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Parties in Elections, Parties in Government, and Partisan Bias

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Political parties are active when citizens choose among candidates in *elections* and when winning candidates choose among policy alternatives in *government*. But the inextricably linked institutions, incentives, and behavior that determine these multistage choices are substantively complex and analytically unwieldy, particularly if modeled explicitly and considered in total, from citizen preferences through government outcomes. To strike a balance between complexity and tractability, we modify standard spatial models of electoral competition and governmental policy-making to study how components of partisanship—such as candidate platform separation in elections, party ID-based voting, national partisan tides, and party-disciplined behavior in the legislature—are related to policy outcomes. We define *partisan bias* as the distance between the following two points in a conventional choice space: the ideal point of the median voter in the median legislative district and the policy outcome selected by the elected legislature. The study reveals that none of the party-in-electorate conditions is capable of producing partisan bias independently. Specified combinations of conditions, however, can significantly increase the bias and/or the variance of policy outcomes, sometimes in subtle ways.

1 Introduction

The relationship among preferences of the electorate and policy outcomes of government is a fundamental topic in both normative and positive democratic theory. As a practical matter, it seems unthinkable to study this relationship without considering political parties.

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Parties are invariably active in democratic politics at each of two phases of political behavior. In the electoral stage, parties compete for votes of citizens to earn seats in government. In the governmental stage, parties compete for influence over policy outcomes. While recent research on the U.S. political system is decidedly split on the nature and degree of majority-party influence over policy outcomes in the governmental stage,[1] an approximate consensus seems to have formed about the significance of parties in the electoral process. Subject to variation in emphases and degrees of belief, the following claims encompass a sizeable sweep of the received wisdom about parties in the American electorate.

- The American voter is more likely than not to identify with one of the major parties and to vote accordingly, even controlling for a voter's policy preferences (Campbell et al. 1960; Miller and Shanks 1996; Bartels 2000).
- Formal affiliation with a political party is often a legal requirement, and almost always a practical necessity, for candidates seeking high office (Jacobson 2001).
- In spite of the centrifugal forces of localism, institutionalized by single-member districts, national party organizations in the United States persistently attempt to manage candidate recruitment (Jacobson 1985–86; Kazee and Thornberry 1990).
- Likewise, party organizations at national, state, and local levels actively raise and disperse funds to enhance their preferred candidates' electoral prospects (Herrnson 1989; Damore and Hansford 1999; Ansolabehere and Snyder 2000; Schecter and Hedge 2001).

In this conventional portrayal, U.S. politics originates with citizens' partisan predispositions and policy preferences and culminates in the production of public policies by elected representatives. In any given step along this path, partisanship motivates behavior and parties mediate among competing interests. Extensive bodies of work address some of the links in the causal chain between parties in the electorate and parties in government, but relatively few researchers have undertaken comprehensive studies of the combined policy impact of parties in the electorate and parties in government. Noteworthy exceptions include Erikson and Wright (1997) and Erikson et al. (2002). Broadly, their argument is that voters in the electorate have partisan predispositions that they express sufficiently systematically in elections that legislators, too, are partisan. Likewise, partisan legislators in government express their constituency-induced preferences sufficiently systematically that policy outcomes are responsive—albeit indirectly—to changes in partisanship in the electorate. Such works make plausible cases for partisan-based representative democracy.[2]

[1]Dozens of researchers stress the importance of parties in government, ranging from the vast literature on divided government to the relatively theoretical- and intra-Congress-oriented studies on the consequences of institutional features. In the latter vein, for example, Cox and McCubbins (1993, 2002) and Aldrich et al. (2002) argue that parties are powerful in moving outcomes away from the median voter or blocking moves to the median voter. On the other hand, Krehbiel (1993, 1996) raises doubts about the effects of party independent of preferences; Schickler and Rich (1997) rebut Cox and McCubbins's claims about partisan motivations for procedural reforms; Brady and Volden (1998) and Krehbiel (1998) attribute nonmedian outcomes with gridlock due to supermajority procedures rather than partisanship; and Krehbiel and Meirowitz (2002) reassess the Aldrich model of majority-party power and illustrate how his substantive claim of majority-party power is analytically incorrect.

[2]Additional research in this macro-political vein constructs an equally plausible but different argument. Jacobs and Shapiro (2000) emphasize politicians' influence on constituency preferences rather than vice versa. They also question the responsiveness of government to citizen preferences.

Continued progress in fleshing out the relationships between partisan forces and governmental policies depends on addressing the substantive concerns of the macro-politics research. However, a deeper understanding of the mechanics in these relationships rests on analytic approaches that are increasingly explicit about the micro foundations of partisanship in the political system. This article, accordingly, embraces macro-political questions with a more micro-analytic approach than is customary in the macro literature. The partisan electoral conditions whose consequences we explore are: *platform differentiation* between candidates within constituencies, *party ID-based voting* behavior, and *national electoral tides.*

The focal endogenous variable is *partisan bias* in policy, which has an analytically precise meaning within the framework we employ. Partisan bias refers to the difference between two policies. The first policy is the result of a benchmark party-free model of elections and legislative policy making—one in which there is no platform differentiation, no voting based on party ID, no national electoral tides, and where the legislature is nonpartisan. Given the structure of our problem, this baseline policy is the ideal point of the median voter in the median district. The second policy corresponds to the outcome predicted by a particular pair of models of parties in elections and parties in government. The specifics vary according to how parties affect electoral or legislative outcomes.[3]

As we noted above, the literature on parties in the United States tends to embrace the proposition that partisanship in the electorate induces partisan governmental conditions that, in turn, produce noncentrist policy outcomes that favor the majority party. This view is reinforced by the undeniable scope and intensity of party activity in U.S. politics. An alternative perspective that is more prevalent in micro-analytic studies, however, cautions against equating partisan activity during political processes with partisan bias in policy outcomes. Pragmatic competitive office seekers within districts or states may converge to similar or identical, centrist platforms that undermine the policy aims of their polar and relatively extreme national party organizations. Inter-district variation in ideology and localism of district elections may neutralize national tides and facilitate the election of slates of parties with heterogeneous induced preferences and overlapping party distributions. Finally, even if these various dampening effects on partisanship in the electorate are not prevalent and, therefore, induced preferences at the national level are homogeneous within parties and bipolar across parties, competitive pressures within the legislature may nevertheless result in national policy that reflects the legislative median, rather than the majority-party median. In any of these hypothetical scenarios, policy centrism rather than partisan bias may emerge as a characteristic feature of governmental policies, even if the legislature is elected under highly partisan conditions.

To assess the relationships among parties in the electorate, parties in government, and partisan bias, we formulate a model that captures the partisan electoral conditions of platform differentiation, party ID-based voting behavior, and partisan tides. In order to encompass these conditions and to trace out their consequences in a tractable way, we focus on aggregate features of each of the conditions. This approach allows a fairly rich parameterization of the model and permits us to use numerical computation to explore variation in the force with which each condition applies and, especially, the way these conditions interact.

[3]Because the model that we analyze is stochastic, we will ultimately treat partisan bias as a random variable and discuss its distribution under various assumptions about partisan influence in elections and legislatures. Readers should avoid confusing the word "bias" in partisan bias with the statistical term "bias."

When viewed from a macro-political perspective, our approach adds micro-level specificity. However, from the opposite, micro-level perspective, reservations might be voiced on the grounds that our formal characterization of voters, candidates, and legislators departs from some of the conventions of equilibrium analysis. Conventionally, analysts characterize agents as optimizing and then study the properties of the equilibrium that results from the interaction of these agents. We chose not to follow this convention for several reasons. First, at the current state of the modeling art, there is no tractable analytical framework that captures what we see as the key elements of the problem. Second, we believe that our approach provides insights that will be useful in formulating game-theoretic models.[4] While our model does not treat voters or candidates as strategic actors, it does permit us to study interactions that almost certainly would be relevant in a strategic setting. Indeed, for a given model of electoral politics, strategic behavior by voters will result in a path of play that corresponds to one of the cases we study in our analysis. For example, we consider situations such that, in a given electoral district, two candidates either converge to the same platform or have divergent platforms located on either side of the district median voter. Each of these corresponds to possible strategic equilibria of two-candidate competition. (A third possible equilibrium, with candidates' platforms diverging, but not symmetrically, could readily be incorporated in our framework.[5]) Our treatment of legislative policy-making draws on commonly studied formal models of legislative politics—in one case, a chamber operating under an open rule in which legislators optimize given their (induced) preferences, and in the other case, a chamber operating under an open rule in which legislators are influenced by party leadership. We can therefore be confident that our analysis is likely to include outcomes that would be predicted by a more fully specified equilibrium model. Third, while the discussion in the body of the article is in terms of a specific set of numerical calibrations, we have also conducted numerical and analytic robustness checks (see Appendices B and C) that reinforce our confidence in our qualitative results.

We begin our analysis with a discussion of key features of parties in government and parties in elections and how we model them. We then present the results of using the model to study the magnitude of party effects and consider some departures from the basic assumptions to check the robustness of our results. In the final section, we address some outstanding issues.

2 Parties in the Electorate and Parties in Government

Political parties have conflicting policy objectives. Party politics is a game in which each party maneuvers to win elections, to obtain majority control of government, to change policies its members dislike, and to block changes to policies they do like. In a two-party

[4]A strategic model of this form would involve, at the least, an early stage in which candidates and/or parties optimize over campaign activities, an intermediate stage in which voters optimize over the available candidates in their district, and a late stage in which the elected legislators select policy. Voter behavior would be based on rational expectations over play in the legislative stage, and campaigning decisions would be based on rational expectations over both the voting behavior and the legislative stage. Austen-Smith (1987) represents an example of work that is in this spirit.

[5]Nonconvergence of platforms in a two-candidate election can arise as an equilibrium in models of elections with uncertainty and policy-motivated candidates (Calvert 1985; Wittman 1977, 1983); models of elections in which voters forecast legislative outcomes but candidates in each district can freely adopt platforms (Austen-Smith 1987); models of elections with valence (Londregan and Romer 1993; Groseclose 2001; Aragones and Palfrey 2002; Schofield 2004); and models of elections in which parties select levels of valence and policy (Meirowitz 2004; Wiseman 2004). In the case of valence, the divergence tends to be asymmetric around the district median.

system with these features, party competition is a tug-of-war in which the majority party attempts to pull policies across the political center and into its own center, and to keep them there. The minority party resists such efforts by attempting to build bipartisan coalitions with moderate majority party legislators. A voluminous literature depicts collective choice as a competitive struggle in which tensions between centripetal and centrifugal forces are resolved in either electoral or governmental arenas.[6] We follow in this tradition, using an orthodox unidimensional spatial model in both electoral and governmental stages.

2.1 *Parties in Government*

Because our primary focus is on a relatively diverse set of electoral conditions, the models of the governmental stage are rudimentary throughout most of the analysis. Policy is made by a unicameral legislature. Rather than taking positions on, or attempting to resolve, the ongoing controversy on whether parties or party labels have an effect on the legislative outcomes, we consider each of the polar positions: a nonpartisan and a partisan model (or, respectively, a weak-party and a strong-party model).

The *nonpartisan (weak-party) model* is simply collective choice under an open rule with no agenda control. This corresponds to a setting in which parties are sufficiently weak in government that their policy significance is small. In the pure case, the legislative process is majoritarian. The fundamental result in such a setting is Black's median voter theorem (Black 1958). The theory is nonpartisan because, regardless of legislators' party identification, the unique equilibrium outcome is the ideal point of the median voter of the entire body.[7] We refer to the legislature's median voter's ideal point as M.

The *partisan (strong-party) model,* in contrast, presumes that political parties in government are disciplined. In a two-party system, this means the majority party as a whole has the requisite votes to dictate the outcome. The precise outcome that is dictated becomes a struggle exclusively within the majority party, and the theory assumes that this is an intra-party median-voter process. The legislative outcome, therefore, is the median of the ideal points of the members of the majority party—not the median of the entire legislature. One justification for this theory is that, while the majority party is disciplined, the policy that the party wants is determined in the party caucus operating under an open rule. Thus, Black's theorem predicts that the party caucus will converge on the median majority party member's ideal point. We refer to the majority party's median voter's ideal point as P.

2.2 *Parties in the Electorate*

In most models of government, preferences of legislators are exogenous.[8] In the model we employ, preferences of governmental officials are endogenous to the electoral process. Elections, in other words, determine the composition of the government and, therefore, raise the possibility that parties in the electorate may be sufficiently strong to influence policy outcomes even if, as in the nonpartisan model of policy formation, parties in government are weak.

[6]See, for example, Hotelling (1929), Downs (1957), or Wittman (1977, 1983) on electoral competition, and Shepsle and Weingast (1987), Krehbiel (1998), or Cox and McCubbins (2002) on spatial competition in government.

[7]Uniqueness requires an odd number of voters.

[8]One notable exception is Austen-Smith and Banks (1988); however, their focus is not on partisanship.

Table 1 Overview of the electoral environment

Conditions	*Separation of candidates*	*Ideology-based partisanship*	*Partisan tide*
Abbreviations	*S*	*I*	*T*
Parameters	δ	α	τ
Where parties may be influential	On the location of candidates within districts $S = 0$	On voter responses to ideological stimuli $I = 0$	On voter responses to national advertising, appeals, and interests $T = 0$
How this condition is represented in the simulation	Downsian convergence of candidates within districts $S = 1$ Parties induce candidates to take more ideological stances than would otherwise happen	Voters in all districts are identical and nonpartisan $I = 1$ Voters from more extreme districts give a party-ID edge to the ideologically closer candidate	No party has an edge in any given election $T = 1$ Party R (arbitrarily) enjoys a nationwide probabilistic advantage

To describe the electoral environment, we begin with standard spatial-model assumptions and add some ways that parties may play a role in elections. Summarized in Table 1 and surrounding text, and formalized in the following section, these consist of three electoral conditions with partisan underpinnings: *separation of candidates* within constituencies, *ideology-based partisanship* of voters, and *partisan tides*.

2.2.1 Condition S: Separation of candidates within districts

Each district holds an election between candidates who represent two parties, R (right) and L (left). The policy platform of the Party L candidate in a district is L, and the Party R platform is R. We adopt the simplifying assumption that, within each district, parties (or the candidates) select platforms that are either separated or not separated.[9] In both cases, the winning candidate is selected randomly (details below) and becomes the district's representative. Upon election, the candidate's platform becomes his or her induced ideal point in the legislature. In the case of nonseparation (or, equivalently, convergence), we assume that both candidates' platform locations lie at their district median voter's ideal point. This case comports with the theory of Downsian competition. Clearly, this is a case of minimal partisanship, because $R = L$ implies that it makes no difference from a preference standpoint which party gets elected. In the case of separation, we assume that candidates' platform locations are on opposite sides of, and are equidistant from, their district's median, with $L < R$. One reason for nonconvergence is that state, regional, or local party organizations pressure candidates to take different stances, e.g., with local party organizations catering to local demands and national organizations attempting to build and

[9]We do not explicitly model electoral competition within each district, because platform selection by parties and voting behavior are not of first-order importance here. See Osborne (1995) for a review of models of strategic platform selection.

preserve the party's "brand name" (Snyder 1994; Snyder and Ting 2002). An alternative source of nonconvergence stems from uncertainty and policy (or mixed) motivations on the part of candidates (Wittman 1977, 1983; Calvert 1985).

2.2.2 Condition I: Ideology-based partisanship

Individual voters' partisan predispositions may also weigh heavily on electoral choice in ways that can be modeled at the aggregate (district) level. Voters who identify strongly with a particular party are more likely than are independents and weak identifiers to vote on the basis of party label—even when other factors, such as candidate qualifications and their platform locations, are equal. If, furthermore, partisan identification is correlated with policy preferences, then we might expect that voters whose policy preferences are further to the left are more likely to identify with an L-party candidate, ceteris paribus. Similarly, a voter whose policy preferences are further to the right would be more likely to identify with an R-party candidate. At the aggregate level, this implies that, other things equal, a district whose median is further to the right will have a higher propensity to vote for an R-party candidate. This would hold even when candidate platforms have fully converged or when platforms symmetrically straddle the district median. Because a similar effect is also true for Party L members, the absolute magnitude of the effect of partisanship is largest for the most extreme districts. For example, ideology-based partisanship means that constituents in a very left-leaning district such as California's 35th, which includes Watts, are highly likely to elect a liberal Democrat (e.g., Maxine Waters) even if her Republican challenger replicates or mirrors her location strategy. A comparably conservative district would likewise elect a Republican over a Democrat even if—on policy grounds alone—its median voter is indifferent between the parties' candidates. In our framework, these party-ID effects become progressively weaker as more moderate districts are considered until, at the midpoint of the spectrum, each candidate has an equal chance of winning the election.

2.2.3 Condition T: Electoral tide

In a purely nonpartisan electoral environment, candidates are effectively independent agents, and the party label has no particular meaning or value during the campaign and on election day. In other circumstances, however, the electoral prospects of a party's candidates may rise or fall in all districts. The causes of such fortunes and misfortunes are the stuff of political punditry. They range from high-profile scandals to unusual economic or national security developments. For our purposes, all that matters is that they exist, and they may well have a partisan basis. Accordingly, we will model electoral tides as a common, party-wide shift factor in the probability that any of a party's candidates are elected.

3 A Simulation Model

In light of our characterizations of parties in government in terms of strong-versus-weak parties, the key points on which to focus when assessing partisan bias in policy outcomes are the majority-party median, P, and the legislative median, M. In the model the identity (and possibly the induced ideal policy) of the winning candidate from each district is random. (Below we will fill in the details of how the exogenous conditions affect the distributions of these election results.) Because P and M depend on these random elections they are also random variables. Thus, the output of the model is distributions for the random values P and M. We now turn to the details of how we use simulations to approximate these distributions under the various combinations of electoral conditions.

We begin by presenting each of the electoral conditions of our model, together with the corresponding parameters. These form the exogenous structure of our model. We then discuss the endogenous variables. After this general presentation, we provide, for each exogenous parameter, an empirically plausible calibration based on data from U.S. national elections. Our calibration exercises also serve to shed further light on the substantive interpretation of the parameters.

3.1 *Exogenous electoral conditions*

In each of N districts (N odd), the policy-relevant aspect of voter preferences is represented by a single exogenous and fixed variable m_i ($i = 1, \ldots, N$) that represents the ith district's median voter defined over a single continuous policy dimension. The values of the district medians, m_i, range from $-K$ to K, where $K = (N - 1)/2$. For convenience, we also assume that $m_1 = -K$, $m_{(N+1)/2} = 0$, and $m_N = K$. Moreover, the distribution of districts medians has a symmetric bell shape.[10] (In Appendix A we provide details of how we construct this distribution. In Appendix B we discuss the sensitivity of our results to the assumptions about the shape and symmetry of the distribution.)

The point 0 is the ideal point of the median voter in the median district and serves as the benchmark for our measure of policy centrism. Because an individual legislator's induced preferences are related to the median preferences of the district he represents, the distribution of induced preferences of government officials is related to the distribution of district medians. The degree of partisanship in the electorate is determined by combinations of three binary variables—S (separation of candidates), I (ideology-based partisanship), and T (electoral tides)—and three corresponding parameter settings, δ, α, and τ. It is useful to think of the binary variable as a switch and a parameter as a dial. The state of the condition/switch determines whether a force will be applied or not (and, respectively, takes on the value of 1 or 0), but the state does not stipulate how much force will be applied in the on state. The parameter/dial determines the magnitude of the force when the state equals 1.

The electoral conditions are formalized as follows.

3.1.1 Separation

- $S = 0$. Platforms of both candidates in each district are the same as their district median.
- $S = 1$. Candidates' platforms are separated by 2Δ and have their district median as a midpoint.

The term Δ represents the deviation between a candidate and his or her district median in policy units. Since the scale is defined by the number of districts (N) and has no intrinsic meaning, a normalization is helpful. Because $K = (N - 1)/2$, the range of district ideal points is $N-1$. So, if we let $\delta = 2\Delta/(N - 1)$, then the parameter $\delta > 0$ is a measure of the gap between the two candidates' platforms as a fraction of the range of district medians in the nation as a whole.[11]

[10] Note that the district medians are not random, so this distribution is not a probability distribution, but rather a convenient way of describing how the N district medians are arrayed on the policy space.

[11] More specifically, these assumptions imply that in district i, the platform L is $m_i - \delta(N - 1)/2$ and R is $m_i + \delta(N - 1)/2$. For example, for the median district (where $m_i = 0$), $\delta = 1$ means that candidates' platform locations correspond to the leftmost and rightmost districts' medians; i.e., candidates in this district locate at $-K$ and K. If $\delta = .5$ then candidates in the district with $m_i = 0$ have platforms of $-K/2$ and $K/2$.

3.1.2 Ideology-based partisanship

While platform locations are deterministic and exogenous, which candidate wins in a district is random. We consider two alternatives. Let x be the district median.

- $I = 0$. In each district, party R wins the election with probability $p(x) = 0.5$.
- $I = 1$. The probability that party R wins in a district with median x is given by

$$p(x) = 0.5 + \frac{\alpha - 0.5}{K}x, \quad \text{where } \alpha \in (.5, 1).$$

The probability function captures the notion of ideology-based partisanship as follows. The constant sets the baseline probability that R (and L) wins at ½. The variable x refers to district median preferences that range from $-K$ to K. The fraction preceding x is a normalized ideology-effect coefficient whose magnitude depends on the parameter, α. When α is very close to 0.5, each candidate wins with a probability very close to 0.5, regardless of x, i.e., independent of where the district lies on the ideological spectrum. Substantively, the lower bound of $\alpha = 0.5$ represents purely spatial/nonpartisan voting at the individual level and is therefore indistinguishable from the nonpartisan benchmark, $I = 0$.

For higher values of α, however, the state $I = 1$ captures probabilistically a party-ID effect. Specifically, even when the two candidates adopt the same platform, one will have an advantage proportional to $|x|$, the extremity of district preferences relative to the median of the median district, which equals 0. At the upper limit ($\alpha = 1$), the leftmost district ($x = -K$) elects the Party L candidate with certainty, while the rightmost district ($x = K$) elects the Party R candidate with certainty.

3.1.3 Tide

- $T = 0$. There is no national tide. The probability that R wins is $p(x)$.
- $T = 1$. The probability that party R wins is $p(x) + \tau$.

To represent a national tide for the R party, we simply add a constant $\tau > 0$ to $p(x)$. Throughout we use a sufficiently small τ so that $p(x) + \tau$ does not exceed 1 in any district.[12]

In summary, these parameterizations allow us to represent an *electoral environment* as the exogenous conditions in effect (S, I, and T) and their associated parameter values (δ, α, and τ). Formally, a simulation can be represented as (δ, α, $\tau \mid N$, s), where N is the number of districts, s is the number of runs or iterations, and everything else is defined as above.

3.2 *Endogenous variables*

The endogenous variables of chief interest in each case are the policy outcomes M and P that correspond to features of the *legislative environment* (nonpartisan or partisan, respectively). The values of the endogenous variables are determined in the following steps.

[12]Notice that when $\alpha = 0.5$, $p(x) = 0.5$ for all x. In this case we are effectively in state $I = 0$. Adding tide τ in this state raises the flat probability line by τ, just as adding τ in state $I = 1$ raises a sloped probability line by τ.

1. Set parameter values (δ, α, $\tau \mid N$, s).
2. Set a value for *S, I*, and *T.*
   a. Election phase. For the given electoral environment, the outcome of the election in each district is determined by comparing a draw from a uniform distribution on [0, 1] with the probability rule defined by *I* and *T.* Party R wins if the draw is below the threshold specified by the probability rule; otherwise L wins. This is repeated with independent draws in each of the *N* districts. The set of winners is composed of *N* party–ideal point pairs who will hold seats in the legislature.
   b. Government phase. *M* (the legislative median) and *P* (the majority party median) are calculated and recorded as the outcomes under the nonpartisan and partisan models, respectively.
3. Repeat steps a and b a large number of times (*s* in all) to generate distributions of *M* and *P* for the given electoral environment.[13]
4. Perform steps 2 and 3 for each of the eight possible settings of *S*, *I*, and *T.*
5. Repeat 1–4 with different parameter values.

With sufficient data from simulated election and governmental stages, we recover the approximate distributions of the outcome variables, *M* and *P.*[14] One intuitive way to think about the distributions of *M* and *P* relates to forecasting problems. For a fixed profile of exogenous parameters and variables (δ, α, τ, *S*, *I*, *T*), the distributions represent our beliefs over the values of *M* and *P* if we think the election is characterized by the values (δ, α, τ, *S*, *I*, *T*) . The average of the distribution on *M* (or *P*) is our expectation of the policy under the weak (or strong) theory of parties in government if elections are characterized by the specific values (δ, α, τ, *S*, *I*, *T*). These distributions are not deterministic because we still face uncertainty about how districts will vote even though we believe that (δ, α, τ, *S*, *I*, *T*) characterize their behavior.

We are especially interested in identifying conditions under which *M* or *P* deviate significantly from zero—the benchmark. To capture this tendency, we will look at the means, mean absolute deviations about zero (MAD), and variances of *M* and *P.* Means and MAD (or, alternatively, variances) provide different ways of looking at partisan bias. Means have a straightforward interpretation of policy bias or non-centrism in our expectations about legislative outputs. Mean absolute deviations and variances can be interpreted as measures of how much uncertainty there is about the legislative output. When *M* or *P* has a high MAD (or variance), the range of possible legislative outputs for a given election-legislative pair is large. Thus, high MAD (or variance) means that the random aspects of district-level voting propagate into a high degree of uncertainty about the likely legislative outputs.[15]

[13]Experience suggests that results are rarely more than negligibly different between sample sizes of 1000 and 5000. We chose an excessively large *s* of 10,000.

[14]More precisely, since the individual iterations are independent, the strong law of large numbers implies that as the number of iterations tends to infinity the sample average and variance converge almost surely to the first and second moments of the underlying distributions.

[15]If one wanted to give the model a dynamic interpretation, mean and MAD might be construed as measures of long-term averages and policy volatility. We are reluctant to provide this dynamic interpretation; among other things, this would require a specification of a status quo policy and a description of the process of change over time. We return to this point briefly at the end of Section 7.

3.3 *Calibration*

Since we are interested in numerical solutions to our model, it is useful to specify empirically plausible values of the parameters δ, α, and τ. When consulting data and calibrating simulation settings, we are inclined to err on the high-partisanship side in order to be sure to uncover partisan effects if and when they are present.

Choosing appropriate values for δ is not straightforward for at least two reasons. Most common measures of legislator preferences are derived from roll call voting, which reflects behavior late in the legislative process, when legislators may be subject to influences beyond the general electoral connection. Furthermore, such estimates are usually available only for winning candidates. Fortunately, recent research addresses these limitations in part. Ansolabehere et al. (2001) develop a measure of winning and losing candidate positions using data from the National Political Awareness Test Web site. Among other things, they estimate that on average the divergence between candidates is about 0.47 on a 0–1 scale. Ansolabehere et al. (2003) control for several other factors that affect candidate behavior in the legislative process and find that on a 0–100 scale of Chamber of Commerce scores, a party change has an effect of 30 points, thus implying a δ of approximately .3. We choose a value of the parameter somewhat greater than these estimates (0.5), because there is reason to believe that these estimates are biased downward for present purposes.[16]

To get an empirically plausible value of α, we estimated a probit model for the elections of the 105th and 106th Congresses. The model predicts the probability of a district electing a Republican as a function of NOMINATE scores, which can be interpreted as rough approximations of district preferences. In each case the *t* statistic on the coefficient for the Republican dummy variable was greater than 10 and the magnitude of the effect was large. In the election of the 105th Congress, for example, the 25th-percentile conservative district elects a Republican with probability .2, while a 75th-percentile district elects a Republican with probability .8.

While this finding argues for a high value of α, we should note some caveats. First, the scale and distribution of NOMINATEs are different from those of our x, so the 25th and 75th percentiles of the ratings do not necessarily correspond to the 25th and 75th percentile of our district median voters. Second, probits are nonlinear while our $p(x)$ is linear. Third, to the extent that the effect is real, the probit estimates are also inflated because with high likelihood the 25th percentile district's winning candidate is more liberal than her district median voter, while the 75th percentile districts winning candidate is more conservative than his district median voter. In light of these problems it seems prudent to interpret the probit estimates as confirming that ideology-based partisanship exists while conceding that there is no straightforward method for estimating how much of it exists. We therefore choose a value that is unavoidably subjective but probably somewhat high. Specifically, we will set $\alpha = 0.9$.

To calibrate the setting of τ, we find the portion of variation in national Republican congressional vote percentages not explained by variation in the composition of the

[16]The endpoints of the spectrum in Ansolabehere et al. (2003) are the most liberal and most conservative members in Congress, whereas our parameter is normalized by the most liberal and conservative district medians. To the extent that ideology-based partisanship (see below) is characteristic of the electoral environment, the latter denominator is likely to be smaller than the former. Another rough approximation for δ might be obtained by considering the distance between the average Republican and Democrat preference measures (e.g., NOMINATE scores) when turnover occurs. This estimate would be based on fewer observations and might be biased due to the correlation between turnover and out-of-touch incumbents and/or challengers who are more willing to converge.

electorate. The proportion of votes going to Republican congressional candidates serves as an aggregation of district-level voting behavior.[17] We treat the National Election Study's seven-point scale of party identification as a measure of the ideological leanings of voters.[18] The calibration exercise involves two steps. First, for the years 1952–2000 we regress the national proportion of congressional votes for the Republican candidates on the percent of the population that considers itself Republican (strong and weak identifiers) and the percent that considers itself Democrat (strong and weak identifiers).[19] The predicted Republican proportions from this estimation are then used to generate residuals. For a given year the residual represents the portion of national voting behavior that is not explained by the partisan dispositions of the voters. For this period the maximal residual has a magnitude of 0.044 and seven of the twenty-five years have residuals with magnitude greater than 0.030. From this we infer that in some elections the national percentage of votes to the Republicans can vary from a prediction based just on the longer-term tendencies of voters by $\tau = 0.04$. We interpret this to mean that the idiosyncratic part of national election behavior can be as high as four percentage points.

The calibration approach demonstrates the interpretation of τ. Here, we think of $p(x)$ as measured by a linear function of voter propensities. While we do not use district-level data, the difference between aggregate level voting and the best linear aggregate predictor will be τ under the assumption that each district has the same τ (which is the assumption in the model). While our use of the N.E.S. seven-point scale as a measure of aggregate preferences is surely imprecise, it is clear which way this calibration of τ is likely to err. Since a better model will result in smaller residuals, we are presenting an overestimate of the idiosyncratic aspect of national elections and thus $\tau = 0.04$ is likely to be an overstatement. The interpretation of the error as party tide when the independent variable is party identification is not unreasonable for two reasons. First, the party identification question of N.E.S is often interpreted as a measure of ideology; second, we interpret tide as capturing aspects of aggregate voting behavior that are not explained by stable aspects of behavior (like the distribution of policy preferences or stable partisan identifications).

4 Results

Our summary of the results progresses through the eight possible states of the electoral environment, from the benchmark model with no party-in-election effects ($S = I = T = 0$) through a model in which all three conditions hold ($S = I = T = 1$). For each of eight electoral environments, we present summary statistics of the simulated distribution outcomes. The main question is: Which combinations of partisan electoral conditions, and strong- or weak-party governmental conditions, cause significant deviations in the policy outcome from the nonpartisan benchmark of 0? Before interpreting the findings, the issue of what constitutes a significant deviation requires a brief discussion. Because our estimates of moments are based on a large number of simulations, the estimates are approximately equal to the moments of the underlying distribution. Classical hypothesis testing is inappropriate under these conditions, because the observed variation in a variable (say M) represents randomness from the stochastic model—not sampling error. On the other hand, the strong form of this reasoning—that any difference is therefore a real or

[17]Data on the national vote shares for Democrat and Republican candidates for the U.S. Congress are presented in Table 2 on pp. 47–48 in Mann et al. (2001).

[18]The data are from the N.E.S. Web page, http://www.umich.edu/~nes/nesguide/toptable/tab2a_1.htm. The relevant question is VCF0301 in the NES Cumulative Data File.

[19]The estimated model is %Repvote/(%Repvote + %Demvote) = 0.427 + 0.006RepID - 0.001DemID + τ.

Table 2 Outcomes under all electoral environments*

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Electoral conditions	*Weak parties in government, chamber median, M*			*Strong parties in government, majority party median, P*			*R seat share*	*R in majority*	*District median dissatisfaction***	
SIT	*Mean*	*Var.*	*MAD*	*Mean*	*Var.*	*MAD*			*M*	*P*
1. 000	0.0	0.0	0.0	0.0	18.9	3.5	0.50	0.50	0.50	0.51
2. 001	0.0	0.0	0.0	0.0	18.0	3.4	0.54	0.96	0.50	0.51
3. 010	0.0	0.0	0.0	−0.1	419.9	20.1	0.50	0.50	0.50	0.55
4. 011	0.0	0.0	0.0	17.7	74.7	19.3	0.54	0.96	0.50	0.55
5. 100	0.0	128.0	9.1	−2.0	11905.3	109.0	0.50	0.49	0.52	0.76
6. 101	17.3	119.1	18.0	99.0	2119.1	109.1	0.54	0.95	0.55	0.76
7. 110	0.0	319.7	14.6	0.6	16686.8	129.1	0.50	0.50	0.54	0.80
8. 111	26.0	233.8	26.9	117.1	2752.3	128.3	0.54	0.96	0.57	0.80

*$\alpha = 0.9$, $\delta = 0.5$, $\tau = 0.04$, s = 10,000 per row, n = 435.
**Proportion of district median voters who prefer the benchmark (0) to the outcome.

significant difference—is not fully defensible either. With a finite number of simulations, limited precision, and rounding error, small differences are inevitable and must be treated as insignificant. Our subjective response, accordingly, is to designate as small differences those that are small relative to the more tangible features of the model, such as the range of district medians, or some fraction of the ideological space occupied by legislators.

Table 2 reports the results for all eight combinations of electoral conditions using the parameter settings $(\delta, \alpha, \tau \mid N, s) = (.5, .9, .04 \mid 435, 10000)$. These values of δ, α, and τ are sufficiently large to demonstrate the effect of their respective conditions.

4.1 *Weak parties in government*

The main findings from Table 2 are summarized in the form of two propositions: one for each form of parties in government. The first proposition identifies necessary and sufficient electoral conditions for partisan bias given weak parties in government.

Proposition 1. Partisan bias with weak parties in government. *The expected value of the legislative median, M, is not distinct from zero unless the election involves separation and tide* ($S = T = 1$). *For large enough values of* δ *and* τ, *conditions* $S = 1$ *and* $T = 1$ *are sufficient for bias in M.*

Recall that in the weak parties model, bias in M and partisan bias in outcomes are equivalent. The analytic basis for the proposition is that the expected value of the legislative median, M, is zero and thus unbiased whenever $S = 0$ or $T = 0$ (rows 1−5 and 7). However, when both conditions $S = 1$ and $T = 1$ are in effect and their respective parameters δ and τ are sufficiently large, outcomes at the legislative median are biased even in the absence of party strength in government (rows 6 and 8).[20] What remains to be explained is that neither condition alone is sufficient to generate bias.

[20]The structure of the proposition reveals the nature of inference in the simulation exercise. It is possible to establish through logic that $S = 1$ and $T = 1$ are necessary for a bias in M. However, establishing that a noticeable bias results under these conditions requires specifying particular values of the parameters.

Consider first the case of divergent platforms ($S = 1$) but no electoral tide ($T = 0$). If the legislature has weak parties and thus policy outcomes lie at the legislative median, a necessary condition for partisan bias is that elections, on average, generate a distribution of ideal points whose median is greater than or less than 0. When candidates' platforms diverge, the electorally induced legislative median exhibits greater variability than when platforms converge (compare MAD in row 1 with MAD in row 5). This volatility, however, does not indicate bias (compare M in the same rows). Platform divergence, therefore, is not sufficient for partisan-biased outcomes.

Next consider the reverse case: an electoral tide ($T = 1$) without platform divergence ($S = 0$). Without separation of Party L and Party R candidates in districts, the stochastic component in the election has no bearing on the preferences of the elected representatives (see rows 2 and 4). Therefore, it is known a priori that the composition of the government will perfectly replicate the set of district medians. This ensures that the median winning candidate will come from, and will replicate, the benchmark median voter of the median district. Along with weak parties in government, we will be certain to have an unbiased outcome. The presence of an electoral tide, therefore, is not independently sufficient for policy bias.

With both the separation and tide conditions in effect, things are different. Because of tide, the majority of legislators tend to be from Party R. Because of candidate platform separation, Party R's winning platforms are different from Party L's, as well as being different from the district medians. Furthermore Party R's winning candidates have induced preferences to the right of the medians in their districts. So, when the parameters δ and τ are large enough, the result is partisan policy bias (compare mean values of M in rows 1 and 6).

4.2 *Strong parties in government*

The next proposition identifies electoral conditions for partisan bias with strong parties in government.

Proposition 2. Partisan bias with strong parties in government. *The expected value of the majority party median, P, is not distinct from 0 unless the election involves tide* ($T = 1$) *and at least one of the following: separation* ($S = 1$) *or ideology-based partisanship* ($I = 1$). *For large enough values of* τ *and* $\{\delta$ *or* $\alpha\}$, *conditions* $T = 1$ *and* ($S = 1$ *or* $I = 1$) *are sufficient for bias in P.*

It is not surprising that an electoral tide is necessary for systematic bias in policy, because without this source of asymmetry, P will be equal to 0 on average. The question is whether any additional condition or conditions provide sufficiency. As in Proposition 1, candidate platform separation coupled with a tide is sufficient. Because most legislators are members of Party R (as happens, in expectation, proportional to the tide, τ) and all Party R legislators are to the right of their district medians (as happens, with certainty, in the case of separation, $\delta > 0$), the majority party median will also be to the right of the median of district medians. The consequence is partisan bias.

The more surprising result is that tides and ideology-based voting generate policy bias even without platform separation. The essence of condition $I = 1$ is that the farther to the right a district is, the more likely it is that the district elects the candidate from Party R; conversely, the farther to the left a district is, the greater the probability that Party L's candidate is elected. It follows that, on average, the Party R median in the legislature will be

positive and the Party L median will be negative. Given a symmetric distribution of districts, in the absence of electoral tide, Party R and Party L are equally likely to be in the majority; so the mean P over a large number of simulations will be (close to) zero. With tide, however, Party R is more likely to be in the majority than Party L (compare rows 3 and 4 of column 8 or 9 in Table 2). Therefore, ideology-based partisanship (without candidate separation) and national tide result in a higher likelihood of a right-of-center majority party median (party R) than of a left-of-center majority party median. The mean value of P, therefore, is positive (row 4). Add to these electoral conditions a cohesive majority party in government and the resulting policy exhibits partisan bias, quantified by P.

One might wonder whether the electoral environment described in row 4 of Table 2 would be theoretically plausible in a world in which candidate locations are strategic. That is, could platform convergence ($S = 0$) be an equilibrium in a district where one party's candidate had an electoral advantage of the type captured by the conditions $I = 1$ and $T = 1$? The answer is yes. Wittman (1983) considers just such a case: where candidates are office-motivated, and the electorate is biased in favor of one candidate, in the sense that one candidate has "a greater than 50 percent chance of winning the election even if both candidates took identical positions" (Wittman 1983, p. 146). Proposition 3a of Wittman (1983) shows that this type of bias has no effect on the equilibrium candidate location for candidates who wish only to maximize the probability of winning. Wittman focuses on best responses of one candidate when the other candidate's position is held fixed. His result that the bias in favor of one candidate does not affect best responses implies that in equilibrium candidate policies converge. Therefore platform convergence is an equilibrium in such a model.

Accordingly, if, when $I = 1$ and $T = 1$, voters in leftist districts resolve ties in favor of the left candidate with higher likelihood than voters in rightist districts, then Wittman (1983) predicts candidate convergence ($S = 0$) in each district.

Propositions 1 and 2 together combine parties in the electorate with parties in government in roughly parallel fashion. Partisan tide (in the electorate) is a necessary condition for partisan bias. A strong majority party in government amplifies partisan bias. Although it is not a primary focus here, the micro-behavioral foundations of these two ingredients for partisan bias are similar. Each factor represents individual-level behavior in which partisan affiliation, not just policy preference, affects individuals' utilities. While conventional formal models of electoral behavior rarely employ such utility functions, survey research has long found this kind of behavior to be common among American voters. Our framework amplifies its well-substantiated importance in the electoral arena by revealing analytically its necessity for partisan bias in governmental policy outcomes.

4.3 *Single-condition effects*

No electoral condition by itself—not even strong parties in government—is sufficient to produce systematic partisan bias in legislative outcomes. Tide alone results in a legislature that tends to be dominated by R representatives, but there is no corresponding bias in policy outcomes unless candidates separate in the electoral arena. Separation alone results in more volatility of legislative outcomes (considerably more under strong parties), but, without a partisan tide, the distribution of legislative outcomes will be centered at the benchmark of 0 under both party-in-government models. Ideology-based partisanship alone results in legislative parties that are quite heterogeneous, but, again, without an electoral tide, Parties R and L win a majority with equal probability, and policies symmetrically bounce back and forth centered on the unbiased baseline median of district medians. Finally, strong parties in government alone do not generate biased outcomes,

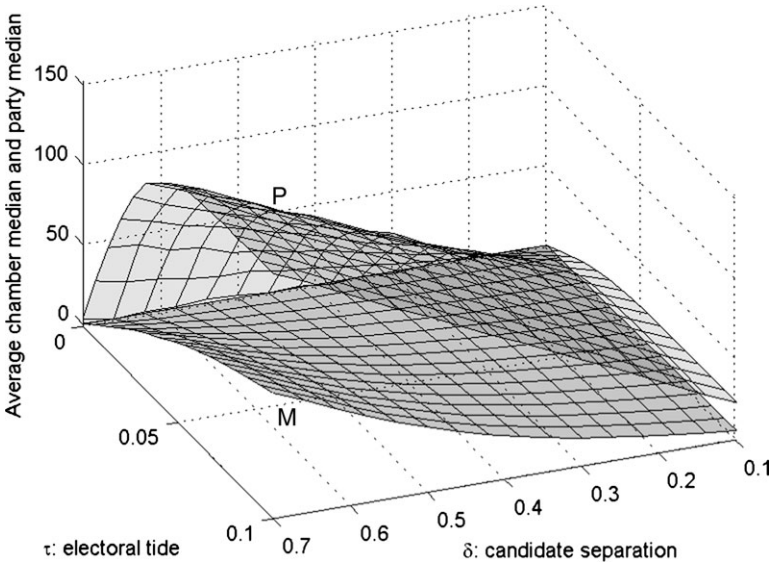

Fig. 1 Deviations from electoral median as functions of δ and τ. (α = .5)

because induced preferences of the respective parties without partisanship in the electorate are indistinguishable, i.e., $P = M = 0$ on average.

4.4 *Interaction effects*

Insofar as no single electoral condition is sufficient for producing policy bias, interactions among partisan conditions are crucial to understanding partisan bias. To illustrate further the interaction effects of conditions on policy consequences, we present in greater detail the case of separation and national tide without ideology-based partisanship (row 6 of Table 2). Figure 1 depicts the average chamber median and average party median as a function of τ (tide) and δ (separation). Propositions 1 and 2 reveal that bias in M and P is possible in this specification. The figure demonstrates how responsive the policy bias is to parameter settings. Two properties are illustrated. First, the bias in M under weak parties in government is always less than that in P under strong parties in government. Second, both biases are increasing in the partisan electoral conditions as parameterized by τ and δ.[21]

Another illustration is the case of national tide and ideology-based partisanship without platform separation (row 4 of table 2). Figure 2 shows the plot of the bias in the majority party median as a function of the parameters τ and α for this case. Again, partisan bias is increasing in both partisan parameters.

Because $M = 0$ on average under these conditions, its surface is not shown but would be the floor of the figure. Note also that the scaling on the vertical axes is much different across the figures. Roughly speaking, for the same amount of tide, candidate separation has a greater partisan-bias effect than does ideology-based partisanship.

5 Magnitude of the effects

While the model clarifies some interaction effects between partisan electoral conditions and partisan bias in governmental policy, an important question remains. How big are

[21]For high (left) values of δ, P appears to decrease in τ (coming forward), but this is an illusion due to the angle from which the surface map is viewed.

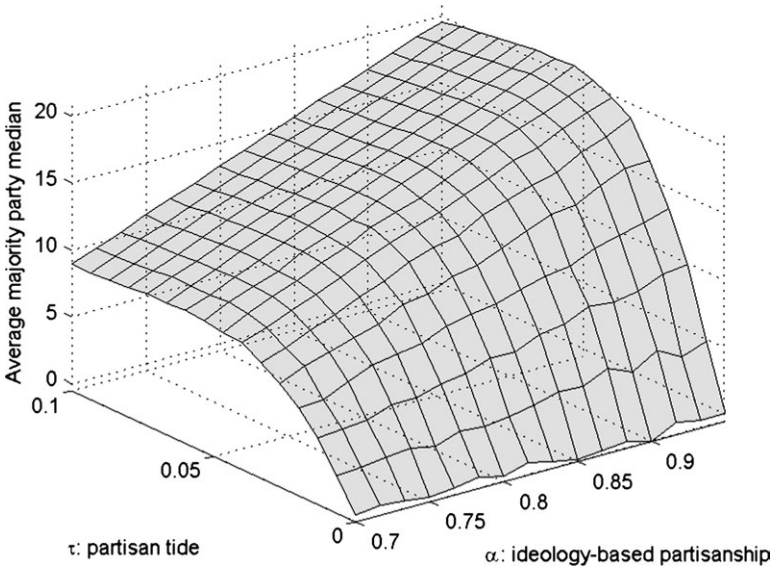

Fig. 2 Deviations from electoral median as functions of α and τ. (δ = 0)

these effects? Inspection of Table 2 and Figures 1 and 2 provides some insight. With weak parties, the bias in policy, whether measured as the mean of M or its mean absolute deviation from zero, is relatively small for reasonable ranges of the parameters. For example, in Table 2, the maximum bias occurs under the conditions of row 8 when all partisan conditions hold ($S = I = T = 1$). The magnitude of the bias in this case is around 26. To put this in perspective, the range of district medians in these simulations is the interval [−217, 217]. So a bias of 26 represents approximately 6 percent of the range of district medians. From Figure 1, we see that one needs to have quite a lot of platform separation (δ around .7) and a strong national tide (τ around .1) before the bias in M approaches 10 percent of the range of district medians.

Another way to look at the magnitude question is to get a measure of the size of the group that bears a policy-preference-related loss due to failure of policy to be located at the benchmark of 0. More specifically, what fraction of district medians would prefer the benchmark outcome of 0 to the expected outcome from the legislature? Based on the same simulations we have reported, columns 10 and 11 in Table 2 answer this question for weak and strong parties in government, respectively. If M is biased (rows 5 through 8), the dissatisfied majority is between 52 and 57 percent of district medians. The finding is different under strong parties. The bias in P reaches 99 units (Table 2 rows 6 and 8), which translates into 76 to 80 percent of district medians who would prefer the benchmark (column 11). The requirements for bias this extreme are stringent, however. At least two of the three electoral conditions must hold *and* the majority party in government must be perfectly disciplined.[22]

[22]Other governmental institutional features also embody biases whose quantification may add perspective to these calculations. For instance, consider the U.S. presidential veto with 2/3 override interpreted through the lens of pivotal politics (Krehbiel 1998). In the presence of a credible presidential veto threat, the equilibrium bill elicits a vote of 67–33, which implies that a cutpoint lies at the veto pivot's ideal point. The bill passes and the corresponding bias measure comparable to the analysis above is 67 percent.

6 Robustness

The analysis moves beyond existing work by combining various conceptions of partisan influence in elections and legislatures in a single model. Typically (with some exceptions, as we have noted), elections and legislatures are studied separately. But to highlight the logic and simplify the exposition, we have made several strong assumptions. For example, we assume that the distribution of district medians is bell-shaped (and thus symmetric and unimodal). Appendix A discusses the construction of a model in which the districts are polarized—most districts have extreme preferences. Appendix B presents the findings from this exercise. The conclusion is that the qualitative findings we have discussed hold in this case also. Appendix B also discusses the extent to which symmetry affects the central conclusions of the article.

We use simulations because analysis of this model with a large (but finite) number of districts is cumbersome (if not intractable). Using computers to generate many realizations of the random variables M and P allows us to approximate these variables' distributions under a wide range of parameterizations. An alternative, analytical rather than computational, approach is to assume that there is a continuum of districts (see Appendix C). Assuming that the district preferences are uniformly distributed on the policy space allows us to derive closed form expressions for M and P. The comparative statics of this analytical model match those in the body of the paper.[23]

7 Discussion

Partisan bias is not necessarily an undesirable characteristic of governmental policy. Indeed, a substantial body of literature argues or seems to presume that it ought to be a core feature of democratic politics (e.g., APSA 1950; Stokes and Miller 1962). Partisan bias is not necessarily a desirable feature either, if policy stability and centrism in policy are valued. Important as these normative issues are, we have deferred any serious attempt to resolve them in favor of a positive objective that seems prerequisite: to better understand the relationships between a comprehensive set of partisan conditions and their potential policy consequences.

Another way to think about our study is as an attempt to answer the question: What difference does it make which of two leading models of parties in government is correct? More precisely, once we recognize that the composition of a legislature is the result of partisan electoral forces, how much does it matter whether legislative outcomes correspond to legislative medians versus majority party medians? We analyzed two connected aspects of partisan politics: candidate choice in the electoral arena and policy choice in the governmental arena. Our study is not unique in making this connection, but its purpose and method have several unique properties. While previous studies have tended to focus on a specific weak link of the chain beginning with citizens in a democratic polity and ending with governmental policy,[24] we sought to model a longer chain: starting with individual and district-level voter preferences, moving through candidate competition,

[23] With a continuum of districts, M and P are nonrandom. This is a consequence of the fact that, with enough districts electing R with probability $p(x)$, the percent of candidates from districts with median x will be arbitrarily close to $p(x)$. In the continuum model, the randomness therefore disappears.

[24] Countless studies on representation exist, of course, but the benchmark is how the preferences and/or behavior of the elected individual—not the collective choice in government—comport with the preferences of voters. Some studies are more comprehensive, such as Stokes and Miller (1962), but focus much more on the existence of a weak link (e.g., voters' information about candidates and policies) than on the policy consequences of the weak link.

individual voting, national electoral tides, district-level electoral outcomes, individual legislators' induced preferences, collective choice processes in government, and finally policy outcomes as they relate to voter preferences. We find, generally, that partisan bias can occur via strong parties but that it does not happen easily as an analytic matter, particularly if parties in government are not cohesive.

The analysis also lends itself to a relatively precise claim that deserves further empirical scrutiny. To the degree that most empirical studies of the U.S. Congress find that party cohesion in the legislature is not a given,[25] widespread partisan bias in outcomes requires not only:

(1) regular and large partisan tides in congressional elections,

but also

(2) at least one of the following:

a. high levels of candidate separation in district (or state) elections
b. high levels of ideology-based party-ID voting.

Of these conditions, current research seems most compelling on existence and magnitude of candidate separation (condition 2a). The growing percentage of independents in the electorate has eroded the force of ideology-based partisan voting (2b), but party ID still accounts for too much variation in voter choices to ignore. Finally, partisan tides (condition 1) come in and go out. Even at high tide, however, partisan policy bias of a modest sort (as measured, e.g., by the dissatisfied-majority criterion) requires the presence of another partisan electoral condition.

Overall, for reasons that span elections and government, the findings suggest that the magnitude of partisan bias in policy is not great. First, notwithstanding the multiple polarizing sources of partisanship in the electorate, electoral institutions tend not to skew the composition of the legislature substantially. Second, even our intentionally strong version of strong parties in government—disciplined imposition of the majority party median akin to Scattschneider's responsible party government—fails to produce a large degree of partisan bias in policy. Had we opted for the currently more popular but considerably weaker notion of party government via obstructive agenda setting (Cox and McCubbins 2004), the degree of partisan bias would have been smaller still.

To the extent that subjectivity weighs into such speculation, these interpretations call for empirical work to derive more refined estimates of partisan parameters and for additional modeling to pursue dynamic approaches with more institutional details. For example, the framework is easy to adapt to study the pivotal politics model. Some basic dynamics can also be fairly readily accommodated. Further theoretical development would recognize that the behavior of parties in elections may be strategically linked to expectations about what happens in the legislature. More specifically, party resource allocation strategies across districts may well depend on whether parties hold a weak-party or a strong-party model of the legislature. In the former case, parties with divergent policy preferences would adopt electoral strategies that pull the expected legislative median in the preferred direction. In the latter case, each party would have incentives to adopt electoral strategies that affect the expected majority-party median. These and other, more strategically based models are on our ongoing research agenda.

[25]Indeed, one recent theoretical account of congressional politics by the most ardent advocates of the strong-parties-in-government *assumes* that parties in government are *not* cohesive. See Cox and McCubbins (2002).

Meanwhile, the contribution of this first pass at the problem with our approach is that it may sharpen the attention of future research on the set(s) of factors likely to reduce present uncertainties about parties in the electorate, parties in government, and partisan bias in policy.

Appendix A: Calculation of District Medians

Bell-shaped distribution

We construct a vector $\boldsymbol{z}$ with its ith element given by $z_i = i/(N+1)$, $i = 1, \ldots, N$. Then we define the vector $\boldsymbol{w}$ such that $w_i = \Phi^{-1}(z_i)$, where $\Phi(\cdot)$ is the standard normal cdf. From the construction of $\boldsymbol{z}$ and the symmetry of Φ^{-1}, if $z_i = 1 - z_j$, then $w_i = -w_j$. In particular, $w_1 = -w_N$.

Next we define the vector $\boldsymbol{m}$ such that $m_i = (N-1)w_i/(w_N - w_1) = (N-1)w_i/2w_N$. This gives $m_1 = -(N-1)/2$ and $m_N = (N-1)/2$, and the elements of the vector $\boldsymbol{m}$ provide the desired bell-shaped distribution of district medians on the interval $[-(N-1)/2, (N-1)/2]$. Compared to a uniform distribution on the same interval, the elements of $\boldsymbol{m}$ are sparser in the tails and more bunched up around 0.

Polarized distribution

Starting with the vector $\boldsymbol{m}$, we transform its elements so that we obtain a new vector $\boldsymbol{m}'$ whose elements lie on the interval $[-(N-1)/2, (N-1)/2]$ but are denser near the ends of the interval and relatively sparse around 0. Specifically, to construct the vector $\boldsymbol{m}'$, we take the $(N-1)/2$ largest elements of $\boldsymbol{m}$, and rescale these to form new values $m_i' = m_L + m_N - m_i$, where $L = (N+3)/2$ and $i = L, \ldots, N$. We do the same for the $(N-1)/2$ smallest values to get $m_i' = m_1 + m_{L'} - m_i$, where $L' = (N-1)/2$ and $i = 1, \ldots, L'$. For $i = (N+1)/2$, $m_i' = m_i$.

Appendix B: Robustness of the Effects

Heterogeneity

First we consider a distribution of district medians that is polarized rather than bell-shaped, keeping the assumption that the distribution is symmetric around zero. This extreme heterogeneity of voter preferences across districts may be due to various activities of parties in elections. For example, state-level parties may play roles—inadvertent or intentional—in shaping district heterogeneity in redistricting cycles. For instance, some have suggested that districts have become more bimodal, with clusters on ideological extremes, because of the tendency to gerrymander safe seats for relatively ideological incumbents. To the extent that this is so, one can think of preference polarization as a party-related condition of the electoral environment, along with the three conditions of our model. For economy of exposition, we will refer to condition $H = 0$ as corresponding to our earlier assumption of a relatively low heterogeneity across districts, and $H = 1$ as corresponding to relatively high heterogeneity.

Table B1 presents our simulations using the polarized distribution of district medians. Other parameters are as in Table 2. The effects are subtle. Comparing columns 2–4 of the two tables reveals that heterogeneity dampens the bias in M that occurs in the presence of candidate separation and national tide. This result is due to the effect that heterogeneity has on the distribution of candidate locations relative to the overall median of district medians.

Table B1 Outcomes with heterogeneous district preferences*

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Electoral conditions	*Weak parties in government, chamber median, M*			*Strong parties in government, majority party median, P*			*R seat share*	*R in majority*	*District median dissatisfaction***	
SIT	*Mean*	*Var.*	*MAD*	*Mean*	*Var.*	*MAD*			*M*	*P*
1. 000	0.0	0.0	0.0	0.7	3070.2	48.8	0.50	0.50	0.50	0.51
2. 001	0.0	0.0	0.0	-0.5	2915.7	47.4	0.54	0.95	0.50	0.51
3. 010	0.0	0.0	0.0	0.2	23297.6	152.6	0.50	0.50	0.50	0.53
4. 011	0.0	0.0	0.0	146.1	1526.6	151.2	0.54	0.98	0.50	0.53
5. 100	-0.1	24.3	3.9	1.8	14898.6	108.9	0.50	0.50	0.50	0.52
6. 101	3.4	25.2	4.8	99.3	5112.6	109.7	0.54	0.95	0.50	0.52
7. 110	0.1	62.2	6.3	5.9	68397.2	261.6	0.50	0.51	0.50	0.63
8. 111	5.6	63.6	7.8	251.5	4439.9	260.2	0.54	0.98	0.50	0.63

*$\alpha = 0.9$, $\delta = 0.5$, $\tau = 0.04$, s = 10,000 per row, n = 435.
**Proportion of district median voters who prefer the benchmark (0) to the outcome.

With $H = 1$ most districts are relatively extreme and with $H = 0$ most districts are relatively centrist. Even when candidate platforms are separated ($S = 1$), extreme districts tend to have L and R candidates that are both on the same side of 0, the median of the district medians. With platform separation, moderate districts have candidates that straddle 0. When many districts have candidates on opposite sides of 0, electoral tide has a greater effect on the legislative median than when only a few districts have such pairs of candidates. In general, the overall legislative median is more sensitive to changes in the electoral outcome of moderate districts than of more extreme districts. So separation and tide have a more pronounced effect on M when $H = 0$ than when $H = 1$.

As to the majority-party median, heterogeneity amplifies the impact of separation and tide. With separation, Party R legislators will tend to have induced preferences that are more rightist than those of Party L legislators. With $H = 1$, the median legislator of the majority party will be from a district farther from zero, ceteris paribus, than when $H = 0$. So increased polarization of the electorate sharpens the divergence between the legislative outcome under weak parties versus under strong parties. At the same time, this divergence is in a sense less consequential under $H = 1$ than when $H = 0$. For example, in row 8 of Table B1, the mean of P is over 250, which is a bias of almost 60% relative to the range of district medians. Yet, as shown in columns 10 and 11, because so many districts have voters with relatively extreme preferences, the proportion of "dissatisfied medians" is only 63% (compared to the 80% who are dissatisfied with P in this electoral environment when $H = 0$).

Symmetry

We have purposely built considerable symmetry into our model. Except for allowing for the possibility of national tide, we have made the parties symmetric and we have used symmetric distributions of district preferences. In large part this assumption is defensible as we do not want asymmetries to drive our results about policy bias. It is nonetheless

worth speculating about possible effects of some types of asymmetry. One natural extension of the separation condition would be to allow the platforms of candidates in a district not to be equidistant from the district median.[26] Our intuition about the median statistic (informed by Proposition 1 and our discussion of the bias in M under heterogeneity) is that the effect of this type of asymmetry is greater when it occurs in moderate districts than in extreme districts. For example, suppose we ranked 435 districts by their medians, with district 1 being the leftmost district and district 435 the rightmost. Suppose also that the 75th quartile district L candidate's platform is to the right of the median of district medians (i.e., the Party L candidate in district 326 has a positive platform). In this case if only the rightmost quartile of districts (those with index greater than 326) experience asymmetry in candidate divergence (i.e., for the upper quartile of district medians the Party R candidate is farther from the district median than the Party L candidate), there will be no change to the distribution of legislative medians relative to the case without this additional asymmetry. The outcome of extreme elections is inconsequential to the location of the legislative median M. In contrast, this type of asymmetry will have a noticeable effect on the distribution of the majority party median. Alternatively, if only the 3rd quartile of districts (from district 217 to district 325) experienced the asymmetry in candidate platforms, then the legislative median will be affected. The outcome of these elections affects the location of the legislative median. While these extensions touch only the tip of the iceberg, in terms of relaxing simplifying assumptions, they demonstrate how one can incorporate richer assumptions than in our first pass.

Appendix C: An Analytic Model

In the material that follows, we present and analyze a model that is quite similar to the simulation model presented in the main body. The key difference is that here we consider a continuum of different districts. This smoothing and the assumption that district medians are uniformly distributed allows closed-form solutions. A less fundamental distinction is that instead of treating the distribution of district medians as bell-shaped, here we assume that the distribution of districts (by district medians) is uniform. A final distinction is that we parameterize the linear function $p(x)$ in a slightly different manner.

We consider a large number of districts with district medians on [0,1]. Let $F(x)$ be a smooth distribution function on [0,1]. At each point x there are $F'(x) = f(x)$ districts. Let the probability that a district with median x elects an R candidate be

$$p(x) = \alpha + \beta x.$$

An L candidate is elected with probability $1 - p(x)$. So no tide means $\alpha = (1 - \beta)/2$. The policy position or platform of an R candidate from a district with median x is $x + \delta$. We assume $\delta < ½$ For the L candidate the platform is $l(x) = x - \delta$. The distribution of legislator preferences is characterized as follows:

For a given point x there are $f(x)$ districts having district median x that each elect a legislator. The fraction of those districts that elect R legislators with platform $x + \delta$ is

[26]Indeed, in a strategic setting, even in one that led to candidate separation, it would not typically be the best response of a party that is disadvantaged by tide or ideology-based partisanship to locate as far from the district median as the advantaged party (see, for example, Aragones and Palfrey 2002).

$\alpha + \beta x$ and the fraction that elect L legislators with platform $x - \delta$ is $1 - \alpha - \beta x$. Accordingly, the density of legislative preferences is given by the following function:

$$g(y) = f(y-\delta)p(y-\delta) + f(y+\delta)(1-p(y+\delta))$$

on $[-\delta, 1 + \delta]$.

If the district medians are uniform, $f(x) = 1$, then the distribution function for legislative preferences is

$$G(y) = \int_{\delta}^{y} [\alpha + \beta(y' - \delta)]dy' + \int_{-\delta}^{\min\{y,1-\delta\}} [1 - \alpha - \beta(y' + \delta)]dy'.$$

This expression simplifies to

$$G(y) = \begin{cases} 1 & \text{if} \quad y \geqslant 1+\delta \\ y\alpha - \frac{1}{2}\beta - \alpha - \alpha\delta - y\beta\delta + \frac{1}{2}y^2\beta + \frac{1}{2}\beta\delta^2 + 1 & \text{if} \quad y \in [1-\delta, 1+\delta) \\ y + \delta - 2\alpha\delta - 2y\beta\delta & \text{if} \quad y \in [\delta, 1-\delta) \\ y + \delta - y\alpha - \alpha\delta - y\beta\delta - \frac{1}{2}y^2\beta - \frac{1}{2}\beta\delta^2 & \text{if} \quad y \in [-\delta, \delta) \\ 0 & \text{otherwise} \end{cases}$$

The legislative median y^m solves

$$G(y^m) = \frac{1}{2}.$$

For a parameterization in which $y^m \in (\delta, 1 - \delta)$ this implies that

$$y^m + \delta - 2\alpha\delta - 2y^m\beta\delta = \frac{1}{2}.$$

The solution is

$$y^m = \frac{2\delta - 4\alpha\delta - 1}{4\beta\delta - 2}.$$

This solution is our continuous version of the expected value of M. The following remarks lead to the conclusions of Proposition 1.

Remark 1: At $\alpha = (1 - \beta)/2$ we have $y^m = \frac{1}{2}$.
Remark 2: At $\delta = 0$ we have $y^m = \frac{1}{2}$.
Remark 3: At $\beta = 0$ we have $y^m = \frac{2\delta - 4\alpha\delta - 1}{-2}$.

The majority party median is characterized as follows. The identity of the majority party is given by

$$maj = \begin{cases} R & \text{if} \quad \int_0^1 p(x)f(x)dx > \frac{1}{2} \\ L & \text{if} \quad \int_0^1 p(x)f(x)dx < \frac{1}{2} \end{cases}.$$

For $f(x)$ uniform, $maj = R$ if $\alpha > (1 - \beta)/2$. The distribution of Party R legislators is

$$R(y) = \int_{\delta}^{y} f(y' - \delta)[\alpha + \beta(y' - \delta)]dy'.$$

In the uniform case this yields

$$R(y) = y\alpha - \alpha\delta - y\beta\delta + \frac{1}{2}y^2\beta + \frac{1}{2}\beta\delta^2.$$

The total measure of majority party legislators is just $R(1 + \delta)$. This is equivalent to $\alpha + \beta/2$. Thus, the majority party median y^r solves

$$R(y^r) = \frac{2\alpha + \beta}{4}.$$

The equation

$$y\alpha - \alpha\delta - y\beta\delta + \frac{1}{2}y^2\beta + \frac{1}{2}\beta\delta^2 = \frac{2\alpha + \beta}{4}$$

has two real roots (for $\beta \neq 0$), but for values of β not too distant from 0 the correct solution is

$$y^r = \frac{1}{2\beta}\left(-2\alpha + 2\beta\delta + \sqrt{2}\sqrt{2\alpha\beta + 2\alpha^2 + \beta^2}\right).$$

This solution is our continuous version of the expected value of P. The following remarks lead to the conclusions of Proposition 2.

Remark 4: At $\delta = 0$ we have $y^r = \frac{1}{2\beta}(-2\alpha + \sqrt{2}\sqrt{2\alpha\beta + 2\alpha^2 + \beta^2}) > ½$. This is our statistical effect.
Remark 5: At $\beta = 0$ we have $y^r = \frac{1}{\alpha}(\frac{1}{2}\alpha + \alpha\delta) = \frac{1}{2} + \delta$.
Remark 6: At $\beta = 0$ and $\delta = 0$ we have $y^r = \frac{1}{2}$.

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