

Parties, Coalitions, and the Internal Organization of Legislatures*

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Abstract

We present a model of legislative organization and policymaking that provides microfoundations for the organization of democratic legislatures along party lines. Our theory recovers as special cases the predictions of both partisan and non-partisan theories in the ongoing debate on the strength of political parties' influence on legislative outcomes in the U.S. Congress. Unlike leading partisan theories, however, our model does not rely on the existence of a party leadership that can effectively deploy legislative or extra-legislative rewards or punishments in order to force members to toe the party line. Rather, we argue that partisan outcomes can also arise endogenously, without outside leadership pressure, when a majority of legislators who have policy affinities, in pursuing their own ideological preferences, are able to limit the minority's agenda setting power. Legislative organization in equilibrium can thus feature unequal distributions of agenda power which, due to bargaining costs, lead to policy outcomes biased away from the issue median. Other things equal, the policy bias away from the median increases with the degree of ideological polarization. Our theory is also able to uncover the conditions under which median outcomes nevertheless prevail in equilibrium: costless bargaining or no polarization. We discuss the implications of our findings for a general theory of legislative organization.

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Modern democracy is unthinkable save in terms of the parties.

Schattschneider (1942)

The fact is that no theoretical treatment of the United States Congress that posits parties as analytical units will go very far.

Mayhew (1974)

1 Introduction

Theoretical debates over the role of parties in the U.S. Congress are as old as the modern study of Congress itself. While classical texts such as David Mayhew's *Congress: The Electoral Connection* had previously questioned the role of parties in congressional politics, it was the publication of Keith Krehbiel's "Where is the Party?" (Krehbiel 1993) that recently reignited the debate, leading to scores of articles and books. Yet, the debate does not appear to be abating in the slightest (Smith 2007). In part, this may be due to the fact that parties are among the more complex political institutions, closely connected to both legislative and electoral politics that, as research domains, usually progress in isolation from each other. The key question underlying the debate is, simply put, whether parties are able to affect legislative outcomes above and beyond what legislators would achieve if they acted independently, without party direction.

One major factor that has fueled the debate has been the elusiveness of robust and valid measures of such influence. On the one hand, there seems to be agreement about what a conclusive test would look like (e.g. Krehbiel 2006a). In principle, one would need for each of the hundreds of bills considered by Congress in each term the distribution of members' ideological ideal points, bill locations in the same ideological space, a complete description of the proposal generating process and other potentially relevant institutional features. Ideal points would have to be "unaffected by party influence" (Krehbiel 2006a). One could then measure party influence by determining whether the measured behavior (e.g. location of final bill, voting behavior etc.) would support the idea that policy outcomes are biased away from the chamber median and toward the party median or that party members change their voting behavior in response to inducements by party leaders. Unfortunately, the key components of such a test (ideological locations and bill locations in a given policy space) are either not directly observable or are based on measurement models that are themselves heavily contested.

Consider the issue of estimating ideal points. The most widely used measure of ideal points, DW-Nominate scores (Poole and Rosenthal 1985, 1997, Poole 2005), are derived from roll-call votes. But as Krehbiel has repeatedly pointed out (e.g. Krehbiel 2006a) this approach is problematic for isolating and measuring the effect of parties on legislative voting and policy outcomes. The problem is that observed voting patterns may be consistent both with strong party-leadership models *and*

models where representatives' preferences are already aligned with parties. To see this suppose, for example, that all members of the governing party always vote with the leadership. Then, this voting behavior may be due to effective leaders (through arm-twisting, office perks or agenda control) or due to the fact that party members when they enter Congress have preferences over policy outcomes already aligned with the leadership. Hence, in the absence of exogenous measures of *basic* preferences, i.e. those that are unaffected by partisan influence, roll-call data alone seem insufficient for testing party-influence theories.

Much of the existing debate on the influence of parties has subsequently focused on measurement and the correct interpretation of new and established empirical findings. While formal theoretical models are part of the debate they usually play a limited role, e.g. in illustrating how to properly interpret certain data. We believe this is unfortunate for three reasons. First, the lack of a common theoretical framework in which to compare the different theoretical assumptions and claims might have contributed to the polarization of views in the debate, to the point where many authors now speak of partisan vs. non-partisan theories of congressional parties. Second, partisan theories (e.g. Cox and McCubbins 1993, 2005 and Aldrich and Rohde 2001), in particular, have often been based on informal reasoning and reduced-form assumptions (e.g. the existence of a party leadership is taken as given, as is the ability of the rank-and-file to keep leadership accountable) that are not always easy to interpret theoretically or empirically. Third, a sound theoretical understanding of the forces at work in congressional politics may help inform empirical studies by clarifying the exact assumptions and implications of each approach.

The goal of this paper is provide such a formal model. Our proposed framework is general enough to provide a common representation of the competing partisan and non-partisan theories. This is possible because we make no assumptions about legislator behavior, only about their preferences and constraints. The resulting model thus allows us to precisely identify some of the the implicit assumptions in the competing theoretical accounts and to pin-point their similarities and differences. In terms of conceptualization, all the existing theories, although making conflicting claims, completely agree on one point: that for a party to matter the party's leadership must be able to change some party members' votes.¹ This is where our paper departs from the existing approaches. We demonstrate how a party can be influential even when it cannot change its members' votes. This finding matters for empirical research, because if the presence of arm-twisting is the gauge used to measure the degree of party strength (e.g. Snyder and Groseclose 2000) then an empirical model based on that assumption will be mis-identifying the full extent of party influence.

The key insight of the resulting model is that even in an environment without external constraints on legislators' voting behavior, where one would expect the force of pure majority rule to

¹To emphasize this point many contributions distinguish between voting cohesion and voting discipline. The point of agreement among partisan and non-partisan theories is that voting *cohesion* within parties, brought about purely by ideological affinities, is not enough for parties to matter. Parties matter only when they can impose *discipline*, i.e. create uniform voting behavior by forcing some party members to vote against their preferences.

compel legislators to push the status quo towards the median policy position every time, a legislative majority may find it in their interest to shift agenda power away from the legislative median by changing the rules of how policies are proposed. The coalition’s goal is to generate *expected* bias in policy outcomes away from the median on every given issue. We identify two conditions that are required for a change in the proposal rules to be supported by a legislative majority: First, proposing, deliberating, and voting take time and resources that could be used on other activities. Therefore, they are costly activities, in the sense of *opportunity costs*.² Second, there is a certain degree of *polarization* in legislators’ intrinsic preferences over policy outcomes, i.e. their preferences in the absence of inducements by the respective party leaderships.

If these factors are present a legislative majority will want to redistribute proposal power from the whole legislature to a subset of legislators. Concentration of agenda power leads to policy bias on average. Delegation to party leaders is a key feature of the most recent versions of party governance theories (e.g. Cox and McCubbins 2005, Aldrich and Rohde 2001). In our model, however, legislative delegation is not assumed but emerges as an equilibrium phenomenon when legislators vote by majority rule on the internal organization of their chamber. That is, the organizational structure of Congress, and thus the degree of party influence, is *endogenized* in our model.

Moreover, we find that the degree of party influence varies with the degree of polarization across parties, a key point of the Conditional Party Government approach (Cooper and Brady 1981, Aldrich and Rohde 2001). That is, a legislative majority will centralize or decentralize proposal power depending on the degree of ideological polarization.³ If polarization is high the majority party will vote to concentrate agenda power into a small subset of its membership. This will ensure that outcomes are as close as possible to the *majority party median*, which is the majority party members’ expected preferred outcome. At the other extreme, if polarization is negligible, all legislators prefer outcomes as close as possible to the *legislative median* because this is every legislator’s expected ideal point. The legislative organization that best achieves this outcome is an egalitarian distribution of agenda power.

Finally, our model uncovers the implicit assumptions of Krehbiel’s (1998) conjecture that the issue median rules *every time*. This will be the case when floor deliberation does not create opportunity costs, i.e. deliberation and floor decision making takes only negligible time or resources. A weaker form of Krehbiel’s conjecture, which would state that median outcomes occur *on average*, holds in the case of even significant opportunity costs but critically requires no polarization. But in the case of both opportunity costs and polarization the expected policy will be biased towards the majority party median. Moreover, bias increases with the degree of ideological polarization.⁴

²In the present context opportunity cost is defined as the time and effort for deliberating on the next most valuable issue.

³The source of polarization may be due to electoral competition or other factors. See Smith and Gamm (2001) for a concise account of this issue.

⁴The focus in our paper is on showing under what circumstance and to what degree legislative majority would

The logic of the model is as follows. Changing the status quo takes place through a process of sequential proposing and voting, which we call "legislative bargaining." When bargaining takes valuable time the floor median has an incentive to compromise on policy in order to avoid the costs of prolonged deliberation and decision-making. This creates a premium for a legislator who is in charge of setting the agenda because he will be able to bias policy outcomes away from the median and closer to his own preferred position. If an entire majority of legislators benefit from these systematic biases they will want to redistribute agenda power from the minority to their own group. This can occur when a majority of legislators have policy preferences that are distinct from a minority, in other words when there is a polarization of views across the political spectrum. In this case everybody in the majority wants to skew the distribution of agenda power towards their own group thus engendering systematic policy bias in its own favor. In the context of legislative organization the expected policy bias is implemented by centralizing or decentralizing agenda control. The degree of organizational centralization depends on the degree of polarization.

We begin our argument with a formal representation of the position that started the debate: Krehbiel's view of parties as agglomerations of like-minded legislators. We will then formally introduce the two main competitors to Krehbiel's approach, the Legislative Cartel approach (Cox and McCubbins 2005) and the Conditional Party Government approach (Aldrich and Rohde 2001). This is done in steps. First we discuss a model of policy choice that takes place within an exogenously given organizational structure that distributes agenda control. Then, in a second step, we endogenize the organizational structure and let members vote on the distribution of proposal power. We characterize the equilibria of this organizational stage and identify the factors that determine the degree of centralization over agenda control. In the penultimate section we discuss the implications of our findings for the study of legislative decision-making, followed by a concluding section.

2 The Baseline Model: Parties as Agglomerations of Like-Minded Legislators

We start our formal model with Krehbiel's concept of "weak parties," i.e. the view that a party is simply a happenstance collection of legislators who share policy dispositions on issues. Legislative institutions, incentives, or agenda control play no role (Krehbiel 2006a). For our purposes this concept will serve as the baseline model. We will derive its implications and then step by step add features that characterize alternative accounts. Then, we derive the augmented model's implications

adopt governance structures that bias policy outcomes away from the median legislator's ideal point on a given issue. We are not modeling how such a legislative organization can be stable over time. Various explanations for such stability could be conceived. Possible candidates include repeated game arguments such as the framework developed by Diermeier and Feddersen (1998) where legislative organization is sustained as an equilibrium in a multi-stage game. We will return to this important issue in the discussion section.

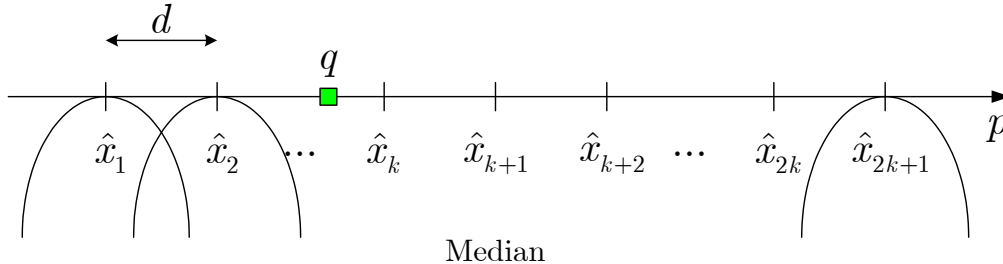


Figure 1: The policy space and players' preferences.

and compare them to the baseline model.

2.1 A Model of Policymaking

We formalize Krehbiel's position using the standard spatial model with single-peaked preferences. This environment allows us to represent Krehbiel's argument because the median will be well-defined for every issue. Let N be a set of size $|N| = 2k + 1$ legislators, where $k \geq 1$ is an integer. We assume the number of legislators is odd to avoid having to deal with ties in majority voting. The policy space X is a compact interval on the real line: $X = [\underline{x}, \bar{x}] \subset \mathbb{R}$. For simplicity assume that all legislators have quadratic preferences over this policy space. Let \hat{x}_i denote the ideal point of legislator i . His preferences over policies in X will be represented by the quadratic utility function:⁵

$$u_i(x) := -(x - \hat{x}_i)^2 \quad \text{for } i \in \{1, 2, \dots, 2k + 1\} =: N \text{ and for all } x \in X.$$

For simplicity, we assume that ideal points are arranged equidistantly in the policy space; we denote the distance between any two adjacent ideal points by d .⁶ Figure 1 illustrates the policy space and the spatial distribution of ideal points. In the figure q represents the status quo policy.

We now formally represent the notion of parties as "like-minded individuals." Here, there is no canonical model. Recently Krehbiel (2006b) proposed a spatial model and Krehbiel (2006a) a probabilistic model. Our model combines the two approaches. We want to capture the stylized fact that on different issues a legislator may be at different places on the left-right ideological spectrum, but that members of the same party are *more likely* to be on the same side of the issue. In other words there may be issues where party members think alike (and differently from the other party) but we also allow for issues that cut across party lines.⁷

⁵Many other types of single-peaked preferences support our results. We choose the quadratic because it is standard in the literature on uni-dimensional models, delivers simple closed-form equilibrium solutions and simplifies the derivation of comparative statics.

⁶In order to accommodate all legislators' policy positions the length of the policy space has to be at least $2kd$ i.e. $|\bar{x} - \underline{x}| \geq 2kd$.

⁷In this paper we do not model where these issues come from. They may be strategically selected ("Gays in the Military"), imposed by external events ("9/11") or be a combination of both, for example, elevating a personal event

To model these various policy alignments we partition the set of legislators into two disjoint subsets $A = \{1, 2, \dots, k\}$ and $B = \{k + 1, k + 2, \dots, 2k + 1\}$. Thus group A has one member less than group B . There are then $(2k + 1)!$ different possible orderings of ideal points. Denote a generic ordering by $\omega = (\omega_1, \omega_2, \omega_3, \dots, \omega_{2k+1})$. To model the idea of legislative parties as groups of "like-minded legislators" we assume that some orderings are more likely than others. For instance, with five legislators one possible ordering is $\omega' = (\hat{x}_1, \hat{x}_2, \hat{x}_3, \hat{x}_4, \hat{x}_5)$, where A and B types are completely separated; another possible ordering is $\omega'' = (\hat{x}_1, \hat{x}_3, \hat{x}_5, \hat{x}_2, \hat{x}_4)$ where A and B types mix with each other; on this issue an A -legislator (legislator 2) has very different views from his fellow A -legislator (legislator 1). If legislators 1 and 2 are both left-leaning most of the time (i.e. on most policy issues) this second ordering ω'' can be thought of as less likely to occur (to occur for fewer policy issues) than the first one ω' .

The ideal point that separates the set of legislators into two groups of equal size k will be referred to as the *median* ('s ideal point). We assume that any given ordering comes from a probability distribution $f(\omega)$ over the space of $(2k + 1)!$ distinct orderings of ideal points. There are many possible distributions of orderings, some that feature more left-to-right separation of A and B types than others. At one extreme only orderings where A and B types are completely separated into a left block and a right block receive positive probability. At the other extreme, all possible orderings are equally likely; in this case we can say that there is no systematic left-to-right conflict between A and B types. To be able to distinguish between distributions with differing degrees of partisan left-to-right conflict between the A block and B block we introduce an index of two-group polarization of preferences.

We distinguish between two orderings, one featuring more left-to-right conflict and one less, using the total left-to-right distance between A and B types in that ordering:

$$D(\omega) := \sum_{a \in A} \sum_{b \in B} [\hat{x}_b(\omega) - \hat{x}_a(\omega)]$$

Note that there are $k!(k + 1)!$ different orderings with the same total left-to-right distance between all A 's and all B 's. Also note that the largest such distance is $\overline{D} = \frac{k(k+1)(2k+1)}{2}$, for instance for the ordering $(\hat{x}_1, \hat{x}_2, \hat{x}_3, \dots, \hat{x}_{2k}, \hat{x}_{2k+1})$ and the smallest is $\underline{D} = -\frac{k(k+1)(2k+1)}{2}$, for instance for the ordering that's just the reverse of the previous one: $(\hat{x}_{2k+1}, \hat{x}_{2k}, \hat{x}_{2k-1}, \dots, \hat{x}_2, \hat{x}_1)$.

The index of polarization then is simply:

$$\pi(f) := \frac{\sum_{\omega \in \Omega} D(\omega) f(\omega)}{\overline{D}}.$$

or tragedy to increased political significance ("Patty Schiavo"). As discussed below our focus is on modeling agenda setting. In other words, we do not model the topics of political debate, our main interest is in modeling how these topics are converted into concrete bill proposals.

In words, this index measures the average total left-to-right distance between A 's and B 's relative to the maximal possible left-to-right distance between A 's and B 's. The normalization is meant to force the index to vary between -1 and 1 . However, we want to rule out distributions of orderings where the average total left-to-right distance between A 's and B 's is negative, since those cases imply that A 's are more likely to be on the right. To achieve this we impose two further weak assumptions on the distribution of orderings that insure that $\sum_{\omega \in \Omega} D(\omega)f(\omega)$ is positive:

- (i) If $D(\omega') > D(\omega'')$ then $f(\omega') \geq f(\omega'')$.
- (ii) If $D(\omega') = D(\omega'')$ then $f(\omega') = f(\omega'')$.

The first assumption says that an ordering that has higher total left-to-right distance between A 's and B 's gets a larger weight in the distribution f .

The second assumption insures that orderings that have the same total left-to-right distance between A 's and B 's receive equal weight in the distribution f . This implies that *within* each preference type, conditional on a given level of left-to-right conflict between A 's and B 's, the average total left-to-right distance between members of the same preference type is zero. That is,

$\sum_{\omega \in \Omega | D(\omega)=D} \sum_{a_1 \in A} \sum_{a_2 \in A} (\hat{x}_{a_2} - \hat{x}_{a_1}) \frac{f(\omega)}{\sum_{\omega \in \Omega | D(\omega)=D} f(\omega)} = 0$. In other words, there is zero average left-to-right conflict between members of the same preference type.

The parameter π thus captures in a single number between $\pi_{\min} = 0$ and $\pi_{\max} = 1$ the degree of preference *polarization* in the legislature. At one extreme, when $f(\omega) = \frac{1}{(2k+1)!}$ we have $\pi = 0$ and so all orderings are equally likely; in other words each legislator can be at any position on the ideological spectrum with equal probability and there is no polarization. There is still conflict on each and every issue (for each and every ordering) but this conflict is diffused, it is not systematically left-to-right. Formally, although for all legislators marginal distributions of ideal points are identical, these distributions are not independent, but are correlated.

At the other extreme, when $f(\omega) = \frac{1}{k!(k+1)!}$ for $D(\omega) = \bar{D}$ and zero otherwise then $\pi = 1$ and all orderings feature complete separation between A -legislators and B -legislators.⁸ Note that even when A s and B s do not mix at all in this case there is still ideological conflict within preference types. The position of a given legislator is not fixed but may still vary with the issue: for instance a left-wing legislator may be extremely liberal on social-cultural issues like abortion and gun control, but only moderately leftist on economic issues like the level of taxation.⁹ The parameter π is exogenous to our model. It is a feature of the long-term fundamentals of the political environment shaped by forces outside of the model, such as shifts in ideological alignments.

⁸Because the density of the distribution of orderings is non-decreasing it is possible to show that a distribution with more polarization first-order stochastically dominates a distribution with less polarization. Formally, $\pi(f) < \pi(g)$ if and only if g first-order stochastically dominates f .

⁹One way to see how weak our distributional assumption is would be to note that there are several distributions f that feature the same degree of polarization. In other words the constant $\pi(f)$ does not uniquely identify the distribution f .

2.2 Relationship to the Literature on Congressional Parties

The theoretical framework we propose is novel both because it shifts the focus of the existing literature away from its emphasis on parties' ability to impose discipline from above, but also because it is equipped to compare and contrast the existing theoretical approaches - both partisan and non-partisan - in a single model. To understand our modeling choices it is useful to briefly summarize for the reader the current leading arguments.

Where do preference similarities come from? Krehbiel's approach starts with the assumption that party members have similar preferences. It does not provide a *theory* for where these preferences come from. They may be based on selection due to personal ideology (i.e. individuals with a conservative world view may be more likely to join the Republican party) or they may be the consequences of electoral institutions and constituency characteristics. For example, parties may represent "brands" i.e. cognitive short-cuts that help voters solve their informational problems (e.g. Cox and McCubbins 1993, Snyder and Ting 2002). Alternatively, polarization may vary as a consequence of election results (Cooper and Brady 1981). At any rate, for our purposes we do not need to take a position on what drives polarization. Rather, we take the degree of polarization as exogenously given in our theory and then study how it influences legislative organization.¹⁰

Parties as Legislative Cartels. It is important to understand what the Krehbiel approach rules out. It is inconsistent with any control of legislative institutions or procedure by parties and the use of such institutions to change voting behavior in order to bias legislative outcomes away from the chamber majority and towards the party majority. This, of course, is the essence of the partisan theories in all its variations.

The debate over legislative parties therefore comes down to whether and how parties can shape changes in behavior and policy outcomes. There are two variants to distinguish. Cox and McCubbins (2005; p.19) clearly state the distinction.

Parties as Floor Voting Coalitions

Some partisan theories view parties primarily as floor voting coalitions. In such theories the central issue is the degree to which parties can discipline their members, ensuring a cohesive voting bloc on the floor, even when there are internal disagreements over policy (...)

Parties as Procedural Coalitions

¹⁰Krehbiel (1998) has argued this point on methodological grounds: the question of the origins of polarization does not need to be answered by a theory of *legislative* institutions. Rather, it belongs to the domain of *electoral* studies. In other words, legislative theories (at least choice-based approaches) take the basic preferences of legislators as given and then study how their behavior may change in response to incentives in the chamber. For example, it appears perfectly consistent with Krehbiel's approach that party leaders withhold electoral endorsements or restrict campaign funds to discipline candidates. But these mechanisms must be purely electoral; they cannot involve legislative institutions such as the threat of withdrawal of a valuable committee membership, agenda control and so forth. Indeed Krehbiel's claim is that the latter institutions have no measurable effect on the behavior of members of Congress.

Other partisan theories, including our own, view parties primarily as procedural coalitions. For such theories, the central issue is the majority party's ability to control the legislative agenda, defined as the set of bills considered and voted on the floor.

The first variant ("floor voting coalitions") is usually based on a public good argument. Forming a legislative cartel provides various benefits to members but creates a collective action problem.¹¹ For this reason the cartel needs to be enforced by selective incentives and punishments. The assumption is that legislative leaders have various carrots and sticks available to discipline party members such as appointing or excluding them from a particularly attractive committee or allocating versus withdrawing staff resources. The second, and more recent, approach ("parties as procedural coalitions") conceptualize party governance as an agenda control problem (e.g. Cox and McCubbins 2005). That is, even if there are no sticks and carrots available parties can skew outcomes through agenda control by preventing policy issues that can split the majority party from being scheduled for a vote on the floor. Importantly, under a pure agenda control approach (i.e. no selective incentives) legislators would vote as in the Krehbiel model, i.e. there would be no bias in voting behavior, but there would be bias in policy outcomes because a chamber majority can only vote on issues strategically selected by the majority party leadership.

Cox and McCubbins (2005) cite Aldrich (1995), Rohde (1991), and Aldrich and Rohde (2001) as examples of the parties-as-floor-voting-coalitions view. Indeed, Aldrich and Rohde (2001; p.7), in their theory of "conditional party government" express this point as follows:¹²

Most partisan theories would yield the expectation that the majority party would have sufficient influence (...) to skew outcomes away from the center of the whole floor and toward the policy center of [majority] parties.

Our focus in this paper is squarely on the second approach: parties as procedural coalitions. That is, in our model the parties have no mechanisms available to discipline their members when they are voting on policy or procedural votes. This is equivalent to assuming that Krehbiel's baseline

¹¹A note of clarification: Unfortunately, the parties-as-brands approach and the parties-as-cartels approach are frequently conflated and (in our view) unnecessarily identified. When we say "parties as cartels" we mean the case where collaboration among party members is enforced by *legislative* means. The goal is the control of the legislative process. Note that there is no logical inconsistency between supporting Krehbiel's view on legislative parties and also holding the parties-as-brands position. Such a position simply claims that all possible disciplining of party members is limited to incentives related to campaigns and elections. On the other hand, we can also have a legislature with parties-as-cartels but without any resemblance to parties-as-brands. This would be the case, for example, when we study pre-modern or authoritarian legislatures where parties exist (in this case they perhaps should better be called "factions") but there are no meaningful elections. Of course, one can also hold both positions as do Cox and McCubbins (2005). In this case, the idea is that the use of legislative punishments further enhances the arsenal of party leaders and therefore makes it easier to maintain well-defined brands. Of course, this is perhaps a plausible position, but it is not logically necessary. This issue may not be critical in the U.S. context (or in any legislature with a two-party system) but it will become critically important once we consider multi-party democracies with coalition governments. We will further discuss this question below.

¹²Cited in Cox and McCubbins (2005; p.4).

model holds for votes on policy. This implies that once a policy is on the agenda a legislator will vote according their basic policy preferences. Any policy bias will be the consequence of agenda control, not control over floor voting. Cox and McCubbins (2005, p.4) come close to adopting this point when they follow the above quote from Aldrich and Rohde (2001) with the following statement.

Such theories are vulnerable to Krehbiel's critique and its predecessors.

However, after distancing themselves from the idea of parties as floor voting coalitions over policy issues Cox and McCubbins (2005) later do allow for the possibility of parties as voting coalitions over *procedural* (as opposed to policy) matters (now called "super-structural"; p.5). In this paper we follow Krehbiel in assuming that party members can be forced to vote against their preferences *neither* in procedural *nor* policy votes. We adopt the Krehbiel baseline model not because we necessarily believe it holds, but because it allows us to precisely isolate what the parties-as-procedural-coalitions view entails. As we show later, however, the baseline model alone is sufficient to create highly biased policy outcomes; party punishments are not needed, neither at the policy nor at the procedural level. In other words, the effectiveness of incentives to induce members to deviate from their basic preferences on policy is not a necessary assumption to explain party influence on outcomes.¹³

Conditional Party Government. This approach has emphasized that the degree of party governance is not fixed, but varies over time. In the "floor voting coalitions" variant this means that carrots and sticks may be more or less successful in shaping behavior, i.e. their potency may vary. This may be due, for example, to changes in polarization of an electorate and other factors. In the "parties as procedural coalitions" variant party control over the agenda setting process may vary. For example, the specifics of delegation of procedural power such as the degree of centralization or decentralization of the agenda setting process may change over time (Smith and Gamm 2001).

We can capture these claims formally by letting the chamber first vote on the number of offices with proposal power. This captures the degree of centralization. It is followed by a vote on who will fill the posts. As we will show below the majority party will first fill all positions with party members, but then will add members of the minority party until the optimal degree of centralization is reached. The fewer positions, the more expected policy bias will occur. The number of positions will, in turn, depend on polarization. In equilibrium the degree of chosen centralization (and therefore policy bias) will thus depend on the degree of policy polarization, as predicted by the Conditional Party Government approach. Notice that, at least in our formal representation, the Conditional Party Government approach is not devoid of content. It does not simply imply that more polarization on policy leads to to more partisan voting behavior. Rather, more polarization

¹³Notice that our theory is compatible with the existence of such carrots and stick, it just does not depend on it. Indeed, the mechanism proposed in this paper could be used to explain how carrots and sticks could be created.

leads to more unequal equilibrium distributions of proposal power, which leads to more partisan agendas, which leads to more biased policy outcomes.

Negative and Positive Power. In their analysis Cox and McCubbins (2005) emphasize *negative* agenda power, i.e. the ability to block legislation, as opposed to *positive* agenda power, i.e. the ability to ensure passage (Diermeier and Myerson 1999). One possible reason for the focus on negative power is the overwhelming empirical evidence that congressional committees lack positive power in contrast to e.g. cabinet ministries in parliamentary democracies (Laver and Shepsle 1990, 1996). Cox and McCubbins (2005) argue that negative power is executed through gate-keeping, i.e. the ability to prevent proposals from coming for a vote on the floor. An alternative approach is to focus on *proposal* power (e.g. Baron and Ferejohn 1989), i.e. the ability to put items on the agenda. Both negative and positive proposal power are forms of agenda control. It is commonly believed, however, that proposal power is stronger than gate-keeping power (e.g. Cox 2006) as the holder of proposal power can not only prevent proposals from being voted on, but he can also determine which proposals from the remaining ones are actually considered on the floor. In our analysis we will focus on proposal power. As we show below groups of like-minded legislators can create highly biased distributions of proposal power and *a fortiori* of gate-keeping power. In other words, we propose a theory of legislative organization that supports effective procedural control by a chamber majority. According to our model there is no need to limit this control to negative agenda setting power only.

2.3 Addressing the Krehbiel Critique

With this representation we can now state the core of Krehbiel's critique against "parties as procedural coalitions" (2006a, 2006b). It goes as follows:

- (1) The notion of agenda control presupposes control over legislative institutions.
- (2) In a majoritarian legislature control over legislative institutions depends on support of the chamber majority (the "median voter")
- (3) Therefore, policy outcomes cannot be biased away from the median as the median could otherwise simply change the organizational structure.

In other words, in Krehbiel's view the whole concept of parties-as-cartels critically depends upon the majority party's ability to use legislative procedures to impose punishments. But the use of legislative procedures requires the support of the legislative median. Support from the majority party's median is not enough.

Institutions as Congealed Tastes. The structure of Krehbiel's argument seems utterly compelling. However, as we intend to show below, we believe there is a gap, which lies in making the transition from claim (2) to claim (3). Krehbiel's argument presupposes that because the chamber as a whole decides on policy choice it must be in the chamber's interest to rectify any

possible deviation from the median's ideal point on a given policy by adjusting the procedural context or the organizational structure. For example, if committees keep the gates closed and frustrate a chamber majority that would like to consider the bill on the floor, why does the floor not simply vote on a discharge procedure? And if the exact details of the discharge procedure are too onerous why not change them to make it easier to the chamber majority to obtain its preferred outcome? In other words, organizational structures are just more or less complicated choice alternatives subject to the same voting rules as votes on policies. Preferences over policy will induce preferences over institutional arrangements. Therefore, Krehbiel argues, there can be no gap between majorities on policies and majorities on procedure.¹⁴ Of course, there are many ways to model procedural rules and proposal protocols. We will propose a particularly flexible model that (as one of its limiting cases) can faithfully represent Krehbiel's conjecture as a theorem. The reader may disagree with this specific model. However, in that case, at least, we could locate the exact point of disagreement: how to model procedural rules and organizational structure.

Too Many Bills, Too Little Time. In our view the implicit assumption in Krehbiel's approach is that proposing and voting (whether on policy or procedure) are essentially costless. And indeed, as we show below, if it is, Krehbiel's argument holds. Perhaps the most plausible rationale for costs is the "plenary bottleneck" argument (e.g. Cox and McCubbins 2005, Cox 2006). A precise formulation of the argument can be found in a recent article by Cox (2006). It is based on the following premises, describing a "busy legislature":

(1) Bills can only be passed pursuant formal motions and voting in plenary session. This process necessarily takes some amount of time.

(2) Bills pass if a majority votes for them.

(3) The plenary session faces a hard time constraint.

Premises (1)-(3) seem utterly uncontroversial.¹⁵ Together they imply that a vote on any given bill is subject to an opportunity cost. That is, the time spent on any given bill could be used to debate or decide on some other proposal. Cox (2006) argues that these time constraints are substantial,¹⁶ in other words: too many bills, too little time. We can formally represent this idea with the following model of legislative decision-making.

¹⁴We see here the echos of a famous argument by Riker (1980) where he criticized the emergence of structure-induced-equilibrium models (Shepsle 1979) as proposed solutions to cycling problems. Riker viewed institutions as "congealed tastes." Therefore, if there is cycling on policy alternatives, there must be cycling on institutions. The problem with this argument is that it never explicitly models procedural rules or the proposal process. Indeed, Diermeier (1997) shows that Riker's argument does not hold once we model voting and decision-making as a non-cooperative game.

¹⁵In passing we point out that (2) is identical to claim (2) in Krehbiel's argument.

¹⁶Cox (2006) argues that (in the absence of agenda control) legislators have an incentive to hold the legislature hostage using delay and blocking tactics. While this argument is certainly plausible and consistent with our approach, our approach does not presuppose it to be true. It is enough that legislative bargaining on any given issue takes time and resources.

3 The Augmented Model: A Busy Legislature

To the formal environment outlined above we add more structure on players' actions. Suppose that once a policy issue has come up the ordering of ideal points within the legislature becomes common knowledge. At that point legislators can make proposals to change the status quo, but this requires that they are first recognized to speak i.e. have the power to propose, have agenda power.¹⁷ We allow for the possibility that some legislators have more agenda power than others. Formally the distribution of agenda power in the legislature is modeled as a vector of recognition probabilities from the $2k$ -dimensional unit simplex:

$$\left\{ \boldsymbol{\rho} \in \mathbb{R}^{2k+1} \mid \sum_{i=1}^{2k+1} \rho_i = 1 \right\} =: \Delta_{2k}.$$

Once the distribution of agenda power $\boldsymbol{\rho}$ has been set and:

(I) **A policy issue arises** This determines the position of the status quo q and an ordering of ideal points $\boldsymbol{\omega}$. Legislators learn their own and each other's ideal points.

legislators are ready to bargain over the current policy issue. They are involved in the following sequence of events:

(P1) **Recognition** A legislator is recognized to make a policy proposal $p_i \in X$ (the proposal can be the status quo itself - meaning that the proposer keeps the gates closed to preserve the status quo). If a legislator is indifferent among several proposals we assume that he will propose the one that has a better chance to be accepted.

(P2) **Proposal** All legislators simultaneously vote on the proposal p_i . The vote can be either to accept or to reject the proposal.

(P3) **Voting** The voting rule is simple majority rule: if $k + 1$ or more legislators vote for the proposal, bargaining stops and the adopted proposal is implemented immediately and in all subsequent periods. If less than $k + 1$ legislators vote for the proposal the status quo $q \in X$ prevails during the current period and bargaining continues i.e. stages (P1) to (P3) are repeated. If the status quo was proposed at stage (P1), i.e. the gates are closed, a vote against means that legislators want to change the status quo; bargaining continues.¹⁸

¹⁷Allowing a legislator to be uncertain about fellow legislators' ideal points adds an extra layer of frictions in the model, that increases the premium that a proposer is able to extract from his position. A larger proposer premium strengthens our argument, as seen below, but is not necessary.

¹⁸This policy game is based on a model first proposed by Banks and Duggan (2003). The sequence of proposals and votes in this model approximates very well legislative bargaining under an *open rule* i.e. bargaining continues until a majority is satisfied with the policy outcome.

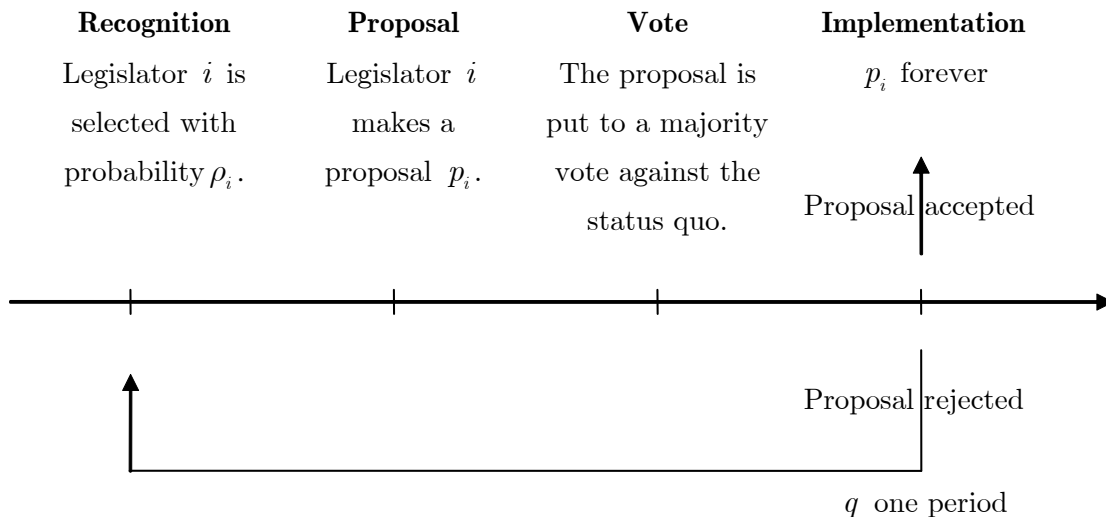


Figure 2: Timing of policy bargaining game.

All legislators share a common discount factor denoted by δ , where $0 \leq \delta < 1$. The lifetime utility of legislator i from the sequence of policies $(p_t)_{t=1,2,\dots}$ adopted at the policy stage is:

$$\sum_{t=1}^{\infty} \delta^{t-1} u_i(p_t).$$

3.1 Equilibrium Definition

A history of length t is a collection of variables describing the identity of the recognized proposers, the policy each one proposed and how each legislator voted. A strategy for a legislator is a mapping from the set of histories to the set of available actions (policy proposals, votes). In what follows we restrict attention to pure strategies.

A voting strategy for legislator i is a measurable map $r_i : X \rightarrow \{\text{accept}, \text{reject}\}$. Following Banks and Duggan (2006b) we find it convenient to construct our arguments using the set of policies that are acceptable to legislator i , formally denoted

$$A_i := r_i^{-1}(\text{accept})$$

and referred to as the *acceptance set of legislator i* . Given a profile of acceptance sets

$$(A_1, A_2, \dots, A_{2k+1})$$

define the *social acceptance set*¹⁹ as:

$$A := \bigcup_{M \subset N} \bigcap_{i \in M} A_i \quad \text{where } |M| \geq k + 1$$

that is, the set of policies that are acceptable to some majority M of legislators. Here M denotes any group of legislators larger than $k + 1$, i.e. that constitutes a majority.

Given the assumed timing of legislative bargaining a sequence of equilibrium policy outcomes can take one of the following forms

$$\underbrace{(q, q, \dots, q, p, p, \dots)}_{T \text{ periods}} \quad \text{where } 0 \leq T \leq \infty.$$

For each vector of recognition probabilities $\rho \in \Delta_{2k}(\varepsilon)$ the bargaining game taking place in the policy period may yield different equilibrium outcomes. We study behavior in stationary equilibria of these games, defined as in Austen-Smith and Banks (2006). Following Banks and Duggan (2006b) we also define two types of stationary equilibria of our policy bargaining game.

Definitions The following definitions refer to an equilibrium of the policy game [described in (P1)-(P3)] governed by an exogenous allocation of agenda-setting rights ρ . In the next section we endogenize ρ by making it the object of bargaining among legislators.

- A *stationary equilibrium* is an undominated subgame perfect equilibrium in stationary strategies, i.e. strategies that are independent of the history of play up to the current period.
- A stationary equilibrium is *static* if the equilibrium outcome of bargaining is no change from the status quo i.e. the sequence of policies (q, q, \dots) .
- A stationary equilibrium is *no-delay* if every legislator who has positive recognition probability proposes a policy that is accepted by a majority. The outcome of this equilibrium behavior is thus a sequence of policies of the form (p, p, \dots) , where p is the policy proposed by the legislator who is recognized in the first period.

Given an equilibrium²⁰ $[(p_i), (A_i)]_{i \in N} =: \sigma$ the continuation value of a legislator in period t is his expected utility evaluated at the beginning of the next period $t + 1$ if the proposal made in the current period is rejected. Since we will be interested solely in stationary equilibria, the continuation value of a legislator in any such equilibrium does not depend on time and will thus be denoted simply by $v_i(\sigma)$. We also notice that if the stationary equilibrium is no-delay the

¹⁹This is the terminology proposed in Banks and Duggan (2006b) and we use it unaltered.

²⁰Equilibrium behavior does depend on the underlying vector of recognition probabilities ρ ; the complete notation should be $\sigma(\rho)$. However, for expositional simplicity, in this section we do not carry the full notation along.

continuation value of a legislator i takes the simple form:

$$v_i(\boldsymbol{\sigma}) = \sum_{h=1}^{2k+1} u_i(p_h)\rho_h. \quad (1)$$

The acceptance set of legislator i in the equilibrium $\boldsymbol{\sigma}$ is the set of proposals p that, if adopted, leaves him at least as well off as if it were rejected.

$$A_i(\boldsymbol{\sigma}) = \left\{ p \in X \mid -(\hat{x}_i - p)^2 \geq -(1 - \delta)(\hat{x}_i - q)^2 - \delta v_i(\boldsymbol{\sigma}) \right\}. \quad (2)$$

Our first results characterize the stationary equilibrium of the policy game for a given recognition vector $\boldsymbol{\rho}$. All proofs are relegated to the appendix. The first proposition covers the case where the median legislator's ideal point is distinct from the status quo. The second proposition characterizes stationary equilibria in the case where the median's ideal point is the status quo.

3.2 Equilibrium Characterization

Consider first the case where the median's ideal point is away from the status quo. The next proposition states that in this case the median's acceptance set is an interval centered at the median's ideal point, and whose width depends on the (i) location of the status quo, (ii) the distribution of proposal power and (iii) on the level of impatience in the legislature. Additionally, it shows that the social acceptance set coincides with the median's acceptance set:

$$A_m = A = [\hat{x}_m - \Delta_{j^*}, \hat{x}_m + \Delta_{j^*}] \quad (3)$$

where Δ_{j^*} is the maximal deviation that the median is willing to approve, in other words, it is the distance that policy can be moved away from the median so that the median remains just indifferent between accepting and rejecting the proposal. Formally Δ_{j^*} satisfies the following equation:

$$-\frac{1}{1-\delta}\Delta_j^2 = -(\hat{x}_m - q)^2 - \frac{\delta}{1-\delta} \left\{ \left[1 - \rho_m - \sum_{h=0}^{j-1} (\rho_{m-h} + \rho_{m+h}) \right] \Delta_j^2 + \sum_{h=0}^{j-1} (\rho_{m-h} + \rho_{m+h}) (hd)^2 \right\}. \quad (4)$$

The left-hand side is the present value of accepting a proposal that deviates Δ_j from the median, and the right-hand side is the present value of rejecting the current proposal and taking part in extended bargaining after a period in which the status quo remains in place.

Notice that a legislator who expects that the social acceptance set is as that given in (3) will

make a proposal of the following form:

$$p_i = \begin{cases} \hat{x}_m - \Delta_{j^*} & \text{for } i = m - j, j \geq j^* \\ \hat{x}_m - jd & \text{for } i = m - j, j < j^* \\ \hat{x}_m & \text{for } i = m \\ \hat{x}_m + jd & \text{for } i = m + j, j < j^* \\ \hat{x}_m + \Delta_{j^*} & \text{for } i = m + j, j \geq j^* \end{cases} \quad \text{for } j = 1, 2, \dots, k \quad (5)$$

because he wants to pick the policy in the social acceptance set that is closest to his own ideal point. The equilibrium outcome can be illustrated as in Figure 3. In this figure the legislators' locations are represented by $2k + 1$ vertical lines, equilibrium policy proposals are represented as solid circles, and the status quo as a solid square.

Proposition 1 *Suppose the status quo is distinct from the median policy position $q \neq \hat{x}_m$. Then there exists a unique stationary equilibrium and it is no-delay. Policy proposals in this equilibrium take the form (5) where j^* is the unique $j = 1, 2, \dots, k$ that satisfies: $(j - 1)d < \Delta_j < jd$.*

The social acceptance set is $A = [\hat{x}_m - \Delta_{j^}, \hat{x}_m + \Delta_{j^*}]$ where Δ_{j^*} is implicitly defined in (4).*

The strategy of proof for Proposition 1 is the following. First, existence of stationary equilibria is established: we find a no-delay equilibrium as a function of the parameters of the model (Lemma 1 in the Appendix). Second, the set of stationary equilibria is more precisely described: they can be either no-delay or static (Lemma 2). Third, the no-delay equilibrium is shown to be unique (Lemma 3). Fourth, we show that static equilibria with delay can be ruled out (Lemma 4).

The key substantive implication of Proposition 1 is that when the proposer is not the median legislator and bargaining is costly (i.e. bills passed later on are less valuable than bills today) the proposer may be able to bias policy on the current issue in his direction by a strictly positive amount. For instance, in Figure 3 legislators 1 through $k - 1$ are able to keep policy Δ_{j^*} away from the median and legislator k is able to get his ideal point (which is a distance d away from the median). The deviation from the median can be either the proposer's ideal point $\hat{x}_m \pm jd$, if the proposer is sufficiently close to the median ($j < j^*$) or is Δ_{j^*} away from the median, for proposers that are more extreme ($j \geq j^*$). The proposer's ability to move policy away from the median is measured by the width Δ_{j^*} of the social acceptance set. In this sense Δ_{j^*} is a measure of the premium (i.e. the power) that a proposer derives from controlling the agenda.

The maximal equilibrium deviation Δ_{j^*} depends on the parameters of the model (δ, q, π) in the following way. It increases with the increased impatience of all legislators (low δ); as long as the median has positive recognition probability, as the discount factor approaches unity (a lot of patience) the unique stationary equilibrium outcome approaches the unique core alternative of this one-dimensional policy space - the median ideal point.²¹ The width of the social acceptance set is

²¹This is an instance of the "core equivalence" result of Banks and Duggan (2000).

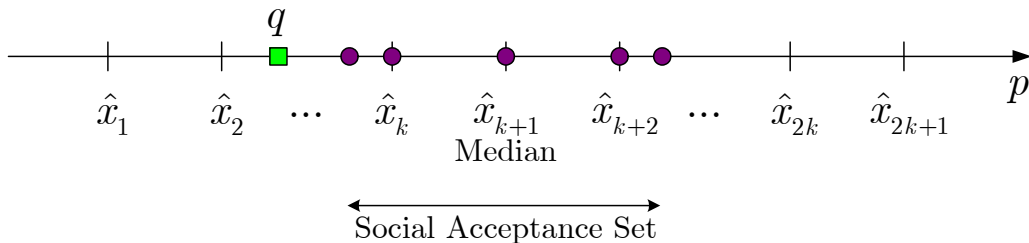


Figure 3: A social acceptance set where $j^* = 2$.

increasing with the distance between the median \hat{x}_m and the status quo q ; the further away from the center is the status quo, all else equal, the more the median legislator will have to compromise with the proposer on policy. Preference polarization π does not affect the extent of the maximal policy bias, but influences whether deviations will be predominantly to the left or to the right. With complete heterogeneity, deviations will be symmetric around the median; with complete homogeneity and an inegalitarian distribution of agenda-setting rights, there will be deviations that are systematically more likely to the left or to the right. In some cases equilibrium policy proposals are supported by supermajorities in the voting stage. Some specific examples will be discussed below.

The maximal policy deviation also depends on the distribution of agenda power within the legislature, measured by the vector of recognition probabilities ρ . The more power is concentrated in locations close to the median (locations $m \pm h$, where $h = 1, 2, \dots, j^* - 1$) the smaller the maximum possible policy deviation. This is not surprising. The pivotal legislator is the median. When faced with an extreme proposal the median will have a stronger incentive to block it the more likely it is that in the next period either himself or legislators close to him are going to be recognized to propose.

Consider also the special case where the status quo happens to be the median legislator's ideal policy $q = \hat{x}_m$. If this is the case the median will clearly have an interest to block all proposals that try to change the status quo; and since the median is pivotal, this will also be the will of a majority. The social acceptance set is therefore the singleton $\{\hat{x}_m\}$, which means that no policy other than the median can gather a majority of votes (see Figure 4). This observation can be stated formally as follows.

Proposition 2 *If the status quo is the median legislator's ideal policy $q = \hat{x}_m$ then the unique stationary equilibrium is the static no-delay equilibrium: all legislators propose the status quo in the first period and it is accepted by a majority. Thus the median legislator gets his ideal point in all periods.*

So far we have taken the policy issue (ω, q) and distribution of agenda power ρ as given. The

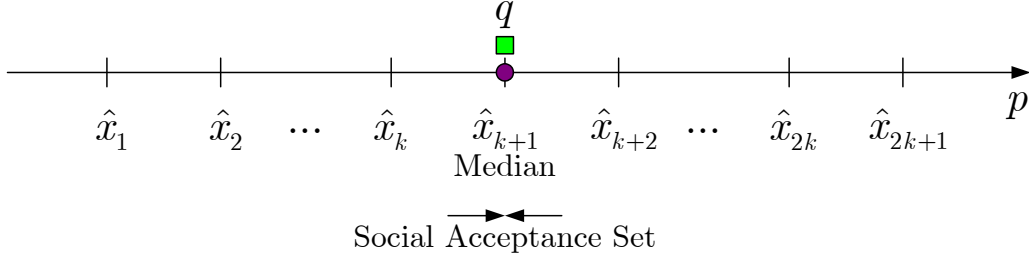


Figure 4: Singleton social acceptance set when $q = \hat{x}_m$.

next natural question is: How does the distribution of agenda power influence the distribution of policy outcomes in equilibrium? The answer is key to our argument and is illustrated in the following section with a few suggestive examples. By studying these examples it becomes possible to see that ex ante (*before* the policy issue becomes known) systematic bias in policy away from the median requires *both* inegalitarian agenda access *and* some degree of preference polarization ($\pi > 0$). Ex post (*after* policy positions are known) inegalitarian agenda access is sufficient to produce outcomes biased away from the median.²² The only exception is the case where the median monopolizes agenda power. In this case Krehbiel's conjecture turns out to hold (see Example 3).

3.3 Examples

Consider a legislature composed of five members ($2k + 1 = 5$). Let the distance between two adjacent policy positions be normalized to $d = 1$. All legislators discount future payoffs at the common discount factor $\delta = 0.925$. Suppose the median policy position is $\hat{x}_m = 0$ and the status quo is on the left at $q = -1.4$.

Example 1 Egalitarian agenda access. *Every legislator has an equal chance of being recognized to make a policy proposal ($\rho_i = 0.2$ for all $i = 1, \dots, 5$). The unique stationary equilibrium of the policy bargaining game, given these parameters, is one in which each legislator who is recognized first proposes the median ideal point $\hat{x}_m = 0$ if this is, in fact, his ideal policy; otherwise he will propose $p_l = \hat{x}_m - |q| \sqrt{\frac{1-\delta}{1-\delta(1-\rho_m)}} \simeq -0.75$ if he is situated to the left of the median and $p_r = \hat{x}_m + |q| \sqrt{\frac{1-\delta}{1-\delta(1-\rho_m)}} \simeq 0.75$ if his favorite policy is to the right of the median. The social acceptance set of this bargaining game is a closed interval centered at the median policy*

$$A = [-0.75, 0.75].$$

This set coincides with the acceptance set of the median legislator i.e. the legislator whose ideal policy is $\hat{x}_m = 0$. In the unique equilibrium each legislator votes for any policy proposal that belongs

²²The policy bias decreases when bargaining costs are lower.

to his own acceptance set and votes against any policy proposal outside this set. The individual acceptance sets are respectively, and approximately: $A_4 = [-3.94, -0.06]$, $A_1 = [-2.08, 0.08]$, $A_5 = [-0.75, 0.75]$, $A_2 = [-0.4, 2.4]$, $A_3 = [-0.31, 4.31]$.

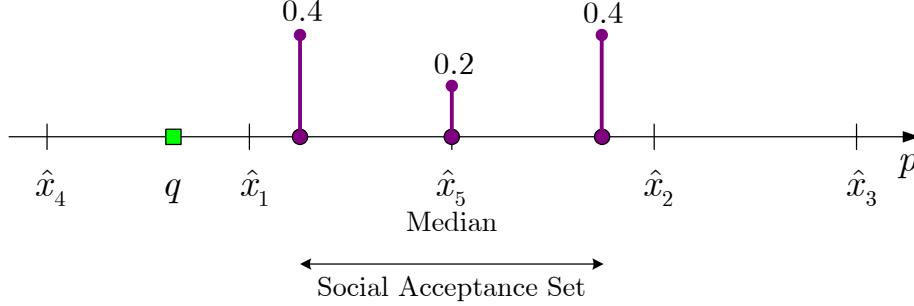


Figure 5: Probability distribution of equilibrium policy outcomes for $\rho = (0.2, 0.2, 0.2, 0.2, 0.2)$ and arbitrary π .

The outcome of this unique stationary equilibrium is random and symmetric. Policy will be $p_l = -0.75$ with probability 0.4 (i.e. the probability that leftist legislators get to propose first), the median policy position $\hat{x}_m = 0$ with probability 0.2 and the policy $p_r = 0.75$ with probability 0.4. With the corresponding probabilities, each of these three policies are proposed by a legislator and accepted by the legislature in the first period. Figure 5 illustrates this equilibrium outcome. In the figure the vertical segments stand for the probabilities with which the indicated policies occur in equilibrium. Notice that in this case there is on average no bias in the policy outcome in either direction; the outcome is symmetric. What is more, the outcome remains symmetric regardless of the level of polarization because rival party members have equal access to the agenda.

Example 2 Unequal agenda access. Consider the special case in which one legislator has a monopoly on the agenda $\rho_i = 1$. We consider two extreme cases:

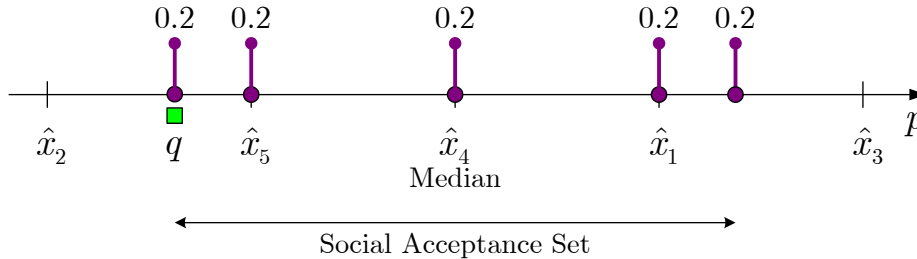


Figure 6: Probability distribution of equilibrium policy outcomes for $\rho = (0, 1, 0, 0, 0)$ and no polarization $\pi = \frac{1}{2}$.

Case 1) No polarization ($\pi = 0$). There are $5!$ different and equally likely orderings of ideal points. Suppose legislator 2 monopolizes agenda power: $\rho_2 = 1$ and $\rho_i = 0$, for $i \neq 2$. The

equilibrium outcome for this case is illustrated in Figure 6. Notice first that now the maximal deviation produced by an extreme proposer is exactly commensurate with the extremity of the status quo (just as in Romer and Rosenthal 1978). If the proposer, legislator 2, is located at the extreme left he will be able to preserve the leftist status quo since no other legislator (including the median) can hope for a better outcome using delaying tactics; legislator 2 can credibly threaten to keep the gates closed next time around as well. The same logic applies for the case where legislator 2 is located at the extreme right; in this case, positive, rather than negative, agenda power is going to move the status quo to the other extreme of the ideological spectrum.

Case 2) Maximal polarization ($\pi = 1$). There are now six possible orderings of ideal points, one of which is illustrated in Figure 7.

2.1) If the main agenda setter is of the preference type A then outcomes will be systematically biased towards the preferences of left-wing legislators (1 and 2). Consider Figure 7. Here legislator 2 is the agenda setter that monopolizes agenda power. Half of the time he is going to be located at the extreme left, half of the time at the more moderate left, as is the case in the figure. His proposals for each case are indicated in the figure with purple circles; they are approved right away by a majority. Notice how in this case policy bias occurs both case by case (i.e. for each possible location of the agenda setter) and on average.

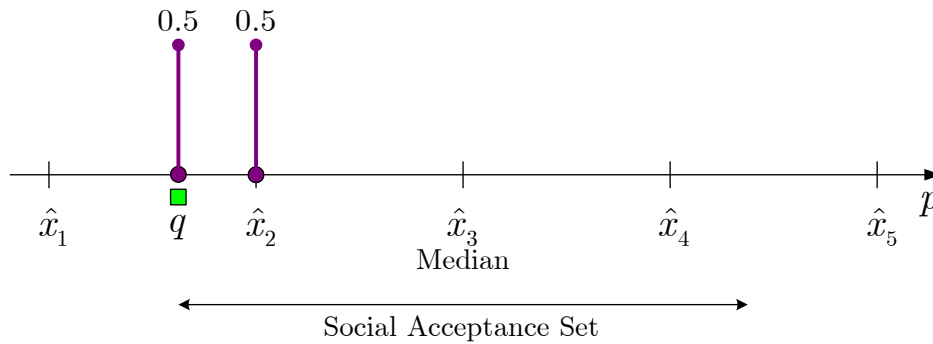


Figure 7: Probability distribution of equilibrium policy outcomes for $\rho = (0, 1, 0, 0, 0)$ and maximal polarization $\pi = 1$.

2.2) If the main agenda setter is of the preference type B then outcomes will be biased towards the preferences of right-wing legislators (3, 4 and 5). Consider Figure 8. Here legislator 4 is the agenda setter. A third of the time he will be located at the median, a third of the time he will prefer the fourth policy position, and a third of the time he will be located at the extreme right. In the last two cases there will be policy bias away from the median. On average, as well, policy will be biased to the right.

Example 3 Issue Median Rules. In our model, just as in Krehbiel (1998), an impatient legislature, however polarized, cannot overcome the issue median if the issue median controls the agenda. This

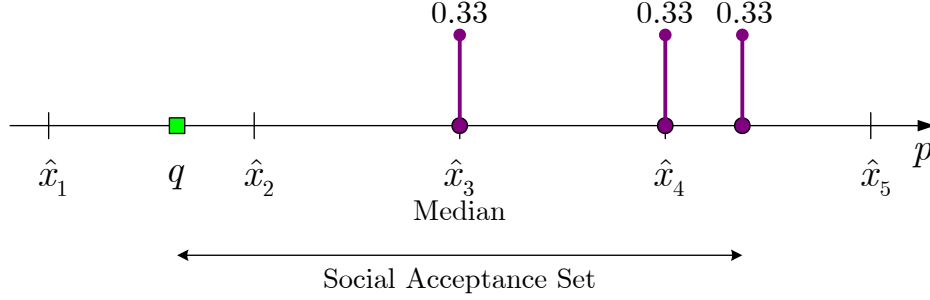


Figure 8: Probability distribution of equilibrium policy outcomes for $\rho = (0, 0, 0, 1, 0)$ and maximal polarization $\pi = 1$.

feature of the model can be illustrated as follows. Suppose legislators are more impatient than before: the common discount factor is $\delta = 0.2$ and the median legislator - whoever he may be for that particular issue - concentrates all proposal rights: $\rho_m = 1$. In this case the maximal deviation will be $\sqrt{1 - \delta} \simeq 0.89$. Still, in this case, non-median legislators have no proposal power and so there will be no one there to propose a deviation from the median. Equilibrium policy is represented in Figure 9 (where the median is legislator 3).

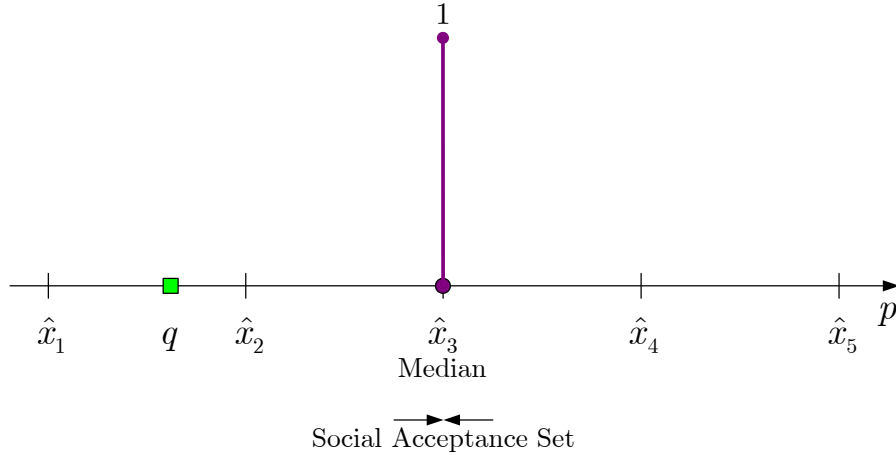


Figure 9: Probability distribution of equilibrium policy outcomes for $\rho_m = 1$ and an arbitrary degree of polarization $\frac{1}{2} \leq \pi \leq 1$.

Notice that no matter how impatient the legislators or how little overlap between the parties, as long as the median controls the agenda the equilibrium outcome cannot diverge from the center; it will stay at the median's ideal point with probability one.

We can now formally represent Krehbiel's claim discussed above as a corollary to our first two propositions:

Proposition 3 *Regardless of the level of preference polarization the median voter's ideal point*

becomes the final policy outcome if and only if:

- the median has non-zero agenda power and voting on proposals is costless (bargaining is costless $\delta \rightarrow 1$), or
- the median monopolizes agenda power $\rho_m = 1$, or
- the median's ideal point is the status quo.

The potential gap in Krehbiel's argument is the "only if" part. In other words, unless we assume that voting is costless (or, equivalently, that plenary time is not scarce), the median policy result holds only when the median monopolizes agenda power or the status quo happens to be right in the middle of the ideological spectrum. A weaker form of Krehbiel's median policy conjecture, however, saying that policy outcomes are at the median *on average*, does not require costless bargaining but holds only if the distribution of agenda power is egalitarian or there is no polarization (see examples 1 and 2 above).²³

However, following Krehbiel's intuition, it is possible to close this gap in the argument. It goes as follows. As we have just shown the median legislator will always be able to obtain the median policy if he is recognized to make the proposal, even if the (opportunity) costs of rejecting a proposal are substantial, i.e. if δ is low. Now suppose legislators can vote on who should have proposal power and that the vote is by majority rule. Then, why wouldn't a legislative majority adopt a legislative power structure that gives the issue median as much proposal power as possible? (in our model that would mean to set $\rho_m = 1$, as in Example 3).

Our answer to that key question is in the following section. Before going into it, however, it is useful to compare Krehbiel's argument to Cox's (2006) recent claim that plenary bottlenecks are the reason for the evolution of highly unequal institutions of agenda control. To make his argument Cox introduces the concept of a "legislative state of nature," i.e. a fictitious choice situation characterized by the "busy legislature" assumptions (1)-(3) and the following additional premise:

(4) access to plenary time is *egalitarian* and *unregulated*.

"Egalitarian" means that each legislator has an equal probability of being recognized to make a proposal, while "unregulated" means that once a motion has been made all who wish to speak may speak without limits on debate.²⁴ Cox (2006) claims that such a legislative state of nature

²³According to Cox (2006) neither costless bargaining nor egalitarian agenda access are conditions that can be expected to occur in a modern legislature. The key reason in the "plenary bottleneck." The sheer amount of legislation that has to be considered by a national legislature has (1) increased the costs of bargaining over time and (2) led to tight self-regulation of agenda access (in Cox's words, modern legislatures feature "equal voting power, but unequal agenda power").

²⁴We list the condition of "unregulated" access here for completeness. However, it will play no further role in our argument. As we show below, a focus on the probabilities to be recognized as a proposer is sufficient to generate strong incentives for agenda control.

cannot persist. Rather, busy legislatures will evolve to create inequalities in member's access to floor time and limit the members' ability to delay. More formally, if chambers can decide on their own internal organization by majority rule,²⁵ then the "legislative state of nature" cannot be an equilibrium in a game of organizational choice.²⁶

Cox makes his argument informally, but the logic is compelling. How is it related to Krehbiel's argument? The answer is clear: Busy legislatures may necessarily be inegalitarian (as Cox argues), but they may be inegalitarian by adopting procedures that grant the median the maximal amount of power. In the absence of other arguments Krehbiel's view of the rule of the median is perfectly consistent with the idea of inegalitarian legislatures as long as it is the *median* that benefits from unequal allocation of proposal power. Of course, this is not Cox's position. He argues that it is parties that will be able to assume agenda control and proposal power. And so, we appear to have come full-circle. In other words, the opportunity costs associated with plenary bottlenecks may indeed lead to inegalitarian proposal, debate, and access rules, but it leaves open the question whether control over procedure rests with the median voter or the majority party.

4 Endogenous Legislative Organization

To provide an answer we explicitly model the choice of the proposal structure that governs bargaining over policy. That is, the chamber now decides on its own legislative organization by majority rule. One may expect that this will naturally lead to an outcome with unbiased policy choice, but this turns out not to be the case.

4.1 A Model of Organizational Choice

To address this question formally we explicitly model the *choice* of legislative organization by endogenizing the vector of recognition probabilities ρ . In other words, we will investigate which proposal structures (here formally modeled as ρ) constitute equilibrium institutions in a model of institutional choice.²⁷ Since each organizational structure is associated with a distribution over policies via the policy model discussed above we will then be able to infer under what conditions we can expect majoritarian outcomes and when to expect partisan bias. Moreover, as we show below, by varying the parameters of the model, a comparative statics analysis will show us how the equilibrium institution will vary in response to changes in the basic parameters of the model, such as the polarization index. This will allow us to formally model the main insight of the Conditional Party Government theory, namely that the degree of control by the majority party may vary over time in response to factors such as polarization.

²⁵Majority rule is not really necessary. Anything other than unanimity will do.

²⁶The argument replicates the structure of the classical social contract argument due to Hobbes. First, the author defines a state of nature. Then he shows such a state of nature cannot persist.

²⁷See Diermeier and Krehbiel (2003) for a methodological discussion of this approach.

We start from the premise that at the beginning of each new legislature all members have equal agenda power *and* equal voting power. However, whereas equal voting power is a constitutional requirement and therefore outside of the control of the legislature, the distribution of agenda power is a choice variable for the legislature. In other words, as long as a majority agrees to change the original "state of nature" - in which each member is equally entitled to make legislative proposals - to a new distribution of agenda power, that new arrangement becomes binding on the entire legislative body. To capture this feature of legislative decisionmaking we allow legislators to change, through majority voting, the egalitarian distribution of agenda power. We refer to this initial stage of the model as the *organizational stage*.²⁸

There are two main features of this initial stage of legislative decisionmaking. First, *organizational bargaining* is based on egalitarian agenda access *and* egalitarian voting power. We will show that even starting from this "state of nature" where this dual power is equally distributed, the legislature may end up using majority voting to skew the distribution of policy agenda power towards a subgroup of the legislature. The end result is new rules for *policy bargaining*: egalitarian voting power *but* inequalitarian agenda access. Second, we assume that once in place the current legislative organization governs the entire policy game. That is, it is not in the interest of any legislator to change the rules midway through the policy game.²⁹

Therefore at the organizational stage we let legislators use *pure majority rule* to allocate agenda power. Pure majority rule is an idealized and egalitarian open rule in which every legislator has an equal chance to be recognized to make a motion. After a motion is made a majority vote is taken between the motion and the last motion passed (the status quo motion). If the motion passes it becomes the new status quo. Then, any legislator can make a motion to change the status quo or to stop taking motions. The sequence of motions and votes continues until either a majority votes to stop taking motions or no motion exists that can beat the status quo.

As discussed above, proponents of the Conditional Party Government approach have argued that agenda control by the majority party can be captured by the degree of centralization of proposal rights (e.g. Smith and Gamm 2001). To formally capture this idea we divide the organizational phase into two stages. In the *structural stage* legislators decide on the number of agenda setting positions, our measure of centralization. In the *assignment stage* they allocate individual legislators to these positions. The timing of the organizational stage is then as follows.

(O1) **Structural stage** Legislators decide on a number n of agenda setting positions ($1 \leq n \leq 2k + 1$) that will share agenda power equally. The collective decision rule is pure majority rule.

²⁸ Examples of organizational issues decided on the floor of the U.S. Congress include: the election of committee/subcommittee members and chairs, the election of the House Speaker (both of which take place every two years at the beginning of each Congress), the appointment by the Speaker of conference committees whose role is to reconcile House-Senate differences over versions of the same legislation.

²⁹ The assumption that legislative organization is stable can also be based on an opportunity cost argument. We will discuss this assumption further in the final section.

The status quo is the legislative state of nature i.e. equal sharing of agenda power, or, in other words, complete decentralization, $n = 2k + 1$.

(O2) **Assignment stage** Once the degree of centralization of power (i.e. the number of agenda setting positions n) has been determined the legislature assigns individual legislators to those seats. Each legislator has one vote to allocate to whoever he thinks is the best candidate for a given position. The winner of the position is the candidate who gets the most votes. All legislators are candidates. In case of ties, winners are determined randomly.

Putting it all together, the model we propose starts with an organizational period (stages O1 and O2), is followed by the arrival of a policy issue (stage I) when the status quo and the ordering of ideal points become known, and ends with bargaining over policy (stages P1, P2 and P3).

In what follows we characterize equilibria of the organizational stage. Specifically, we can identify the conditions for a legislative majority to adopt an inegalitarian distribution of agenda power, which will lead to biased policy outcomes towards its side of the policy space. The adoption of these rules is based exclusively on affinity in policy preferences and not on the use of incentives (carrots and sticks) by party leaders. Our model does not depend on the assumption of a pre-existing party leadership or exogenous source of party power since all members of a preference type are identical at the organizational stage of the game. Rather, policy bias towards the preferences of the majority party emerges in equilibrium as legislators rationally delegate power to legislators of their own preference type. Importantly, the degree of delegation will vary depending on the degree of polarization. To make these claims precise we solve for the equilibria in the organizational stage.

4.2 Equilibrium Legislative Organization

As the analysis of the policy game in the previous section makes clear, in busy legislatures (i.e. where bargaining is costly $\delta < 1$) the final policy outcome is heavily influenced by the distribution of agenda power ρ (see examples 1 to 3). In particular the median's ideal point will be the policy outcome only if the median monopolizes proposal power (by Proposition 3). In our proposed formalization the recognition rules are endogenous, since we let the chamber decide its own organizational structure by majority rule. Thus the debate over parties versus the median as controllers of agenda comes down to the following question: *What is the equilibrium distribution of agenda power adopted at the organizational stage?*

We start by working backwards and solve for the equilibrium at the assignment stage, given the number of agenda-setting positions adopted at the structural stage. We then close the analysis by solving for equilibrium at the structural stage.

Proposition 4 *Once the number of agenda positions has been chosen in the structural stage, at the assignment stage each preference type allocates a given position to a member of his own preference type rather than to a member of the rival preference type.*

Proposition 5 *In a coalition-proof Nash equilibrium at the assignment stage all majority members coordinate by voting cohesively on the same candidates. That is, the first n winners of the agenda-setting positions are majority members and each gets all the $k+1$ votes of the majority preference type B .*

The intuition underlying Proposition 5 is straightforward. At the assignment stage it is in interest of each member of party B to fill the positions with members of the B party as they are of the same preference type. Similarly party A members prefer filling the positions with members of party A . But B -legislators gain priority in filling the agenda-setting positions since they are able to gather more votes than A -legislators. An important implication of this assignment behavior is that representation in the offices endowed with agenda power will not exactly mirror the ideological composition of the legislature; instead there will be *over-representation* of the majority preference type B and under-representation of the minority preference type A . Depending on the number of agenda setting positions the degree of over-representation will vary. This prediction of the model is fully consistent with stylized facts from the U.S. Congress. In the U.S. Congress representation in the important policy committees such as Ways and Means, Appropriations and Finance has been consistently skewed in favor of the majority party.³⁰ In particular, the chairs of the committees and subcommittees are invariably occupied by members of the majority party.³¹

We can now analyze the first stage of the organizational game: What degree of agenda centralization n would a legislative majority prefer? The answer turns out to depend critically on the degree of policy preference polarization π . The following proposition characterizes the preferences of majority members over policy biases arising from different legislative structures.

Proposition 6 *At the organizational stage if there is no polarization ($\pi = 0$) all legislators prefer zero policy deviation from the median. With some preference polarization ($0 < \pi < 1$) majority members prefer a policy deviation in between the legislative median and the majority median $\hat{x}_m + \frac{k}{2}d$. With maximal polarization ($\pi = 1$) the majority's preferred policy deviation is at the majority median (halfway between the median and the extreme right).*

It is not surprising that a majority member's preferred policy deviation increases with the degree of polarization. This is a consequence of the spatial nature of our model where ideological positions range from left to right. When there is no polarization all legislators' expected ideal points lie in the middle of the ideological spectrum, at the legislative median. Therefore, knowing that on future

³⁰In the 106th Congress (1999-2000), for instance, the House ratio of Republicans to Democrats was 1.06:1. The Republicans to Democrats ratio in the coveted Ways and Means committee was significantly higher, 1.44:1.

³¹A notable exception is the Committee on Standards of Official Conduct of the U.S. House of Representatives. Its role is to handle ethics violations by members of the House. Party representation on this committee mirrors closely the composition of the respective chamber, and sometimes can even be in favor of the minority party. This exception confirms the rule, however. Serving on Ethics is one the least sought after assignments, since no one wants to be associated with helping tarnish the public image of a fellow congressman. Many members of this committee are freshmen.

issues his preferences uniformly span the entire ideological space every legislator would prefer that outcomes remain unbiased, located on average at the ideological center. As polarization increases, the expected ideal point of a legislator from the majority preference type B moves towards the majority median $\hat{x}_m + \frac{k}{2}d$ and eventually reaches it when polarization is so high that it completely separates A and B types. The consequence is that majority members start to prefer outcomes that are more and more biased to the right.

Finally we can ask what are the legislative organizations that support legislators' induced preferences over policy deviations. Next we characterize the types of legislative organization adopted in equilibrium. These critically depend on the degree of preference polarization in the legislature.

Proposition 7 *With preference homogeneity ($\pi = 0$) maximal centralization of agenda power cannot be an equilibrium; it is dominated by the legislative state of nature ($n = 2k + 1$). Equilibrium expected partisan bias is zero. At the other extreme, for sufficiently high preference polarization ($\pi \geq \pi^*$) the legislative state of nature cannot be an equilibrium; it is dominated by maximal centralization ($n = 1$). Equilibrium expected partisan bias is positive and increases with bargaining costs and with more extreme status quos.*

The intuition is as follows. At the organizational stage legislators have expectations on where they will stand, but they do not know for sure until a policy issue has arrived. Centralized proposal power will be advantageous for a given legislator i if it is likely that the chosen proposer is ideologically close to i , but disadvantageous if the proposer is far away. Note that this effect can go both ways. If i has a moderate position on an issue, he does not want the proposer to be extreme (on either side of the policy spectrum), but if he is extreme, he does not want the proposer to be moderate and certainly not extreme on the other side of the policy spectrum. Notice that the last case (e.g. i is takes an extreme position on the left, while the proposer takes an extreme position on the right) is less likely if polarization is high, as it will be unlikely that any legislator will find himself on the one extreme of an issue while his fellow party member (who is the proposer) will be on the other extreme. Therefore, the risk of delegation to a more centralized organizational structure is fairly low.

In the low polarization case, the changes of misalignment of proposer and legislator from the same party are much higher. A more decentralized organizational structure therefore serves as a form of insurance against the worst case of the proposer being on the opposite extreme. Notice that decentralization has two effects. It distributes proposal power more evenly, but also at the policy stage it leads to less biased policy outcomes as the social acceptance set shrinks. This is a direct consequence of Proposition 1. The downside of this insurance policy is that in the case where the proposer's and legislators' ideal points are close the proposer is less able to bias the policy outcome into his direction.

The next proposition makes this result more explicit for the case of negligible bargaining costs.

Proposition 8 *For high levels of patience ($\delta \rightarrow 1$) the legislative state of nature ($n = 2k + 1$) is the unique equilibrium under preference homogeneity ($\pi = 0$) and maximal centralization ($n = 1$) is the unique equilibrium under maximal polarization ($\pi = 1$).*

When legislators are very patient bargaining is almost costless and so the issue median’s power is at its peak; he gets his ideal point even with a little proposal power because he can afford to wait indefinitely for the chance to propose, and thus impose, the median policy. In this case, therefore, outcomes can deviate from the median only if the median has no agenda power. The majority’s incentive to strip the median of power is now even stronger. The means to achieving it is maximal centralization of power within the majority party since the more unequal the legislative organization the more numerous the issues over which the median has no proposal power.

If there is no preference polarization, by Proposition 6, all legislators *ex ante* prefer the median outcome to anything else. This is exactly what the legislative state of nature offers in this case: if there are no partisan incentives then power should be shared equally among legislators to ensure that the median always has the power to push outcomes to the center. If preferences are fully polarized then majority members would rather have outcomes as close to the *majority median* as possible. An egalitarian legislative structure will not deliver such outcomes. The best way to ensure that outcomes are to the right with high probability is to delegate all proposal power to a single majority member, thus stripping the median of as much power as possible. This is the sense, in our model, in which power is taken away from the median and given to a representative of the majority party.

5 Consequences for Theories of Congress

The promise of formal modeling is that it makes ideas and theories more precise and therefore helps to identify clearly what their implications are, where they share assumptions, and where they differ. In this section we discuss what we believe our formal exercise in the previous sections entails for the contending theories of Congress.

Theories of Congress Reconsidered: Conditional Party Government (Aldrich and Rohde). The model that we proposed in this paper predicts that the critical variable driving the strength of parties in the U.S. Congress is the degree of ideological polarization among legislators. This is in line with one of the prominent theories in the party-strength debate, namely the Conditional Party Government approach advanced by Cooper and Brady (1981) or Aldrich and Rohde (2001). In essence this is a principal-agent theory that claims that the higher the degree of preference cohesion within parties and the larger the ideological distance between parties the more likely both parties will delegate power to their respective leaderships. This will allow the leadership to exert tighter control over members’ votes on policy or procedure, thus helping to promote partisan

policy outcomes. Note that the polarization index that we propose (the parameter π) captures both of this theory's drivers of partisan outcomes: intra-party cohesion and inter-party ideological separation.

Although our model produces the same qualitative prediction as the Conditional Party Government theory (see propositions 7 and 8) we emphasize that the forces at play in our model are very different. Conditional Party Government proponents claim that more power is delegated to the majority party's leadership in order to help the leadership better control how the majority's rank-and-file vote, i.e. maintain floor voting coalitions. In our model the rank-and-file vote unconstrained, i.e. in line with their basic policy preferences. And yet the result is not always a median policy outcome. Instead the agenda power captured by the majority is used, in a polarized environment, to promote partisan outcomes that serve the ideological interests of all majority members. One way to interpret our model is to think of it as a formalization of the Conditional Party Government approach as restricted to procedural coalitions, or in short, the "conditional agenda control approach." What our model adds to their approach is a theory of how and when agenda control operates. Importantly, polarization by itself is not sufficient for party government. Legislative bargaining must also face time and resource constraints that impose opportunity costs, most importantly at the organizational stage.

Theories of Congress Reconsidered: Legislative Cartel Government (Cox and McCubbins). Our model also shares a variety of features with Cox and McCubbins (2005). As in their approach our model is focused on agenda control. Floor voting occurs according to basic preferences as is cannot be influenced by the party leadership. Moreover, as Cox (2006) we emphasize the importance of a "busy legislature." Opportunity costs are a necessary condition for partisan government. However, in contrast to Cox and McCubbins (2005), we do not assume that agenda control exist, but we show under what circumstances it will emerge in equilibrium. Finally, in Cox and McCubbins's procedural cartel theory the party exerts influence by screening the issues that go to the floor. Specifically, the ones on which the party is expected to be rolled will not make it to the floor. Party influence, therefore, occurs because the status quo is preserved on issues that can split the party. In other words, although in their theory the party does not change votes, the party in effect censors some votes. These actions by the party leadership, in turn, are motivated by the need to maintain the party's "brand," as voting splits on the floor will blur the party's image with voters. In our model, brands play no role. Agenda control is entirely motivated by legislative concerns, i.e. the ability to create policy bias in expectation. Party influence occurs even when legislators are completely free to bargain over each and every policy issue.

In our model partisan outcomes are not solely stemming from negative agenda setting power. We suggest that positive forms of agenda setting power, i.e. "proposal power," can be sustained as well. Suppose that, on empirical grounds, one were to believe that the U.S. Congress is predominantly characterized by negative proposal power rather than positive proposal, especially in the case of

Congressional committees. Under this supposition one would then need to know where the restraint to delegate on negative power comes from. A possible answer goes beyond our model, but we conjecture that the results by Diermeier and Myerson (1999) may be germane in this case. They show that unicameral legislatures have incentives to fully delegate positive agenda setting power to a few members of the chamber, but that multi-cameral or presidential systems lead to delegation equilibria where only negative power is delegated. (The rationale is that this increases bargaining power in inter-cameral bargaining.) In other words, the equilibrium outcome in a single chamber would be delegation of positive power, in a multi-cameral setting delegation of negative power. We conjecture that a variant of the Diermeier and Myerson (1999) model may also apply in our case, which may provide an explanation for the delegation of negative power. We intend to pursue this line of inquiry in the future.

Theories of Congress Reconsidered: Parties as Groups of Like-Minded Individuals (Krehbiel). Our model shares much with Krehbiel’s approach, most importantly the majoritarian postulate: voting on policy and procedure must be conducted by majority rule. However, our model shows that (contrary to Krehbiel) the majoritarian postulate *does not* preclude partisan bias in policy outcomes. Rather, a majority of like-minded legislators can find it in their interest to set up an organizational structure that favors them on average at the expense of the median. However, our model also uncovers when Krehbiel’s results of no partisan bias will hold. The strong version of his conjecture, namely that the issue median rules every time, occurs in our model when floor deliberation and bargaining over organization are not subject to opportunity costs. A weaker form of Krehbiel’s conjecture, that would state that median outcomes occur on average, holds even when there are significant opportunity costs but requires the absence of ideological polarization. When both opportunity costs and polarization are present the expected policy will be biased towards the party median (and not the legislative median, as Krehbiel’s approach predicts).

Party Heterogeneity. Our model of parties as like-minded individuals is highly simplified. Party members are all of the same type. So, we do not investigate party heterogeneity. This means that in our model, from a party member’s point of view it does not matter which party member occupies a position with proposal power. One can relax this assumption by considering party heterogeneity. The idea would be to associate with each legislator a single-peaked distribution over ideal points. We can then order these distributions from left to right by first-order stochastic dominance.³² In such a richer model one can investigate the question under what circumstances parties would select more moderate or extreme members as their party leaders.

Floor Voting Coalitions Reconsidered. Much of the empirical literature on Congress has focused on the question whether party influence on voting behavior can be detected in the data. Our results suggest that this question may be too narrow. Perhaps the main insight of our paper is how legislatures can sustain organizational arrangements that lead to policy bias without influence

³²We thank Sven Feldman for suggesting this approach.

over votes on bills and organization. In other words, partisan policy bias is perfectly consistent with empirical findings that question the existence of party influence on floor votes. Influencing votes on policy is not *necessary* to generate policy bias. This, however, does *not* mean that our theory is inconsistent should we be able to detect such evidence. It just does not require it. On the other hand, our model could be extended to study the potential impact on floor voting as well. The idea is that instruments to influence floor votes, e.g. committee assignments or floor access for a legislator's bills, depend on organizational arrangements that need to be sustained in equilibrium. But once such arrangements exist they could in principle be leveraged to influence floor votes. For example, one could imagine arrangements where a specific party member would be stripped of his proposal rights if he were to vote against the party leadership. Notice, however, that for such arrangements to be credible they must be sustained in equilibrium, like our proposal structures. Further, it is to be expected that their impact may vary depending on the degree of polarization or the opportunity costs of deliberation. Such models could be developed by extending our framework to a fully dynamic setting.

Organizational Stability. The astute reader may have already formulated a counter-argument towards our model that may resuscitate Krehbiel's position. The argument goes as follows. In the model, once the organizational structure has been adopted, it cannot be changed, it will govern multiple policy periods. In an alternative structure, however, the legislature could proceed to an organizational stage every time a new policy issue arises. To some legislators the advantage of this structure is that they can make organizational decisions without uncertainty about the identity of the issue median. It is possible to show that in this latter model the median always gets full agenda power and thus, by Proposition 3, will be able to impose the median outcome every time. Then, why would a legislative majority on a given issue not want to change a distribution of agenda power that leads to non-median outcomes?³³

This question cannot be answered in the context of this paper, where the organizational structure is assumed to be stable, but can be formally addressed in a fully dynamic model where there are multiple rounds of organizational and policy choice during a legislative period (Diermeier and Feddersen 1998). The ideological advantages of re-organizing the legislature everytime a new policy issue arises have to be weighted against the opportunity costs of spending time on organizational matters instead of legislating on important policy issues. In a busy legislature changing the organizational structure frequently costs every legislator valuable policy periods. A legislator may then prefer to compromise somewhat on policy in order to have the opportunity of addressing more policy issues in a legislative term. Opportunity costs can thus make legislative organization stable over time. U.S. House Speaker Clarence Cannon (D-MO) articulated this argument this way (cited in Oleszek 2007, p.10):

³³A well-studied example used in practice are committee discharge procedures.

The time of the House is too valuable, the scope of its enactments too far-reaching, and the constantly increasing pressure on its business too great to justify lengthy and perhaps acrimonious discussion of questions of procedure which have been authoritatively decided in former sessions.

Translating in the language of our theory, in a dynamic model bargaining over organization takes time and, since it yields no policy payoffs during that time, carries with it the opportunity cost of instead addressing policy issues that do carry valuable ideological payoffs. As shown in a companion paper (Diermeier and Vlaicu 2008) these costs create room for policy bias. That bias, in turn, makes agenda control valuable which therefore can be sustained over time.

Testable Predictions. Despite its parsimony the model we presented is capable of generating a considerable number of predictions at several levels: voting behavior, organizational structure, party legislative success, and policy outcomes. We discussed the most important above, commenting on the empirical support they receive from past research as well as from known stylized facts of the U.S. Congress. Here we summarize them. Further empirical work is needed to craft direct tests of these hypotheses. First, when there is polarization, organizational votes are strictly partisan, regardless of the degree of polarization, whereas votes on bills can be bi-partisan, with party lines crossed more often when polarization is less. For extreme status quos or low discount factors (e.g. emergency measures) bills are supported by supermajorities. Second, the model predicts that the majority is over-represented in agenda-setting offices. Third, the model predicts positive majority roll rates. This is in contrast to cartel theory (Cox and McCubbins 2007) where the majority's roll rate is zero. Also, the majority roll rate is smaller than the minority roll rate (equal for zero polarization) and the gap increases with polarization. Fourth, polarization generates policy outcomes that are biased in favor of the majority party. Policy bias is conditional on, and increases with, preference polarization (cf. conditional party government theory).

6 Conclusion

In this paper we provide a formal model of party governance in the U.S. Congress. Our model starts from the primitive of legislator preferences and builds up a structure flexible enough to capture the predictions of leading theories of parties in legislatures as special cases. This allows us to achieve two goals. One is to understand the assumptions underlying the leading theories, some of which we believe are left implicit. The second is to provide minimal conditions for the existence and degree of party government in Congress. As Krehbiel (1998) we assume the majoritarian postulate. That is, voting on policy and organization is by majority rule. Moreover, we also assume that voting on policy and organization is entirely determined by basic preferences. In particular, there are no punishments or rewards for changing one's vote once a proposal has reached the floor. The key

insight of the model is that even under these conditions a legislative majority may find it in their interest to shift agenda power away from the issue median *on average* by changing the rules of how policies are proposed. We identify two conditions that are required for a change in the proposal rules to be supported by a legislative majority. First, proposing, deliberating, and voting take time and resources that could be used on other activities. Therefore, they are costly activities, in the sense of *opportunity costs*. Second, there is a certain degree of *polarization* in legislators' preferences over policy outcomes, even in the absence of inducements by the respective party leaderships.

Under these conditions a legislative majority will vote to concentrate agenda power into a subset of its membership. This will ensure that outcomes are as close as possible to the majority party median. If polarization is low the majority party median coincides with the legislative median. If polarization is high the majority party median is bounded away from the legislative median. Finally, our model uncovers the condition under which Krehbiel's (1998) conjecture that the issue median rules every time holds: there are no costs to bargaining indefinitely. A weaker form of Krehbiel's conjecture, that would say that median outcomes occur on average, can be shown to hold when there are non-negligible opportunity costs but requires the absence of polarization.

Our model is one particular formalization of the issues at stake in the debate on party strength in legislatures. As with all models its value depends on the plausibility of its assumptions. We have chosen to make no assumptions about behavior (for instance, we do not take a position on whether legislators give in to party leadership pressure) but instead let legislators vote on policies *and* institutions unconstrained by their peers. Our key assumptions are the presence of costs to prolonged bargaining, both at the policy and the organizational stage - thus in the model legislative organization is assumed to be stable once it has been voted on, and ideological polarization - although we do not model heterogeneity within parties. We believe that our framework can be suitably extended to relax or endogenize these assumptions. The issue of stability, for instance, can be addressed in a fully dynamic model, while party heterogeneity can be captured by associating each party member with an ordered distribution of ideal points. We hope that this paper can serve as a starting point for exploring these issues in future research.

Appendix

Proof of Proposition 1 The strategy of proof is the following. First, existence of stationary equilibria is established: we find a no-delay equilibrium as a function of the parameters of the model (Lemma 1 below). Second, the set of stationary equilibria is characterized: they can be either no-delay or static (Lemma 2). Third, the no-delay equilibrium is shown to be unique (Lemma 3). Fourth, we show that static delay equilibria can be ruled out (Lemma 4).

Lemma 1 *The proposal strategies described in Proposition 1, together with the corresponding voting strategies, constitute a no-delay stationary equilibrium.*

Proof. Let us conjecture that there is a no-delay stationary equilibrium $[(p_i), (A_i)]_{i \in N} =: \sigma$ in which proposal strategies take the form

$$p_i = \begin{cases} \hat{x}_m - \Delta_{j^*} & \text{for } i = m - j, j \geq j^* \\ \hat{x}_m - jd & \text{for } i = m - j, j < j^* \\ \hat{x}_m & \text{for } i = m \\ \hat{x}_m + jd & \text{for } i = m + j, j < j^* \\ \hat{x}_m + \Delta_{j^*} & \text{for } i = m + j, j \geq j^* \end{cases} \quad \text{for } j = 1, 2, \dots, k. \quad (6)$$

where

$$\Delta_j := \sqrt{\frac{(1 - \delta)(\hat{x}_m - q)^2 + \delta \sum_{h=0}^{j-1} (\rho_{m-h} + \rho_{m+h})(hd)^2}{1 - \delta \left[1 - \rho_m - \sum_{h=0}^{j-1} (\rho_{m-h} + \rho_{m+h}) \right]}}$$

and j^* is a number between 1 and k .

σ is a no-delay stationary equilibrium if:

$$p_i \in \arg \max \{u_i(x) \mid x \in A(\sigma)\} \quad \text{for all } i.$$

Because preferences are quadratic, Lemma 1 in Banks and Duggan (2006a) ensures that the social acceptance set $A(\sigma)$ is identical with the acceptance set of the core voter, in our case the median legislator:

$$A(\sigma) = A_m(\sigma).$$

The acceptance set of the median legislator in the equilibrium σ is:

$$A_m(\sigma) = \left\{ p_i \in X \mid -(\hat{x}_m - p_i)^2 \geq -(1 - \delta)(\hat{x}_m - q)^2 - \delta \sum_{h=1}^{2k+1} \rho_h (\hat{x}_m - p_h)^2 \right\}.$$

Let Δ_j satisfy

$$-\Delta_j^2 = -(1 - \delta) (\hat{x}_m - q)^2 - \delta \left\{ \left[1 - \rho_m - \sum_{h=0}^{j-1} (\rho_{m-h} + \rho_{m+h}) \right] \Delta_j^2 + \sum_{h=0}^{j-1} (\rho_{m-h} + \rho_{m+h}) (hd)^2 \right\}. \quad (7)$$

We first prove the following properties of the Δ'_j s that will be useful in showing that for a given parameter vector there is a unique Δ_j in the equilibrium range $[(j-1)d, jd]$. These are:

$$\Delta_j < jd \text{ iff } \Delta_j < \Delta_{j+1} < jd \quad (8)$$

$$\Delta_j = jd \text{ iff } \Delta_j = \Delta_{j+1} = jd \quad (9)$$

$$\Delta_j > jd \text{ iff } \Delta_j > \Delta_{j+1} > jd \quad (10)$$

To see this, subtract from the equation defining Δ_j the equation defining Δ_{j+1} . Rearranging we obtain:

$$\left[1 - \rho_m - \sum_{h=0}^{j-1} (\rho_{m-h} + \rho_{m+h}) \right] (\Delta_{j+1}^2 - \Delta_j^2) = \delta (\rho_{m-j} + \rho_{m+j}) [(jd)^2 - \Delta_{j+1}^2]$$

and so

$$\text{sgn}(\Delta_{j+1} - \Delta_j) = \text{sgn}(jd - \Delta_{j+1})$$

which proves the inequalities (8)-(10).

We can now show that the proposal strategies $(p_i)_{i \in N}$ defined in Proposition 1 are sequentially rational. First, we will demonstrate that there is a unique j for which

$$(j-1)d < \Delta_j < jd \quad (11)$$

call it j^* . Whenever (11) holds we will say that Δ_j is in its equilibrium range. Second, we will demonstrate that the condition $(j^* - 1)d < \Delta_{j^*} < j^*d$ together with the equation defining Δ_{j^*} support a no-delay stationary equilibrium of the form conjectured in Proposition 1.

If Δ_j is in its equilibrium range then all higher-indexed Δ 's lie at least one range below their equilibrium range. Moreover they are all larger than Δ_j . To see this, note that using (8) $\Delta_j < jd$ implies $\Delta_j < \Delta_{j+1} < jd$. This further implies that $\Delta_{j+1} < (j+1)d$, which again by (8) yields $\Delta_{j+1} < \Delta_{j+2} < (j+1)d$. Reasoning like this we can infer that $\Delta_j < \Delta_{j+1} < \Delta_{j+2} < \dots < \Delta_k$ and $\Delta_{j+1}, \Delta_{j+2}, \dots, \Delta_k$ all lie at least one range below their respective equilibrium ranges.

If Δ_j is in its equilibrium range then all lower-indexed Δ 's are at least one range above their equilibrium range, because if they were in or below their equilibrium ranges then, since Δ_j is higher-indexed, they would draw down Δ_j at least a range below their equilibrium range (this follows by applying the logic of the previous paragraph). Moreover, all lower-indexed Δ 's are larger

than Δ_j , because if Δ_{j-1} exceeds its range, by (10) it must be larger than Δ_j , because if Δ_{j-2} exceeds its range, by (10) it must be larger than Δ_{j-1} , and, since $\Delta_{j-1} > \Delta_j$, larger than Δ_j as well, and so on.

Suppose that the equilibrium acceptance set of the median voter is $[\hat{x}_m - \Delta_{j^*}, \hat{x}_m + \Delta_{j^*}]$. We will verify that this can be supported by equilibrium strategies. By Lemma 1 in Banks and Duggan (2006a) this is also the *social* acceptance set:

$$A = [\hat{x}_m - \Delta_{j^*}, \hat{x}_m + \Delta_{j^*}].$$

When legislator i is recognized to make a proposal he will propose that policy in A that is closest to his ideal point. Legislators with $j < j^*$ have their ideal point inside A and so they will propose their ideal points $\hat{x}_m \pm jd$. Legislators with $j \geq j^*$ have their ideal points outside of A and so they will select either the lower or the upper bound of A , depending on whether their ideal point lies at the left or at the right of A . Therefore, the equation defining Δ_{j^*} (the median best responds to proposals $\hat{x}_m \pm \Delta_{j^*}$) implicitly defines the above conjectured social acceptance set $A = [\hat{x}_m - \Delta_{j^*}, \hat{x}_m + \Delta_{j^*}]$.

In the same manner it can be verified that no other social acceptance set supports an equilibrium of the form conjectured in Proposition 1. ■

Lemma 2 (*Banks and Duggan 2006b, Theorem 4*) *If $\delta > 0$ every stationary equilibrium with delay is static.*

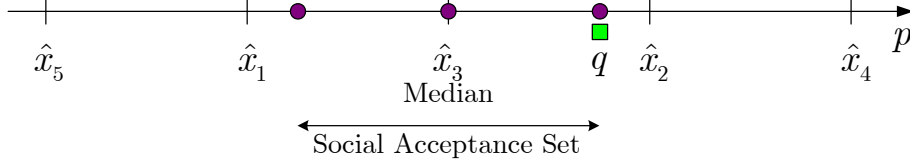
Proof. See Banks and Duggan (2006b). ■

Lemma 3 (*Cho and Duggan 2003, Proposition 1*) *The no-delay stationary equilibrium of the policy bargaining game is unique.*

Proof. See Cho and Duggan (2003). ■

Lemma 4 *In the policy game with $q \neq \hat{x}_m$ there exists no stationary equilibrium with delay.*

Proof. By Lemma 2 above we know that a stationary equilibrium with delay is necessarily static i.e. the policy outcomes are (q, q, q, \dots) . Denote this equilibrium by $\bar{\sigma}$. First, note that the median is indifferent between voting for and against the status quo: the outcome in the current period is identical, as is the outcome in all future periods. The social acceptance set corresponding to this equilibrium therefore contains the status quo. Second, note that by definition the median's acceptance set can never strictly contain the status quo, because the median has veto power over



all proposals and so it will not approve any policy that is further away from its ideal point than the status quo is. Based on these two observations the status quo must be on the boundary of the social acceptance set. This is illustrated in the following figure.

Furthermore, since the equilibrium is static, it must be that only legislators outside the social acceptance set on the side of the boundary that is the status quo, have proposal power. Otherwise policies different than the status quo will be proposed and accepted. But then all those legislators with proposal power will propose the status quo and their proposal will pass, which means that the equilibrium is *without* delay. In the above figure, only legislators 2 and 4 have agenda power and when recognized they both propose the status quo. ■

Proof of Proposition 2 It is straightforward to verify that when $q = \hat{x}_m$ the game has a static no-delay equilibrium. First, since the median is getting its ideal point in all future periods, the only proposal that it will accept today is the status quo. If a different proposal were made, legislators closer to the proposal than to the status quo are going to vote for it, but that is not enough for it to pass. The social acceptance set is therefore the singleton $\{\hat{x}_m\}$. Second, given the voting strategies implicit in this social acceptance set any legislator with proposal power is indifferent between all proposals, since the median is able to preserve the status quo no matter what. Since proposing the status quo is the most expeditious thing to do for all proposers, their strategy will be to propose the status quo, which is in the social acceptance set and therefore approved by a majority.

To show uniqueness, suppose that there exists another stationary equilibrium that is either non-static or with delay. If the equilibrium is non-static it means that a legislator with proposal power when recognized will propose a policy different than the status quo and his proposal will be accepted by a majority. Consider the most extreme of these proposals. For this particular proposal the voting behavior just described is not sequentially rational, however. All legislators on the other side of the median from the proposal are better off rejecting this proposal since they improve their payoff both today (status quo is preferred to the proposal) and in the future (on average future proposals will be closer to the legislators on the other side). If the equilibrium is with delay there are two cases. First, it can be that at a later period a proposer makes a proposal different than the status quo and it is approved by a majority. This is not sequentially rational by the same logic exposed for the non-static equilibrium. Second, it can be that there are proposals made that are either the median or are never approved. This is clearly not an equilibrium either, given the assumption that when indifferent among proposals the one that is more likely to be approved is

made.

Proof of Proposition 3 The first conclusion can be seen by setting $\delta = 1$ in the definition of a social acceptance set. Since the median can wait indefinitely for its turn to propose, its only acceptable proposal is its own ideal point. The last two follow directly from Propositions 1 and 2.

Proof of Proposition 4 Suppose there were n positions of power created at the structural stage. Consider legislator i . The difference in expected payoff between appointing a legislator of his own type (call him i') and appointing a legislator of the other type (j) is:

$$\begin{aligned} & \frac{1}{k(k-1)} \sum_{t=1}^k \sum_{l=1, l \neq t}^k \left\{ -[ld - x(t)]^2 \right\} [(\mathbb{P}\{\hat{x}_{i'} < \hat{x}_m, \hat{x}_i < \hat{x}_m\} + \mathbb{P}\{\hat{x}_{i'} > \hat{x}_m, \hat{x}_i > \hat{x}_m\}) - \\ & - (\mathbb{P}\{\hat{x}_j < \hat{x}_m, \hat{x}_i < \hat{x}_m\} + \mathbb{P}\{\hat{x}_j > \hat{x}_m, \hat{x}_i > \hat{x}_m\})] + \\ & + \frac{1}{k} \sum_{l=1}^k \left[-(ld)^2 \right] (\mathbb{P}\{\hat{x}_{i'} = \hat{x}_m\} - \mathbb{P}\{\hat{x}_j = \hat{x}_m\}) + \\ & + \frac{1}{k^2} \sum_{t=1}^k \sum_{l=1}^k \left\{ -[ld + x(t)]^2 \right\} [(\mathbb{P}\{\hat{x}_{i'} < \hat{x}_m, \hat{x}_i > \hat{x}_m\} + \mathbb{P}\{\hat{x}_{i'} > \hat{x}_m, \hat{x}_i < \hat{x}_m\}) - \\ & - (\mathbb{P}\{\hat{x}_j < \hat{x}_m, \hat{x}_i > \hat{x}_m\} + \mathbb{P}\{\hat{x}_j > \hat{x}_m, \hat{x}_i < \hat{x}_m\})] \end{aligned}$$

where $x(l) := \min\{ld, \Delta\}$, and Δ is the maximal equilibrium policy deviation from the status quo. This expression is positive since:

$$\mathbb{P}\{\hat{x}_{i'} < \hat{x}_m, \hat{x}_i < \hat{x}_m\} + \mathbb{P}\{\hat{x}_{i'} > \hat{x}_m, \hat{x}_i > \hat{x}_m\} \geq \mathbb{P}\{\hat{x}_j < \hat{x}_m, \hat{x}_i < \hat{x}_m\} + \mathbb{P}\{\hat{x}_j > \hat{x}_m, \hat{x}_i > \hat{x}_m\}$$

and

$$\mathbb{P}\{\hat{x}_{i'} < \hat{x}_m, \hat{x}_i > \hat{x}_m\} + \mathbb{P}\{\hat{x}_{i'} > \hat{x}_m, \hat{x}_i < \hat{x}_m\} \leq \mathbb{P}\{\hat{x}_j < \hat{x}_m, \hat{x}_i > \hat{x}_m\} + \mathbb{P}\{\hat{x}_j > \hat{x}_m, \hat{x}_i < \hat{x}_m\}$$

In words, two members of the same preference type are more likely to be on the same side of the median than two members from different preference types, and less likely to be on opposite sides of the median than two members from different preference types.

Proof of Proposition 5 Suppose first that at the structural stage there were $n \leq k + 1$ agenda positions created. First, suppose there is an equilibrium where a minority member wins an agenda-setting position with say x votes. Then the $k + 1$ majority members can form a coalition to replace the minority member with one of them. This deviation is profitable for all coalition members, because they all strictly prefer a majority agenda-setter to a minority agenda-setter (according to Proposition 4).

Second, why do all majority members vote cohesively in equilibrium? Suppose, to the contrary, that there is an equilibrium in which only majority members win agenda-setting positions. Can it be that at least some of these are won with fewer than $k + 1$ majority votes? No, because if a majority candidate gets less than $k + 1$ majority votes, then the coalition of k minority members can coordinate on the same minority candidate and so allow him a nonzero probability of winning. This deviation makes all members of the deviating coalition strictly better off, because whereas before they had a zero chance to fill this position, now they have at least a positive probability to win it for one of their members.

The argument for $n > k + 1$ is similar.

Proof of Proposition 6 First take the case of preference homogeneity ($\pi = 0$). At the beginning of the game a legislator's expected payoff from a legislative structure that produces a maximal deviation of Δ is:

$$\begin{aligned} v_i(k, d, \Delta) = & \frac{1}{2k+1} \left[\frac{1}{k} \sum_{l=1}^k \left\{ -[ld - x(l)]^2 \right\} \frac{2k}{2k+1} \right] + \\ & + \frac{2k}{2k+1} \left[\frac{1}{k(k-1)} \sum_{t=1}^k \sum_{l=1, l \neq t}^k \left\{ -[ld - x(t)]^2 \right\} 2 \frac{k}{2k+1} \frac{k-1}{2k} + \frac{1}{k} \sum_{l=1}^k \left\{ -(ld)^2 \right\} \frac{1}{2k+1} + \right. \\ & \left. + \frac{1}{k} \sum_{l=1}^k \left\{ -[x(l)]^2 \right\} \frac{1}{2k+1} + \frac{1}{k^2} \sum_{t=1}^k \sum_{l=1}^k \left\{ -[ld + x(t)]^2 \right\} 2 \frac{k}{2k+1} \frac{k}{2k} \right] \end{aligned}$$

where $x(l) := \min \{ld, \Delta\}$, and Δ is the maximal equilibrium policy deviation from the status quo.

The slope in Δ of this expected payoff on a generic segment $ld \leq \Delta \leq (l+1)d$ is:

$$\frac{\partial}{\partial \Delta} v_i(k, d, \Delta) = - \frac{8k\Delta(k-l)}{(2k+1)^2} \begin{cases} < 0, & \Delta > 0 \\ = 0 & \Delta = 0 \end{cases}$$

which implies that the payoff is maximized at $\Delta = 0$.

Second, take the case of maximal polarization ($\pi = 1$). A majority member's expected payoff from a legislative structure that produces a maximal deviation Δ and where all agenda-setting positions go to the majority preference type B is:

$$\begin{aligned} v_b(k, d, \Delta) = & \frac{1}{k+1} \left[\frac{1}{k} \sum_{l=1}^k \left\{ -[ld - x(l)]^2 \right\} \frac{k}{k+1} \right] + \\ & + \frac{k}{k+1} \left[\frac{1}{k(k-1)} \sum_{t=1}^k \sum_{l=1, l \neq t}^k \left\{ -[ld - x(t)]^2 \right\} \frac{k}{k+1} \frac{k-1}{k} + \frac{1}{k} \sum_{l=1}^k \left\{ -(ld)^2 \right\} \frac{1}{k+1} + \right. \\ & \left. + \frac{1}{k} \sum_{l=1}^k \left\{ -[x(l)]^2 \right\} \frac{1}{k+1} \right] \end{aligned}$$

The slope in Δ of this expected payoff on a generic segment $ld \leq \Delta \leq (l+1)d$ is:

$$\frac{\partial}{\partial \Delta} v_b(k, d, \Delta) = 2 \frac{k-l}{k+1} \left(\frac{k}{2}d - \Delta \right) \begin{cases} < 0, & \Delta < \frac{k}{2}d \\ = 0 & \Delta = \frac{k}{2}d \\ > 0 & \Delta > \frac{k}{2}d \end{cases}$$

which implies that the payoff is maximized at $\Delta = \frac{k}{2}d$.

Third and last, consider the intermediate case of moderate polarization ($0 < \pi < 1$.) A majority member's expected payoff from a legislative structure that produces a maximal deviation Δ and where all agenda-setting positions go to the majority preference type B is:

$$\begin{aligned} v_b(k, d, \Delta) &= \frac{1}{k+1} \left[\frac{1}{k} \sum_{l=1}^k \left\{ -[ld - x(l)]^2 \right\} (\mathbb{P}\{\hat{x}_b < \hat{x}_m\} + \mathbb{P}\{\hat{x}_b > \hat{x}_m\}) \right] + \frac{k}{k+1} \times \\ &\times \left[\frac{1}{k(k-1)} \sum_{t=1}^k \sum_{l=1, l \neq t}^k \left\{ -[ld - x(t)]^2 \right\} (\mathbb{P}\{\hat{x}_{b'} < \hat{x}_m, \hat{x}_b < \hat{x}_m\} + \mathbb{P}\{\hat{x}_{b'} > \hat{x}_m, \hat{x}_b > \hat{x}_m\}) + \right. \\ &+ \frac{1}{k} \sum_{l=1}^k \left\{ -(ld)^2 \right\} \mathbb{P}\{\hat{x}_{b'} = \hat{x}_m\} + \frac{1}{k} \sum_{l=1}^k \left\{ -[x(l)]^2 \right\} \mathbb{P}\{\hat{x}_b = \hat{x}_m\} \\ &\left. + \frac{1}{k^2} \sum_{t=1}^k \sum_{l=1}^k \left\{ -[ld + x(t)]^2 \right\} (\mathbb{P}\{\hat{x}_{b'} > \hat{x}_m, \hat{x}_b < \hat{x}_m\} + \mathbb{P}\{\hat{x}_{b'} < \hat{x}_m, \hat{x}_b > \hat{x}_m\}) \right] \end{aligned}$$

The slope in Δ of this expected payoff on a generic segment $ld \leq \Delta \leq (l+1)d$ is:

$$\begin{aligned} \frac{\partial}{\partial \Delta} v_b(k, d, \Delta) &= 2 \left[\frac{1}{k+1} \frac{1}{k} \sum_{t=l+1}^k td (\mathbb{P}\{\hat{x}_b < \hat{x}_m\} + \mathbb{P}\{\hat{x}_b > \hat{x}_m\}) + \right. \\ &+ \frac{k}{k+1} \frac{1}{k(k-1)} \sum_{t=l+1}^k \sum_{s=1, s \neq t}^k sd (\mathbb{P}\{\hat{x}_{b'} < \hat{x}_m, \hat{x}_b < \hat{x}_m\} + \mathbb{P}\{\hat{x}_{b'} > \hat{x}_m, \hat{x}_b > \hat{x}_m\}) - \\ &- \frac{1}{k^2} \sum_{t=l+1}^k \sum_{s=1}^k sd (\mathbb{P}\{\hat{x}_{b'} > \hat{x}_m, \hat{x}_b < \hat{x}_m\} + \mathbb{P}\{\hat{x}_{b'} < \hat{x}_m, \hat{x}_b > \hat{x}_m\}) - \\ &\left. - \frac{\Delta(k-l)}{k} (\mathbb{P}\{\hat{x}_b < \hat{x}_m\} + \mathbb{P}\{\hat{x}_b > \hat{x}_m\}) \right] \end{aligned}$$

This is a linear non-increasing function of Δ whose value at $\Delta = \frac{k}{2}d$ is negative, meaning that it is zero at some point $0 \leq \Delta < \frac{k}{2}d$. For this case, therefore, majority members prefer a policy deviation in between the legislative median \hat{x}_m and the majority party median $\hat{x}_m + \frac{k}{2}$.

Proof of Proposition 7 We consider two separate cases. For each we start from the observation that the maximal policy deviation under maximal centralization ($n = 1$) is larger than the maximal policy deviation under the legislative state of nature ($n = 2k + 1$). This follows directly from

equation (4).

$$\Delta_1 > \Delta_{2k+1}. \quad (12)$$

First take the case of zero polarization ($\pi = 0$). Here a legislator's expected payoff does not depend on the legislative structure directly, only through the extent of the policy deviation. Formally

$$v_b^n(\Delta) \text{ constant in } n \quad (13)$$

and therefore, since v_b^n slopes downwards starting from zero slope at $\Delta = 0$, we have³⁴

$$v_b^n(\Delta_{2k+1}) > v_b^n(\Delta_1) \quad (14)$$

and so the legislative state of nature strictly dominates maximal centralization.

Second take the case of maximal polarization ($\pi = 1$). Here a legislator's expected payoff does depend on the legislative structure both directly and through the extent of the policy deviation. Moreover it is easy to show that $v_b^1(\Delta)$ and $v_b^{2k+1}(\Delta)$ start from the same value at $\Delta = 0$ and $v_b^1(\Delta)$ slopes upward until $\Delta = \frac{k}{2}d$ and then slopes downwards. In contrast $\Delta = \frac{k}{2}d$ slopes downwards starting from $\Delta = 0$. Moreover

$$v_b^1(kd) > v_b^1(0) \quad (15)$$

which implies that v_b^1 uniformly dominates v_b^{2k+1} on $[0, kd]$. Thus under maximal polarization maximal centralization dominates the legislative state of nature. Equation (15) and the continuity of v_b^1 in π also implies that there exists a continuum of degrees of polarization $\pi \geq \pi^*$ for which v_b^1 uniformly dominates v_b^{2k+1} on $[0, kd]$, and so even for lower levels of polarization maximal centralization dominates the legislative state of nature for a member of the majority.

Proof of Proposition 8 When $\delta \rightarrow 1$ the legislative state of nature yields, in the limit, an equilibrium policy outcome equal to the median with probability one. Any other legislative structure produces at least one equilibrium outcome that is bounded away from the median with strictly positive probability. By Proposition 6 if preferences are homogenous, $\pi = 0$, all legislators prefer the legislative state of nature.

When $\delta \rightarrow 1$ there are two non-median policy outcomes that can result from inegalitarian agenda access ($n < 2k + 1$). These are symmetrically distributed around the median. The more inegalitarian access to the agenda (lower n) the larger is the probability that the right non-median policy outcome will occur. Under perfect polarization, $\pi = 1$, this is the distribution of outcomes most preferred by the majority's members because it is closest to the majority median, and by Proposition 6 this is what the majority members most prefer.

³⁴For exposition purposes we suppress the dependence of the expected payoff v_b on k and d .

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