary election, the candidate campaign committees, PACs/SIGs, and party leadership committees k simultaneously engage in costly unobserved fundraising which translate, via their cost function c_{kci}^P, into observed primary election spending $S_{kci}^P \geq 0$. We assume the cost function is strictly increasing and weakly convex: $\frac{\partial c_{kci}^E}{\partial S_{kci}^E} > 0$ and $\frac{\partial^2 c_{kci}^E}{\partial (S_{kci}^E)^2} \geq 0$ for $E \in \{P, G\}$. The voter's indirect utility for voting for a certain candidate U_{vci}^P is given below:

$$U_{vci}^P = \gamma_i^P (p_i^P - p_{ci})^2 + \delta^P d_{ci} + \sum_k \beta_k^P (S_{kci}^P)^\theta + X_{ci}^P \beta^P + \xi_{ci}^P + \varepsilon_{vci}^P \tag{5}$$

Abstention has utility $U_{v0i}^P = \varepsilon_{v0i}^P$. The parameters β^P capture the influence of the characteristics on their utility and γ_i^P captures their district specific preferences over policy. If $\gamma_i^P < 0$, voters punish candidates who stray from their preferred policy. Spending affects the voters as candidates inform voters on their policies and qualities.[12]

The voter's (expressive and sincere) voting decision is based on which candidate gives them higher utility $U_{vci} > U_{vc'i}$.[13] With individual idiosyncrasies ε_{kci}^P distributed identically and independently Type 1 Extreme Value, the probability of choosing candidate c_i (over the primary opponents in the set C_i^P and not voting at all) has a Logistic functional form. Using this we can derive the share of votes that candidate c_i receives in the primary election, letting $u_{ci}^P = U_{vci} - (\xi_{ci}^P + \varepsilon_{vci}^P)$:

$$s_{ci}^P = \frac{\exp(u_{ci} + \xi_{ci}^P)}{1 + \sum_{c' i \in C_i^P} \exp(u_{c'i} + \xi_{c'i}^P)} \tag{6}$$

The candidate wins if they have the highest share (plurality not majority rule). Suppose that ξ_{ci}^P is not perfectly observed by the candidates (or committees). Let the candidates and committees have beliefs over how they are perceived $\xi_{ci}^P \sim$ iid Type 1 Extreme Value with location ψ_{ci}^P and scale σ_{ξ^P}; all candidates and committees share the same beliefs on ξ_{ci}^P and this is common knowledge. Then the probability of winning the primary P_{ci}^P from the candidate's perspective (as a function of

[12]This presumes a certain degree of naivety in the voters in that they do not internalize that spending by SIGs may be linked to candidates skewing their policies towards the SIGs' preferences.

[13]We do not model the voter directly taking the general election into account when choosing a candidate in the primary; modeling the voter's expectations is difficult (as they likely differ from committee or candidate expectations) and the current model fits the data well.

spending and conditional on policy and committee assignments) is the following:

$$P_{ci}^{P}(\mathbf{S}_{i}^{P}|\mathbf{p}_{i}, d_{ci}) = \frac{\exp((u_{ci}^{P} + \psi_{ci}^{P})/\sigma_{\xi^{P}})}{\sum_{c'i \in C_{i}^{P}} \exp((u_{c'i}^{P} + \psi_{ci}^{P})/\sigma_{\xi^{P}})} \tag{7}$$

Each committee k decides how much to spend based to support a given candidate. The value they place on this candidate winning however is based on how aligned the candidate's choice policy is to the ideal policy of the committee. We formalize this with the loyalty weight $\omega_k(p_k, p_{ci})$, which is a function of the policy gap between the candidate and the committee; let p_k be their ideal policy.

$$\max_{S_{kci}^{P}} P_{ci}^{P}(\mathbf{S}_{i}^{P}|\mathbf{p}_{i}, d_{ci}) \cdot \omega_{k}(p_{k}, p_{ci}) - c_{kci}^{P}(S_{kci}^{P}) \tag{8}$$

The spending may influence voters' decisions (Jacobson 1978; Gordon and Hartmann 2013) and a winner of each primary is decided. Note that committees internalize the opposing side's primary when deciding how much to spend in their own as the general election opponent affects their primary payoff.[14] Our analysis and functional forms fit with closed primaries, which the majority of states follow. Alternative primary systems, like those in California and Louisiana, complicate the analysis, and we do not consider these states.

2.6 Stages 7 and 8: General Election Spending and Voting

For the general election, the relevant committees spend again (stage 7) and the set of general election voters choose among the remaining candidates (stage 8). The probability of winning the general election P_{ci}^{G} conditional on winning the primary W_{ci}^{P} has a similar form to the primary, just with different voters and election specific parameters:

$$P_{ci}^{G}(\mathbf{S}_{i}^{G}|\mathbf{p}_{i}, d_{ci}, W_{ci}^{P} = 1) = \frac{\exp((u_{ci}^{G} + \psi_{ci}^{G})/\sigma_{\xi^{G}})}{\sum_{c'i \in C_{i}^{G}} \exp((u_{c'i}^{G} + \psi_{ci}^{G})/\sigma_{\xi^{G}})} \tag{9}$$

For each candidate that won their primary $W_{ci}^{P} = 1$, the committees k engage in fundraising which generate, via their costs c_{kci}^{G}, general election spending $S_{kci}^{G} \geq 0$. Their payoff is similar to the primary but now is just conditional on the primary outcome and with a new set of voters and

[14] Note that the only tool we model for SIG influence is spending money during the election; we abstract away from any informational lobbying elements (Cotton 2012; Schnakenberg and Turner 2021).

costs. The loyalty weight is the same as policy has not changed from the primary.

$$\max_{S^G_{kci}} P^G_{ci}(\mathbf{S}^G_i|\mathbf{p}_i, d_{ci}, W^P_{ci} = 1) \cdot \omega_k(p_k, p_{ci}) - c^G_{kci}(S^G_{kci}) \tag{10}$$

The spending affects voting decisions of voters and a winner of the general election is decided.

2.7 Discussion

We establish existence of an equilibrium for the entire game and discuss it in Appendix A.

Proposition 1. *There exists a sub-game perfect Nash equilibrium for the game described in 2.1-2.6.*

The main trade-off a candidate faces with respect to voters is balancing policy between the primary and general in the case that policy preferences differ across those voters. Their secondary concern is balancing between voter, party, and SIG preferences. The model is agnostic to the magnitude of these various pressures on the candidates. We estimate the model with data to uncover the factors that drive candidate behavior, allowing us to quantify the comparative statics of the model.

3 Data

We study the United States House of Representatives. The key variable of interest per election cycle is a composite one-dimensional "policy position" on a left to right scale (-1 to 1) that captures an individual or group's political alignment. We want this variable for voters, candidates, the national party leadership, and SIGs. Beyond this, the political environment includes district characteristics, congressional committees, campaign contributions, and election spending. We approximate a voter's ideal policy and a candidate's chosen policy directly from data. The latent ideal policies for candidates, party leadership, and SIGs must be estimated.[15] We get candidate ideology from CFscores (Bonica 2014), a measure based on the contribution network of all donors. The most common alternate policy variable, DW-NOMINATE, is based on voting records in Congress

[15]National party platforms are a possible ideal party measure, but likely are a function of other factors including the underlying latent policy, for which we solve.

and thus is only observed for incumbents. The two measures are highly correlated for incumbents (Bonica 2014; Cox 2021). While our measure has known issues (Tausanovitch and Warshaw 2017), there is no alternative that is systematically observed for challengers, and the challenger's policy is an important factor in shaping the incumbent's choice. One concern is that if SIGs donate to candidates, then our measure of candidate policy is a function of an endogenous choice variable; the SIGs in our model engage in independent expenditures, which are not directly given to candidates and thus are not components of our ideology measure.

We use election results from CQ Press and the FEC, and measure the safety of the seat based on previous literature (Kustov et al. 2021). Specifically, we use re-scaled lagged presidential election votes to measure a district's general election voter preferences, acknowledging the difficulties with measuring and interpreting policy preferences (Kernell 2009). We also need an ideology variable for primary voters as they can influence candidate policy (Nielsen and Visalvanich 2017). We use previous presidential primary data: the convex combination of candidate ideology weighted by vote-share gives a district-specific information on Primary preferences. We scale this by its mean and multiply it by the general election preferences and a factor of 5 (chosen to maximize fit). There may be concerns over harmonizing between the voter and candidate policy measures. Neither variable changes by more than 0.4% on average from a standardization routine: convert to z-scores and then scale to be between -1 and 1.

Capturing district level exogenous voter policy preferences p_i with presidential election results may seem problematic as the voting decision is a function of latent ideals and other factors. A district-level partisan voting index allows us to broadly rank districts by their level of partisanship. This can fall short in elections in which the candidate's valence dominates their policy issues; averaging across the last two election cycles of presidential results (as in the traditional PVI) assuages this issue and does not significantly affect the results.[16] Alternatively, one could be agnostic to the voter's ideal; instead of using $\gamma_i^P(p_i^P - p_{ci})^2$ to capture the voter's utility from the policy gap, one can specify their preference over policy as $\alpha^P p_{ci} + \gamma^P p_{ci}^2$, which allows for partisan α and moderation γ preference. While this parameterization is robust to measurement error in the voter's ideal,

[16]Another issue is the index assumes that the degree of partisanship of voters across presidential and congressional races is similar; in particular, different dimensions of policy might drive voting behavior differentially across the two kinds of races, which could bias the policy gap estimate. However there is a trend towards national issues affecting local races, which may reduce this concern.

it does not fit the data as well, so we choose the former approach acknowledging the limitations.

To validate our voter preference variable, we compare it to existing measures. The first benefit of our measure is that it can be applied to both general and primary elections. The second benefit is that it can be constructed for the entire duration of the panel: 2002-2018 for every Midterm and Presidential election. The best alternative measure is the American Ideology Project's large scale survey of individual voting preferences, created and discussed in Tausanovitch and Warshaw (2013). They measure ideology and presidential voting behavior averaged to each district, from surveys of over half a million Americans. The surveys are based on the Annenberg National Election Study and the Cooperative Election Study. Their dataset is only available for four elections from 2002-2018 (2008, 2014, 2016, and 2018). The correlation coefficient between our district specific preference variable and theirs is 0.86. Thus our measure is similar to an established method but has greater coverage across districts and years.

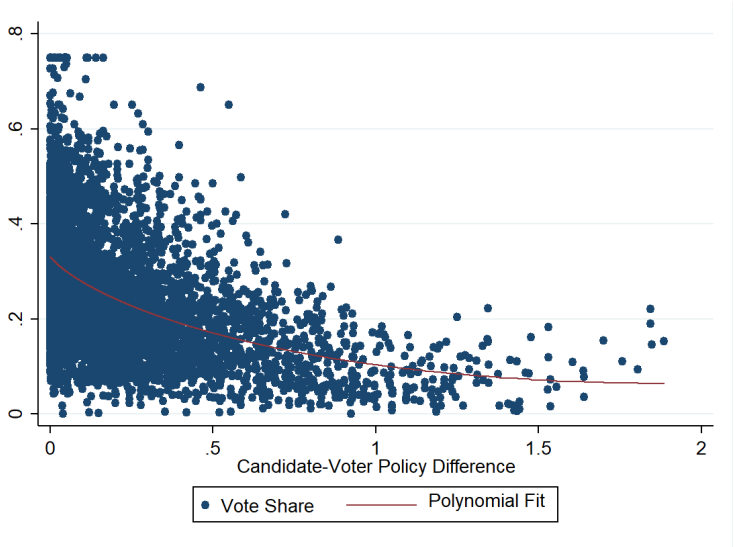
Figure 1 below shows how candidate vote share changes with the gap between the candidate and the voters in their district. Most candidates pick positions that are closely aligned with their district. Candidates choose policies close to their voters, but parties care about voters across the country: Figure 2 shows the distribution of the squared difference between incumbent positions and the median voter; there is significant heterogeneity across districts and thus the party has an incentive to maneuver candidates to better match the nationwide median voter.

We look at PACs and Super PACs to gage SIG election influence. The candidate takes into account the SIG's preferences when making their policy choice. SIGs reveal their support for candidates via campaign contributions and independent expenditures. We get campaign contributions and independent expenditures from Open Secrets and the FEC. We do not consider non-financial forms of support such as get-the-vote out campaigns by activists, explicit endorsements, or candidate "report cards" (see the NRA's ratings).[17] We group committees by type: PAC supporting Republican incumbent, Super PAC supporting Democratic challenger, etc.[18] We focus on independent expenditures as they are directly comparable to the candidate's election ad spending and do

[17]We also do not consider lobbying. Lobbying activities are distinct from election support as lobbying targets current Representatives and bills while contributions and election spending target voters.

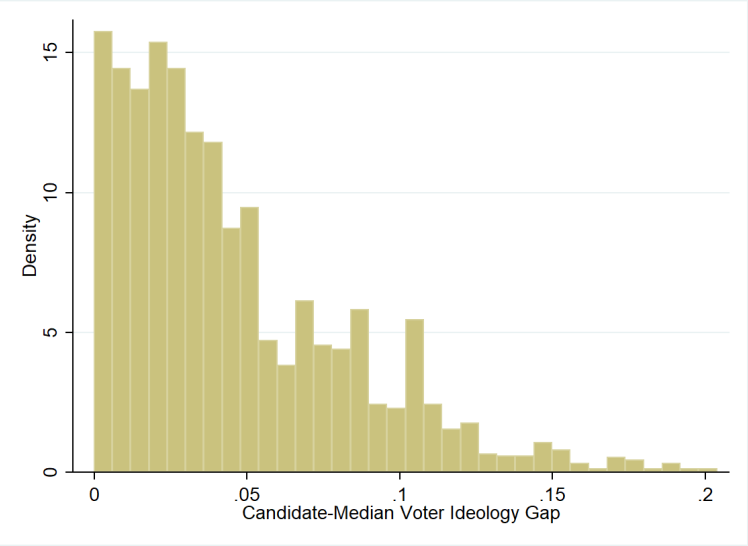
[18]This is fairly innocuous. First, in most races only one committee per type spends non-trivial amounts. Second, in equilibrium, only the most efficient per type would spend non-trivial amounts.

Figure 1: Candidate General Election Vote Share and Candidate-Voter Ideology Gap



This plots the data and polynomial fit of how candidate vote share changes with the gap between the candidate and the voters in their district; measure by squared difference in candidate's normalized CF score and scaled lagged presidential votes.

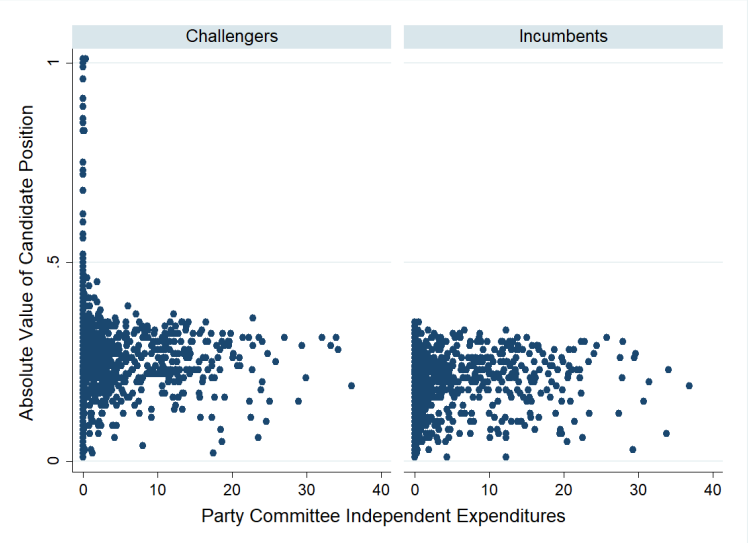
Figure 2: Candidate-Median Voter Ideology Gap



This plots the histogram in the squared difference between candidate positions and the median voter; the median voter position is the median of scaled lagged presidential votes per election cycle across districts.

not have any limitations on the amount that can be spent.[19] Campaign contributions to House candidates have strict limits per election ($2,900 from a PAC and $5,000 from a party committee) and thus are unlikely avenues for major electoral influence from a single source. Party leadership does engage in significant fundraising. These funds are redistributed across many candidates, state-level committees, and used for direct ad buys (like independent and coordinated expenditures). We combine the independent expenditures from national and state-level party committees, acknowledging that they may have different ideal policies when supporting the same House candidate. The party leadership almost never funds extreme candidates, as illustrated in Figure 3, and rarely ever spends in support of a challenger who is more extreme than any incumbent.

Figure 3: Party Spending and Candidate Policy



This plots the data of log party committee independent expenditures and the absolute value of the candidate policy position, separated for challengers and incumbents.

We control for committee assignments in their electoral influence and retrieve them from Charles Stewart III's collected dataset and motivate our measure of seat importance on Groseclose and Stewart III (1998).[20] We measure the "quality" of committee assignments that a given candidate has prior to the election by ranking all committees by the average tenure (of all members) on the committee (which captures the desirability and lack of transfers off of it) and take the average across all committees on which the candidate served. We set the quality to 0 for challengers.

[19] We also include coordinated party expenditures as they are similar with relatively high limits: link.

[20] We use the committee placements. See Rohde and Shepsle (1973) for an application of committee request data.

4 Identification and Estimation

The basic elements of measuring party discipline include the observed position for the candidate, the unobserved ideal for the candidate, and the unobserved ideal for the leadership. This ideal refers to the counterfactual position of when there is no discipline (candidate ideal) or complete discipline (party ideal).[21] Recall that the candidate's observed position is a composite of their ideal and deviations from that ideal via discipline. So solving for their (latent) optimal choice and comparing it to their observed choice backs out how much they have deviated due to discipline.

The model estimation steps broadly follow the backward induction used to solve the model. Some stages are dependent on parameters from others, and so all stages are estimated in one routine with nested fixed point. First, we estimate the preferences of general election voters, which is effectively a regression of election vote share outcomes on spending, policy, and exogenously given candidate/district characteristics (including congressional committee assignments). This captures how committee spending decisions are taken as given by the voters on election day. By estimating the voter stage, we can then characterize the voter's optimal choice as a function of the actions from previous stages. The committees then optimize knowing their influence on the voting outcomes. Thus we can estimate additional parameters that influence election committee spending, including the loyalty weight and implicit fundraising costs. These are estimated by regressing the marginal benefit of spending (in that race) on the marginal cost.

Next, the estimation is repeated for the primary, with voter preference and spending regressions. We now use primary election variation but still incorporate how actions in the primary affect the general election. A key aspect here is that committees are forward-looking and consider the various general-election scenarios; we can calculate those as we have already characterized the parameters of the general election. Next, we estimate the challenger entry decisions taking into account all previous steps; we fit a generalized linear model of the entry decision on the expected win probability as a function of candidate/district characteristics. Finally, we discuss the party ideal stage, in which we estimate the nationwide system determining ideal policies for each party. These values are treated as given by the other players and plugged into the loyalty weights for party

[21] Assuming that the "no discipline" scenario is ideal for the candidate is not innocuous. It could be the case that voters care about how much the "whole party" accomplishes, which is affected by all positions, and thus a candidate may care about the positions of other candidates in the party. We abstract away from this possibility.

committees in the spending stages.

4.1 Voter Preferences Estimation

To estimate the vote share parameters (shown for the primary with a general election analog), we transform equation (6) into a linear regression and control for the unobserved candidate characteristics (valence) captured in ξ. Specifically, we regress the turnout-adjusted log-odds vote shares on spending, policy, and committee assignments, and various district and candidate characteristics. This is shown in equation (11), where s^{P_0} is the share of abstention in the primary election. The parameters of this regression capture voter preferences over observables and the residual captures the candidate's valence. We set $\theta = 1/2$ for both the general and primary elections.

$$\ln(s_{ci}^P / s_{ci}^{P_0}) = \gamma_i^P (p_i^P - p_{ci})^2 + \delta^P d_{ci} + \sum_k \beta_k^P S_{kci}^\theta + X_{ci}^P \beta^P + \xi_{ci}^P \tag{11}$$

Our model specification has similarities to those in the literature (Iaryczower, Kim, and Montero 2022a; Shachar 2009; Ujhelyi, Chatterjee, and Szabó 2021). While these recent papers have more flexible voter preference specifications, we jointly estimate voter preferences across both the general and primary elections. While we have a very extensive set of controls, endogeneity concerns may remain. As a robustness check, we use lagged advertising prices as an instrument for spending. Lagged election variables, such as advertising prices, are common instruments for candidate spending (Green and Krasno 1988; Rekkas 2007; Gordon and Hartmann 2013; Gordon and Hartmann 2016). Our instrument is the lagged advertising price in that district (measured by media market level SQAD Cost Per Point Levels for TV Households). This only varies at the district level so we aggregate candidate and non-candidate spending into a single variable.

To estimate the remaining stages of the model, we need to have an estimate for the candidate valence for all candidates involved in the election. The estimated valences ξ from the voter preference regression (11) for both the general and primary elections are only recoverable for elections with vote shares between 0 and 1. In addition, those who lost the primary have a primary election estimated valence but no general election estimated valence, and non-entrants have neither. We approximate unobserved general election valences for primary losers by linearly predicting general election valences from primary valence across candidates.

The valence for non-entrants cannot be directly estimated since the non-entrants never received any votes. State legislature candidates who did not run for Congress have state-level vote shares and their valences (relative to State-legislature candidates who run for Congress) are a good proxy for non-entrant quality differences. Cox (2021) finds that congressional non-entrants have a 20% lower valence in State legislature races and so we assume the non-entrants have a valence 20% lower than the mean for challengers in that state (per party). Table 1 displays the summary statistics for the variables used in general election voter preferences.

Table 1: General Election Voter Regression Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Log(Vote Share)-Log(Abstention)	-0.744	0.869	-7.48	1.099	6599
Candidate Spending	1.938	4.331	0	50.221	14172
Non-Candidate Spending	1.294	5.268	0	93.637	14172
Can-Voter Policy Gap	0.184	0.249	0	3.366	14172
Can Com. Assignment	6.884	12.94	0	36	14172
Can Within-State Donor Income Changes	0.217	0.455	-3.789	5.663	14172
Party Within-State Donor Income Changes	0.123	0.213	-1.135	3.783	14172
S-PAC Within-State Donor Income Changes	0.139	0.388	-3.26	5.694	14172
District Unemployment Rate	5.907	2.025	2.142	16.869	14172
District Income	7.953	1.434	5.267	15.972	14164
District Unemployment Rate	8.799	6.222	1.151	29.548	14172
Last President Vote Share (R)	0.489	0.15	0.03	0.825	14172
Incumbent=1	0.226	0.418	0	1	14172
Party=Republican	0.5	0.5	0	1	14172
Incumbent Lagged Votes	0.528	0.306	0	1	14168
Number of Senate Candidate Running	6.787	6.711	0	29	14172
Governor Same Party	0.483	0.5	0	1	14172
District %< High School	29.164	6.367	11.2	47.602	14172
District Median Age	40.083	3.513	29.306	51.269	14172
District Mean Precipitation	0.126	0.14	0	1.09	14172
District % White	0.746	0.176	0.16	0.968	14172
District % Men	0.491	0.01	0.457	0.537	14172
Candidate Positions	0.006	0.213	-1.005	1	14172
Voter Positions	0.03	0.376	-1	1	14172

Spending is transformed by taking the square root of spending in thousands.

4.2 Spending Stages Estimation

Next we estimate the general election spending decisions by election committees aligned with each candidate $k = \{$candidate's own campaign, party committees, PACs, and Super PACs$\}_g \forall g \in$

$\{D, R\}$ with committee candidate district specific marginal costs c^G_{kci}. Recall k's objective when supporting candidate c in district i: $\max_{S^G_{kci}} P^G_{ci}(\mathbf{S}^G_i|\mathbf{p}_i, d_{ci}, W^P_{ci} = 1) \cdot \omega_k(p_k, p_{ci}) - c^G_{kci}(S^G_{kci})$. The loyalty weight ω_k is given below, where we allow party-specific penalty $\alpha_g > 0$. A small α_g implies there is little punishment whereas a large α_g implies only candidates who are close to the supporter's ideal policy will receive any substantial help.

$$\omega_k(p_k, p_{ci}) = \exp(-\alpha_g|p_k - p_{ci}|) \tag{12}$$

One may think that the party rewards past loyalty. While one could capture this by including the lagged policy gap inside the loyalty weight, in a given election, the party is incentivized to reward candidates that maximize their objective in that specific election cycle. It would also require an additional strictness parameter as the party could be faced with a candidate who was loyal in the past but whose current position is undesirable. Incorporating how such dynamics affect the candidate's decision-making are beyond the scope of this analysis. Our focus is on how in a given election, the party's strategic spending may be influenced by the policy gap. The parsimonious ω_k specification makes analyzing the interactions between the party, candidates, and SIGs tractable.

Next we derive the optimality conditions for each committee k spending in the election by differentiating their objective with respect to their spending, yielding a system of equations that can be rearranged and estimated. We parameterize costs as $c^G_{kci} = \exp(X_{kci}\delta_k + \epsilon_{kci}) \cdot S^G_{kci}$, where X_{kci} are covariates that affect committee fundraising ability and ϵ_{kci} is unobserved noise. For candidate committees, we include their policy and committee assignments as those may affect donors, meaning $[p_{ci}, d_{ci}] \in X_{kci}$ for candidates.[22]

We estimate equation (13) for each committee type k in a distinct manner. For candidate committees, we just estimate δ_k as there is no policy gap. For party committees, we estimate δ_k and α_g. For SIGs, we estimate δ_k and p^*_k. We normalize α_g to be equal to the party's value, as we cannot separately identify the SIG's ideal policy from their penalty. We estimate an ideal policy per SIG-type and party affiliation. Given available data, we must normalize committee uncertainty

[22]For SIGs, the policy gap captures this aspect; by not including policy in their cost function, we are assuming fundraising is independent of policy of candidate they support, but recall that SIGs only support candidates who are close to their ideal (which represents donors) so conditional on the policy gap, policy may not affect cost.

($\sigma_\xi = 1$) and assume that valence estimates equal the committee expectations $\xi = \psi$.

$$\log(P_{ci}^G(1 - P_{ci}^G)\beta_k^G\theta(S_{kci}^G)^{\theta-1}) = X_{kci}\delta_k + \alpha_g|p_k^* - p_{ci}| + \epsilon_{kci} \tag{13}$$

The left hand side captures committee k's spending and its effects on the election. The variation identifying the penalty is the covariation between the marginal effectiveness of party spending on the vote share and the policy gap for the candidate and party, conditional on fundraising constraints X_{kci}. The basic result can be seen in the data, where the correlation between party spending and the policy gap for competitive races is negative. Similarly, the SIG's ideal policy is identified off how much they spend, controlling for its marginal effectiveness. Simply looking at how much they spend is insufficient as high spending could imply a small gap or high effectiveness. Thus estimating the voter preferences first is key. Since spending less than \$200 is not reported, we set that as the minimum spending level.[23]

Next, we estimate the primary election parameters for committees in both primaries. It is useful to decompose the unconditional win probability with general and primary election terms: $P_{ci} = Pr(W_{ci}^G = 1|W_{ci}^P = 1) \cdot Pr(W_{ci}^P = 1)$. Note that this can be expanded to also condition on which opponent the candidate faces in the general (consider candidate R_{1i}'s perspective):

$$\begin{aligned} P(W_{R_{1i}}^G = 1) =& P(W_{R_{1i}}^G = 1|W_{R_{1i}}^P = 1, W_{D_{1i}}^P = 1) \cdot P(W_{R_{1i}}^P = 1) \cdot P(W_{D_{1i}}^P = 1) \\ &+ P(W_{R_{1i}}^G = 1|W_{R_{1i}}^P = 1, W_{D_{2i}}^P = 1) \cdot P(W_{R_{1i}}^P = 1) \cdot P(W_{D_{2i}}^P = 1) \end{aligned} \tag{14}$$

The first order conditions for the primary spending program let us estimate costs c^P for any committee spending in the primary. The main difficulty in this setup is dealing with the counterfactual general election win probability for the primary loser. Each candidate's chances in the general election affect decision-making in the primary election but we only observe the general election outcomes for the primary winners. For example, Bernie Sanders lost the Democratic primary in the 2020 presidential election, but committees formed expectations about Sanders' chances in the general election when deciding how much to spend in the primary.

[23]This is a trivial amount and this approach simply allows us to avoid dealing with corner solutions. Furthermore, practically every non-trivial candidate receives significant support through various channels. Modeling entry in both the primary and general complicates the estimation. We considered this in an earlier version of the paper; it required modeling a two-part weight and committee entry costs, which introduced new identification issues.

Thus to evaluate the primary loser's first order condition, we need to back out their general election chance. This probability is a function of the general election parameters we previously estimated. Thus to accurately capture primary election dynamics, estimating the general election first is key as then we can solve the general election stage for the unobserved candidate combination. With a known P_{ci}^G (known for primary winners and backed-out for primary losers), we estimate a primary analog to the general election regression (shown for a single contested primary). For SIGs that spent in the general election, the loyalty weight is already known and only unknown for SIGs whose preferred candidate lost the primary.

$$\log(P_{ci}^G P_{ci}^P (1 - P_{ci}^P)\beta_k^P \theta (S_{kci}^P)^{\theta-1}) = X_{kci}^P \delta_k^P + \alpha_g |p_k^* - p_{ci}| + \epsilon_{kci}^P \tag{15}$$

4.3 Challenger Entry Estimation

There is nothing to estimate in the challenger policy choice stage since we observe their policies and they simply maximize their win probability. Prior to policy is their entry stage. Their equilibrium entry is a function of the incumbent's position p_i^I, exogenous model variables $\mathbf{Z}_i$ (which includes their own valence and the relevant exogenous predictors from earlier stages), and unobserved fixed costs F_{ci} for each candidate. The main purpose of including challenger entry/policy is to simulate how the existence of challengers influences the incumbent's decision. To this end, we estimate the equilibrium entry function with a Logit regression of whether the primary was contested as a function of p_i^I, $\mathbf{Z}_i$, and $\mathbf{F}_i$. We parameterize $F_{ci} = \exp(X_{ci}^F \beta_F)$ where X_{ci}^F is a challenger party and incumbent party interaction.

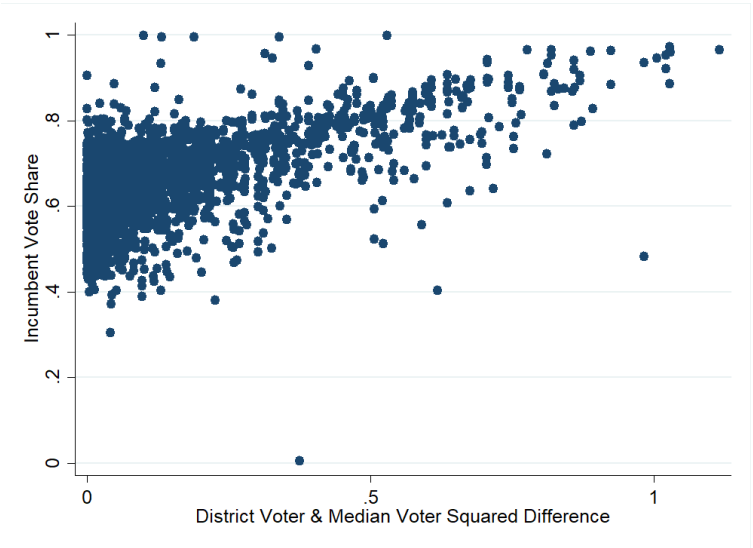
4.4 Party Ideal Estimation

We solve for both party leaderships' latent policy ideals as functions of the voter preferences. We plug in the estimated voter parameters and solve the system of first order conditions for equation (1) across both parties simultaneously for each election cycle. Note that P_{ci}^* is mathematically equivalent to P_{ci} with β_k^G and β_k^P set to zero $\forall k$.

Figure 4 illustrates the party's calculus and a source of their tension with the incumbent. This graph shows the incumbent's vote share (excluding abstention) and the ideology difference be-

tween the voters in that district and the nationwide median. The positive relationship illustrates how safe seats are a function of more partisan districts.[24] Thus when the party is considering all districts simultaneously when choosing a policy, they implicitly put less weight on those seats that are very safe and focus on the bulk of seats that are more competitive with more moderate voters.

Figure 4: Incumbent General Election Vote Share and District Voter-Nationwide Median Voter Ideology Gap



This plots the relationship between how safe a seat ends up being (excluding abstention) and the degree of relative extremism of the voters in that district.

5 Results

5.1 Parameter Estimates

5.1.1 Voter Preferences

Table 2 displays results for the voter preference regressions, meaning equation (11) for the general and primary elections. The dependent variable is a candidate's turnout adjusted log vote share. We include many political, economic, and demographic controls to soak up confounding variation. We are primarily concerned with the effects of spending and voter preferences on the candidate's vote

[24] One may be concerned about whether this relationship is mechanical due to the correlation between presidential and congressional votes; the relationship (correlation coefficient) is largely unaffected by including the incumbent's lagged vote share in their own district as a control.

share. We group all SIG and party spending into the "non-candidate" spending category.

The effect of candidate spending on the vote share is more effective per dollar than non-candidate spending; the candidate's messaging is likely more effective than that of outside groups. Also, candidates consistently spend more than non-candidate groups, and the latter typically spend the most in competitive races in which groups on both sides are already spending. The policy gap between general election voter preferences and candidates is strongly negatively correlated with the vote share, indicating that voters punish candidates whose policies do not align with them.

For primaries, we see similar effects for both spending and policy, as primary voters reward candidates who are closer to them. For Democratic primaries, the policy gap effect is noisier, indicating that Democratic primary voters may punish moderates less than Republican primary voters. Finally, the effect of congressional committee quality on vote share is null. Electoral benefits to committee assignments may arise from channels such as fundraising, discussed later.

The IV results are largely consistent with the OLS results, with a larger spending coefficient. This indicate that the large set of controls and fixed effects soak up major confounders so that we can proceed in the counterfactuals with the OLS results separating out the two types of spending.

5.1.2 Party Ideals

Table 4 displays the estimated party policy ideals each election cycle with percentile bootstrapped confidence intervals with 1,000 draws. We use the voter preference parameters in every district in a given cycle to estimate what single position the party would implement to maximize nationwide seats. We find that the party's ideal is more moderate than the average of their individual members, with Democratic (Republican) leadership preferring a position 15.4 (2.7) points closer to the middle than their average incumbent (from 0 to 100). The Republican leadership has a 17.0 point more partisan ideal position than Democrats, which may be a consequence of the higher primary election pressure on Republican incumbents and the fact that more districts lean slightly conservative than liberal. For districts that are close to the party's ideal, there is little party spending except in cases where a high valence challenger threatens to unseat the incumbent. Note that in 2006 and 2008, the Democratic leadership's ideal position moves to the right of zero. The reason is that the optimization is about maximizing the number of seats, and, as just noted, the district level median

Table 2: Voter Preference Regressions

DV: Log(Vote Share/Abstention)	General	R Primary	D Primary
Candidate Spending	0.0054***	0.0501***	0.0623***
	(0.0016)	(0.0044)	(0.0053)
Non-Candidate Spending	0.0025*	0.0117*	0.0166**
	(0.0011)	(0.0050)	(0.0058)
Can-Voter Policy Gap	-0.3662***	-0.2066*	-0.0993
	(0.0368)	(0.1011)	(0.0656)
Can Com. Assignment	0.0033	0.0036	0.0053
	(0.0018)	(0.0033)	(0.0039)
Party=Republican=0 × Rural	0.0800***		0.1391***
	(0.0084)		(0.0142)
Party=Republican=1 × Rural	0.0709***	0.0654***	
	(0.0097)	(0.0148)	
Can Within-State Donor Income Changes	0.0146	0.0790*	0.1750***
	(0.0196)	(0.0354)	(0.0369)
Party Within-State Donor Income Changes	-0.0763		
	(0.0446)		
S-PAC Within-State Donor Income Changes	-0.0189	-0.0863	-0.1579***
	(0.0196)	(0.0549)	(0.0450)
District Unemployment Rate	0.0224**	-0.0145	0.0201
	(0.0075)	(0.0129)	(0.0167)
District Income	0.0964***		
	(0.0103)		
District Unemployment Rate	-0.0320***	-0.0157**	-0.0036
	(0.0027)	(0.0057)	(0.0056)
Last President Vote Share (R)	-0.3168**		
	(0.1222)		
Incumbent	25.2401***	49.0079***	-55.7476***
	(4.9162)	(9.9207)	(10.5298)
Republican	9.1239		
	(4.9928)		
Incumbent Lagged Votes	-0.1019**	-0.2853***	-0.0063
	(0.0373)	(0.0722)	(0.0647)
Number of Senate Candidate Running	0.0019*		
	(0.0010)		
Governor Same Party	-0.0073		
	(0.0128)		
Incumbent=0 × Republican=0 × Cook's	-0.0303*		0.0492***
	(0.0119)		(0.0091)
Incumbent=0 × Republican=1 × Cook's	0.0888***	0.0075	
	(0.0074)	(0.0089)	
Incumbent=1 × Republican=0 × Cook's	-0.0088		-0.1685***
	(0.0172)		(0.0338)
Incumbent=1 × Republican=1 × Cook's	0.0715***	0.1123***	
	(0.0217)	(0.0251)	
Republican=0 × Incumbent=0 × Cycle	0.0181***		-0.0281***
	(0.0032)		(0.0052)
Republican=0 × Incumbent=1 × Cycle	0.0057*		
	(0.0024)		
Republican=1 × Incumbent=0 × Cycle	0.0125***	0.0242***	
	(0.0025)	(0.0049)	
Observations	6573	4091	3995
R^2	0.713	0.557	0.459
State FEs	yes	yes	yes
Year FEs	yes	yes	yes
District Demographics Interactions	yes	yes	yes

Robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The dependent variable is the difference in the log of vote shares for the candidate and the "outside share", meaning non-voting subset. Cook's refers to Cook's competitiveness ratings. "District Demographics Interactions" refer to party-incumbency interactions with district demographics including age, education, gender, and race.

Table 3: General Election IV Regressions

	OLS	1st Stage	2nd Stage
	Log(Vote Share/Abs.)	Spending	Log(Vote Share/Abs.)
Can. + Non-Can. Spending	0.0036***		0.0266***
	(0.0006)		(0.0067)
Lagged Ad Prices		-0.0452***	
		(0.0056)	
Can-Voter Policy Gap	-0.3679***	-1.6632***	-0.1971***
	(0.0368)	(0.2360)	(0.0598)
Can Com. Assignment	0.0034	-0.0277	0.0035
	(0.0018)	(0.0336)	(0.0020)
Party=Republican=0 × Rural	0.0801***	0.1978	0.0690***
	(0.0085)	(0.1132)	(0.0101)
Party=Republican=1 × Rural	0.0709***	0.3238**	0.0554***
	(0.0097)	(0.1110)	(0.0114)
Can Within-State Donor Income Changes	0.0151	-0.1367	0.0298
	(0.0196)	(0.1688)	(0.0214)
Party Within-State Donor Income Changes	-0.0782	4.6973***	-0.2954**
	(0.0447)	(0.6007)	(0.0903)
S-PAC Within-State Donor Income Changes	-0.0197	0.8618*	-0.0594*
	(0.0196)	(0.3358)	(0.0263)
District Unemployment Rate	0.0224**	0.1226	0.0205*
	(0.0075)	(0.0782)	(0.0082)
District Income	0.0966***	0.0609	0.0981***
	(0.0103)	(0.0501)	(0.0104)
District Unemployment Rate	-0.0322***	-0.0190	-0.0244***
	(0.0027)	(0.0246)	(0.0035)
Last President Vote Share (R)	-0.3074*	1.0440	-0.4661**
	(0.1219)	(1.3738)	(0.1443)
Incumbent	25.1805***	-4.7e+02***	26.9497***
	(4.9103)	(81.6793)	(5.7198)
Party=Republican	9.2938	85.6699	4.6908
	(4.9886)	(55.8250)	(5.7558)
Incumbent Lagged Votes	-0.1025**	-1.6628***	-0.0013
	(0.0373)	(0.3370)	(0.0495)
Number of Senate Candidate Running	0.0019	-0.0162	0.0032**
	(0.0010)	(0.0111)	(0.0012)
Governor Same Party	-0.0074	-0.0692	-0.0021
	(0.0128)	(0.1424)	(0.0142)
Incumbent=0 × Party=Republican=0 × Cook's	-0.0314**	0.1695**	0.0184
	(0.0119)	(0.0636)	(0.0202)
Incumbent=0 × Party=Republican=1 × Cook's	0.0897***	-0.1068	0.0440**
	(0.0073)	(0.0558)	(0.0155)
Incumbent=1 × Party=Republican=0 × Cook's	-0.0076	7.7902***	-0.1740**
	(0.0172)	(0.7517)	(0.0553)
Incumbent=1 × Party=Republican=1 × Cook's	0.0701**	-6.6258***	0.2212***
	(0.0215)	(0.8448)	(0.0563)
Party=Republican=0 × Incumbent=0 × cycle	0.0181***	-0.2077***	0.0170***
	(0.0032)	(0.0545)	(0.0037)
Party=Republican=0 × Incumbent=1 × cycle	0.0057*	0.0412	0.0036
	(0.0024)	(0.0274)	(0.0028)
Party=Republican=1 × Incumbent=0 × cycle	0.0124***	-0.2479***	0.0135***
	(0.0025)	(0.0409)	(0.0029)
Constant	-35.5729***	406.8969***	-33.3490***
	(6.3975)	(109.3177)	(7.4641)
Observations	6573	14116	6573
R^2	0.713	0.226	0.648
State FEs	yes	yes	yes
Year FEs	yes	yes	yes
District Demographics Interactions	yes	yes	yes

Robust standard errors in parentheses; $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$. The dependent variable is the difference in the log of vote shares and the "outside share", meaning non-voting subset. Cook's refers to Cook's competitiveness ratings. "District Demographics Interactions" refer to party-incumbency interactions with district demographics including age, education, gender, and race.

voter is slightly above 0. This ignores possible costs to "crossing over" (via encouraging primary challenger entry or alienating donors beyond what is captured in the model).

Table 4: Party Policy Ideals

Cycle	Coefficient	Confidence Interval
Republican		
2002	0.1417	[0.1054, 0.1763]
2004	0.1391	[0.1059, 0.1766]
2006	0.1958	[0.1612, 0.2249]
2008	0.2003	[0.1680, 0.2318]
2010	0.1693	[0.1353, 0.2018]
2012	0.1654	[0.1293, 0.2019]
2014	0.2214	[0.1830, 0.2611]
2016	0.1874	[0.1440, 0.2268]
2018	0.2694	[0.2292, 0.3100]
Democratic		
2002	-0.0154	[-0.0530, 0.0181]
2004	-0.0067	[-0.0414, 0.0278]
2006	0.0627	[0.0286, 0.0946]
2008	0.0514	[0.0181, 0.0833]
2010	-0.1091	[-0.1415, -0.0763]
2012	-0.0817	[-0.1165, -0.0469]
2014	-0.0051	[-0.0452, 0.0322]
2016	-0.0252	[-0.0680, 0.0139]
2018	-0.0274	[-0.0687, 0.0179]

95% Confidence intervals in parentheses, calculated with 1,000 bootstrap draws.

5.1.3 Election Committee Estimates

The main parameters of the election committee spending stages are displayed in Table 5 with percentile bootstrapped confidence intervals with 1,000 draws. Republican PACs and Super PACs have more moderate ideal preferences than political party leadership whereas Democratic PACs and Super PACs are more extreme than the party. Thus Democratic SIGs may help explain why the party is more moderate than candidates. The policy gap parameter is positive and significant,

indicating that parties punish incumbents who have policies that stray too far from the party's ideal. Both parties penalize, but Republican leadership places a 46% higher penalization on the gap than Democratic leadership. The Democrats are more lenient in terms of electoral support and that may be a function of their average lower reliance on outside spending during 2002-2018.

The spending cost function covariates for PACs, Super PACs, and party committees include a constant, number of senate candidates running in that state, district population, ad costs in that district relative to the state, scaled lagged presidential votes, and incumbent tenure relative to other incumbents in the state. The spending cost function for candidates includes all covariates used for other committees but also includes candidate policy and congressional committee quality. Candidates have the lowest costs, and this is largely due to the fact that candidates outspend all other committees even after accounting for their relative spending effectiveness.

Committee assignments do seem to help candidates in fundraising as the negative coefficient on committee assignments in the candidate's cost function indicates. Note that this effect is already taking into account the candidate characteristics that influence vote-getting. Policy also has effects on fundraising, with more extreme candidates have a harder time in the general election. In particular, a positive (negative) sign for the Republican (Democratic) general cost coefficient for policy means that costs are higher as policy becomes more extreme. The effect is significant for Republicans, consistent with their moderate SIG policy ideals. Both of these effects indicate that voters and donors can have distinct preferences and candidates balance these interests. Results from the primary elections are similar but imprecisely estimated. This is partially due to there being significantly less spending (and more idiosyncratic activity) in primaries than in general elections.

5.1.4 Explaining Candidate Positions

Candidates are very close to voters and the candidate's position correlates with the voter's ideal position more strongly than with SIGs or the party leadership. Democratic incumbents have a larger policy gap with general election voters on average (0.10) compared to Republicans (0.06). For Democrats, the average scaled incumbent position is -0.17, Super PAC ideal is -0.08, party leadership ideal is -0.02, PAC ideal is -0.14, and voter is -0.25 in the districts with a Democratic incumbent. Thus Democratic incumbent positions are pushed leftward by voter preferences and

Table 5: Election Committee Parameters

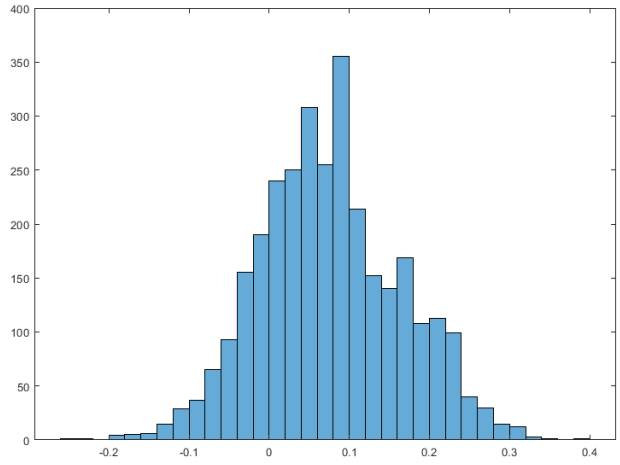
Cycle	Coefficient	Confidence Interval
R-SPAC Ideal	0.0430	[0.0329, 0.2182]
R-PAC Ideal	0.0978	[0.0844, 0.2257]
D-SPAC Ideal	-0.0941	[-0.3180, -0.0345]
D-PAC Ideal	-0.1418	[-0.2634, -0.1244]
R-Policy-Gap Importance	1.9956	[1.1034, 2.8115]
D-Policy-Gap Importance	1.0832	[0.4486, 1.6465]
R-CAN General Costs	0.0004	[0.0004, 0.0004]
R-SPAC General Costs	0.0019	[0.0018, 0.0019]
R-PAR General Costs	0.0018	[0.0017, 0.0019]
R-PAC General Costs	0.0016	[0.0016, 0.0016]
D-CAN General Costs	0.0002	[0.0001, 0.0002]
D-SPAC General Costs	0.0019	[0.0018, 0.0019]
D-PAR General Costs	0.0018	[0.0017, 0.0019]
D-PAC General Costs	0.0016	[0.0016, 0.0016]
R-CAN General Cost: Policy	1.6093	[0.9906, 2.3051]
R-CAN General Cost: CCA	-0.0131	[-0.0173, -0.0091]
D-CAN General Cost: Policy	-0.1783	[-0.6998, 0.3555]
D-CAN General Cost: CCA	-0.0190	[-0.0238, -0.0145]
R-CAN Primary Cost: Policy	4.7697	[-34.5550, 51.3445]
R-CAN Primary Cost: CCA	0.0649	[-0.0173, 0.2140]
D-CAN Primary Cost: Policy	-0.8110	[-1.8408, 0.0711]
D-CAN Primary Cost: CCA	-0.0271	[-0.0331, -0.0163]

95% Confidence intervals in parentheses, calculated with 1,000 bootstrap draws. CCA refers to congressional committee assignments.

PACs with moderation pressure from the party and Super PACs. Average Republican scaled incumbent position is 0.22, Super PAC is 0.05, party is 0.19, PAC is 0.09, and voter is 0.28 in the districts with a Republican incumbent. Again voters drive incumbent positions, with moderation pressure coming from SIGs more than party leadership.

Figure 5 plots the histogram of difference between candidate and party positions. Candidates choose positions more extreme than what the party wants 81% of the time. The issue of moderates defecting from the party is less common but there is non-trivial mass below zero in the distribution. Since candidates do not internalize how their choice affects the party overall, they will be more sensitive to their primary voters than the leadership wakes the nationwide primary voters into account. On average, the difference in the candidate's policy differs from the SIG's policy by 4.6 points, from the party's ideal by -6.0, from the general election voters by 0.4, and from primary election voters by -1.2. Thus we see that candidate's place themselves between what general and primary voters want, which is slightly too extreme for SIGs and the party. SIG and party preferences are less important than voter preferences in explaining the candidate's observed position. Republican positions are more strongly correlated with the party and SIGs than Democrats.

Figure 5: Difference in Candidate and Party Ideal Absolute Positions



This plots the histogram of the difference in candidate absolute positions and their party leadership's absolute ideal. A positive difference means the candidate is more extreme than what the party wants.

5.2 Counterfactuals

The counterfactual analysis plugs the estimated parameters into the model, changes some aspect of the model, and then resolves it for the new equilibrium outcomes across all stages. This method allows us to see how hypothetical changes to the environment affect optimal decision-making and electoral outcomes with a quantifiable prediction based on the estimated model.

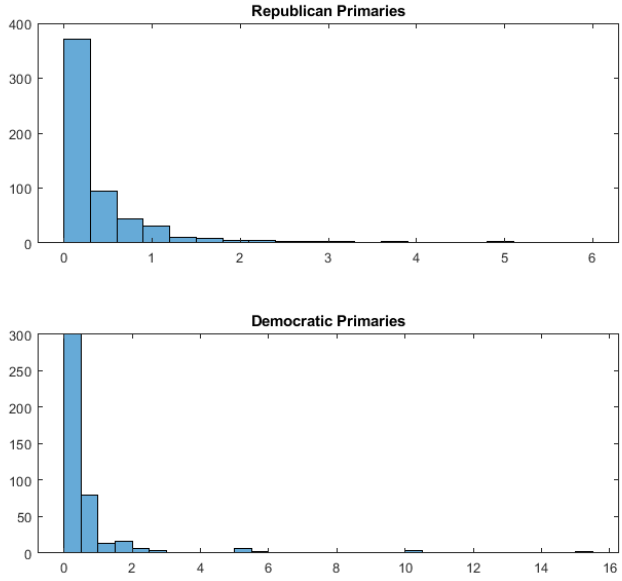
5.2.1 Safer Seats

How does incumbent policy change as their seat gets safer? Consider incumbents getting safer seats by giving them higher valences in the general election. One way to shift the safety of a seat is to change the unobserved component of a candidate or district that helps them win. We consider a 2x increase in mean valence for a single candidate and re-solve the entire estimated model for equilibrium outcomes (and then repeat for every candidate). This change increases Democratic (Republican) incumbent mean vote share from 0.72 (0.67) to 0.94 (0.93). Democratic (Republican) incumbents become 26% (46%) more extreme as they now refocus on the primary; the median change is 0% for all districts and 10% for districts with contested primaries. Spending goes down as the election is less competitive. The distribution in the percent change of incumbent positions under this counterfactual scenario is displayed in Figure 6.

5.2.2 More Influential SIGs

Under what scenario would candidates shift towards SIG ideals? The model's dynamic have the SIG spending after the position is revealed and the amount that they spend is based on their donors' preferences for the candidate's position. To see the extent to which a candidate can shift away from voters, consider a counterfactual of 10x times more effective general election SIG spending. By reducing the candidate's relative ability to spend donations, the candidate is incentivized to pursue on SIG support, which means convincing the SIG's donors to fund the SIG's election ad spending. Since general election SIG preferences are on average more moderate than primary voters, Republicans moderate their positions by 2% and Democrats barely change. This indicates that outside influence may be smaller for Democrats. Election chances in the primary and general election barely change. SIGs are less important for incumbents as incumbent spending is larger

Figure 6: Counterfactual: Change in Incumbent Absolute Position with Safer Seats



This plots the histogram of the percent change in incumbent absolute positions in the model and in the counterfactual situation of safer seats for incumbents with a primary challenger.

than SIG spending in most elections. Overall the effects are quite small because SIG election spending is significantly less important than voter preferences in predicting candidate positions.

5.2.3 Changes to Party Discipline

The party's disciplining ability is largely limited through one main mechanism: district level voter preferences strongly predict the candidate's position. Thus representatives are beholden to their voters and shifting for the sake of funding is not worth the loss in votes. So how could the party increase discipline? More effective party spending would slightly help, but as the SIG spending counterfactual above shows, those effects are small.

What if the party leadership were able to be more stringent by committing to a harsher policy gap penalty? This would lead to some lower win chances for candidates whose electoral situation prevents them from moving in the party direction, but the overall movement of candidates may be worth the cost. We consider a counterfactual with double the penalty cost. As a consequence, incumbents become trivially more moderate. The variance of electoral support increases slightly as closely aligned candidates receive relatively more and candidates that deviate receive less. When

the party threatens to decrease support, the candidate can either change their position in the direction the party desires, engage in costly fundraising to spend more themselves, or rely more on outside groups like Super PACs. We find that candidate spending increases when the party support decreases. This highlights another cause of party weakness: since the party is not a major source of funding for candidates to begin with, a more stringent party simply makes the isolated candidate exert more effort in self-funding, making them even less sensitive to party demands.

Finally, congressional committee quality is treated as an exogenous covariate in the model. The party changing it can affect incumbents but not directly via the policy gap: in our model, the candidate would not internalize the fact that the party is changing the assignment due to policy incongruity. The incumbent would only shift policy in response to the effects of the different assignment on the vote share and fundraising. A worse assignment would slightly reduce their win probability, forcing the candidate to either rely on party/SIG spending or pivot policy closer to the voter ideal. While we do not model how the party allocates assignments as a function of the policy gap, we consider a counterfactual of a 50% decrease in committee quality. We find a null effect on incumbent policy choice and a 1.6% decrease in win probability.

6 Concluding Remarks

In this paper we studied party discipline with a novel empirical approach. We solved for the party's ideal and estimated an election model to capture the various costs and benefits the leadership faces when choosing how to sway their members. We find that voter preferences in both the general and primary elections drive incumbent positions more than SIG or party preferences, and that primary voter pressure in safe seats is a major component in making disciplining difficult. These findings are consistent with the weak discipline observed in the United States Congress.

Our counterfactual simulations reiterate the finding that safe seats are a factor in the increased polarization in Congress, and the party leadership is largely helpless in addressing it. Their tool in elections, namely money, is limited in effectiveness and supply. If incumbents are primarily concerned with getting re-elected, then there is little room to convince them to choose policy that is not in alignment with their district. Furthermore, the parties differ in how much leadership would want to shift their rank and file, creating asymmetric incentives across the aisles. These findings

add to the work on how the parties influence polarization (Canen, Kendall, and Trebbi 2020).

Finally, the role of congressional committee assignments is limited in our analysis. Its effects on outcomes are small, but we do not capture how the party leadership could condition desirable assignments on discipline. In a companion piece, we endogenize committee assignments and study their disciplining effects on the heterogeneous benefits of office-holding.

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A Appendix

Proposition 2. *There exists a sub-game perfect Nash equilibrium for the game described in Section 2.*

Proof. The existence of an equilibrium is established by backward induction.

Stage 8 A multinomial choice by voters over their preferred general election candidate and not voting. A single utility maximizing choice exists as each choice has heterogeneity across voters in ϵ^G_{vci}.

Stage 7 The Glicksberg Theorem (Fudenberg and Tirole 1991) states that an infinite strategic form game with a compact and convex strategy space and continuous objective in all arguments has a mixed Nash equilibrium. In this stage, the payoff and cost are both continuous in spending by all players. Recall the objective:

$$\max_{S^G_{kci} \geq 0} P^G_{ci}(\mathbf{S}^G_i | \mathbf{p}_i, d_{ci}, W^P_{ci} = 1) \cdot \omega_k(p_k, p_{ci}) - c^G_{kci}(S^G_{kci})$$

The strategy space is bounded below at 0. It is without loss to bound the strategy space from above because #1 the "revenue" $P^G_{ci} \cdot \omega_k$ is bounded above [since P^G_{ci} is a probability between 0 and 1, and

ω_k is finite and not a function of spending], and #2 by assumption, the cost c^G_{kci} is strictly increasing and convex.[25]

Stage 6 A multinomial choice by voters over their preferred primary election candidate and not voting. A single utility maximizing choice exists as each choice has heterogeneity across voters in ϵ^P_{vci}.

Stage 5 The objective has the same structure as in stage 7:

$$\max_{S^P_{kci}} P^P_{ci}(\mathbf{S}^P_i|\mathbf{p}_i, d_{ci}) \cdot \omega_k(p_k, p_{ci}) - c^P_{kci}(S^P_{kci})$$

We apply the same argument as above to yield a Nash equilibrium for this stage.

Stage 4 The objective

$$\max_{p_{ci}\in[-1,1]} P_{ci}(\mathbf{p}_i|e_{ci}, p^I_i)$$

has a continuous objective by construction and the strategy space is compact and convex. Thus we can apply the Glicksberg Theorem for existence of a mixed strategy.[26]

Stage 3 This stage has objective

$$\max_{e_{ci}\in\{0,1\}} e_{ci} \cdot \left(P_{ci}(e_{ci}|p^I_i) - F_{ci}\right)$$

for each player. This is a finite player binary choice complete information normal form game which implies existence of a mixed strategy.

Stage 2 This stage has objective

$$\max_{p_{ci}\in[-1,1]} P_{ci}(p_{ci})$$

for the single incumbent. It is a single-agent environment with a compact/convex choice set and a bounded objective function, yielding a solution to either the first order conditions or the two boundaries.

Stage 1 This stage has objective

$$\max_{p_g\in[-1,1]} \sum_{i\in\{1,\ldots,N\}} P^*_{ci}(p_g|p_{-g})$$

This is a bounded objective function for fixed N and compact/convex choice set, and we can use the same argument as in stage 4 for existed of a mixed strategy.

The proof is by backward induction, and all steps are based on conditioning on payoff relevant only actions. By the proofs of **Stage 8** and **Stage 7**, the general election spending stage has a Nash equilibrium. By the proofs of **Stage 6** and **Stage 5**, the primary spending stage has a Nash equilibrium. By the proofs of **Stage 4** and **Stage 3**, the challenger entry and policy stages have equilibria. By the proof of **Stage 2**, the incumbent's policy stage has a solution, and finally, by

[25]To show that a pure strategy Nash exists, we cannot use the Debreu, Glicksberg, and Fan Theorem (Fudenberg and Tirole 1991) because the objective is not globally concave under some parameter values. See Cox (2021) for a proof of the optimality of a pure (and positive) strategy.

[26]For a pure strategy, it can be shown that under the voter preference parameter values observed in the data, the second order conditions are negative and we can apply the Debreu, Glicksberg, and Fan Theorem for existence of a pure strategy Nash equilibrium for this specific stage.

the proof of **Stage 1**, the party leadership policy stage has an equilibrium. Thus the game has a sub-game perfect Nash equilibrium in mixed strategies.

□

Existence of a mixed strategy Nash equilibrium is not sufficient for valid counterfactuals where pure strategy uniqueness guarantees identification. The conditions for pure strategty uniqueness per stage can be checked ex-ante in certain stages. To address possible multiple equilibria, first we numerically solve for the equilibrium across multiple starting values. Second, we discretize the choice space and re-frame the game as a finite normal form game where we can simply evaluate the grid of choices for both parties, find a pure strategy equilibrium, validate whether it is close to the continuous form version of the game, and directly check for multiple pure strategy equilibria in the discrete version.