The Legislative Calendar*

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Abstract

In this paper, we model a legislative calendar as an ordered list of issues to be considered in sequence. We present two equilibrium models of legislative scheduling, one presuming that the calendar is itself the object of collective choice and the other considering which calendars are immune from “discharge” (the change of at most one element of the calendar by a decisive coalition in the legislature). We then examine the question of designing a scheduling process consistent with a preexisting decisive structure. We show that, so long as the status quo policy is Pareto efficient, then for any legislative calendar there exists a nontrivial scheduling process under which the calendar in question is stable. The results have implications for the robustness of structure induced equilibria in general and the design of intra-legislative “gatekeepers” (such as the Rules Committee in the U.S. House of Representatives) in particular.

1 Introduction

In this paper, we present a formal theory of equilibrium legislative scheduling. We focus on the choice of issues that are considered in a session. This somewhat abbreviated conceptualization of “legislative scheduling” is motivated largely by the fact that there exists

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no generally accepted formal theory of legislative scheduling.\(^1\) In fact, the theory developed here extends the principal candidate for a formal theory of legislative scheduling, due to Cox and McCubbins [1993, 2002, 2005]. Our focus is more firmly placed on the institutional underpinnings of scheduling than that studied Cox and McCubbins, whose interest is primarily in the role played by parties (principally the majority party) in legislative outcomes. Nevertheless, understanding their starting point is useful in understanding the motivation behind the structure of our framework.

Cox and McCubbins presume that the legislative calendar is set by the majority party leadership and is effectively immune from alteration by the general membership of the House.\(^2\) The arguments forwarded by Cox and McCubbins [2005] are intuitive and compelling on several levels. In tackling the question of legislative scheduling, we heed the points made by Krehbiel [1991, 1999] and Crombez, Groseclose, and Krehbiel [2006] in beginning with the presumption of that any calendar is subject to a majoritarian constraint. Specifically, we are interested in whether an agenda can be constructed in such that the policy resulting from that agenda is majority preferred to any feasible modification of the proposed agenda.\(^3\) Within the House of Representatives, our theory is consistent with the presumption that the scheduling of legislation is constrained by the discharge process.\(^4\) Accordingly, this paper is intended to extend our theoretical understanding of agenda setting in which the agenda is subject to various forms of explicit or tacit majority support.

By tying the study of agenda-setting to the underlying majoritarian principles of the legislative body, the results of this paper raise questions about the robustness of institutionally

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\(^1\)There are, of course, many formal models of different stages of this process, including most prominently Denzau and Mackay [1983], Gilligan and Krehbiel [1989], and Diermeier and Feddersen [2000]. Nearly all of the models to date, however, have focused only on the treatment of a bill by a legislative committee with the implicit assumption that whatever the committee approves will ultimately receive floor action.

\(^2\)This issue is discussed at length in Cox and McCubbins [2005], pp.83-86. For an argument bolstering the presumption that the argument is correct, at least in a de jure sense, see Patty [2007].

\(^3\)We discuss two definitions of “feasible modification” in this paper.

\(^4\)For more on the discharge process, see Beth [2003a,b], Lindstadt and Martin [2003], Burden and Frisby [2004], Crombez et al. [2006], and Patty [2007].
determined equilibrium concepts, the most famous of which is *structure induced equilibrium* (Shepsle [1979]). Our results in particular raise questions about the sensitivity of structure induced equilibrium when only a subset of issues can be considered by the legislature (*i.e.*, there are binding time constraints on the legislature’s consideration of bills or issues). When time is limited, our results support the basis of the Riker’s famous objection that inducing a policy equilibrium by conditioning on an institutional structure simply necessitates a search for an equilibrium institutional structure (Riker [1980]).

2 The Basic Model of the Legislative Process

Before presenting two models of policy making with legislative scheduling, we first present the basic model of the legislative process. In words, we presume that the legislature considers at most one issue at a time. The primitives of our framework are standard in models of legislative choice in multidimensional policy spaces.

The set of potential public policies is denoted by $X$. We assume that $X$ is a nonempty convex and compact subset of $\mathbb{R}^m$ possessing full dimensionality. Each dimension of $X$ is referred to as an “issue.” Thus, there are $m$ potential issues for the legislature to address. We do not restrict $m$ other than assuming that it is a positive integer. We denote the set of issues by $M = \{1, 2, \ldots, m\}$, and for any $d \in M$ and $x \in X$, we denote the $d^{th}$ component of $x$ by $x_d$, while the vector of $m - 1$ components other than $x_d$ is denoted by $x^{-d}$. Finally, denoting the $j^{th}$ dimensional basis vector of $\mathbb{R}^m$ by $e_j$, denote by $S(j, x) = \{y \in X : y = \alpha e_j + x\}$ the

5Of course, we are not the first to venture into this area. For example, two similarly motivated examinations in which seemingly small institutional details are shown to have significant effects on the stability of structure induced equilibrium are Krebs [1987] and Humes [1993]. On the general question of institutions as equilibria themselves, see Schotter [1981], Shepsle [1986], and Calvert [1995], in addition to a family of more recent works cited below (fn. 18, p. 22).

6Some relevant examples include Denzau and Mackay [1983], Shepsle and Weingast [1984], Cox and McCubbins [1993], Cox and McCubbins [2002], and Austen-Smith and Banks [2004].

7This is the set of all potential issues that can be addressed. As is standard in the study of spatial models of politics, we take the dimensionality of the issue space as exogenously determined and fixed throughout.
unidimensional subspace of $X$ determined by any dimension $j \in M$ and policy $x \in X$. This is the set of policies that can be achieved when dimension $j$ is under consideration and $x^{-j}$ represents policy on the other $m-1$ dimensions.

An exogenous policy $q \in X$ is commonly known to all of the legislators and is referred to as the *status quo*. The status quo represents the policy that will prevail in the absence of legislative action. The set of $n \geq 1$ legislators is denoted by $N$ and we assume for simplicity that $n$ is odd. Each legislator $i \in N$ is assumed to possess preferences over $X$ that are represented by a continuous utility function, $u_i : X \to \mathbb{R}$. We denote the vector of utility functions for all legislators by $u = (u_1, \ldots, u_n)$. The ideal policy of member $i$ on dimension $d$, given policy $x^{-d}$ on the other dimensions, may be denoted as $p^d_i(x^{-d}) = \arg\max_{\alpha \in \mathbb{R}} u_i(\alpha, x^{-d})$. While several of our results are insensitive to the exact nature of $u$, the assumption of *issue separability* makes the theory directly comparable to most spatial models of legislative politics and allows a direct application of Black’s median voter theorem.

**Definition 1** Legislators’ preferences are *issue separable* if, for all legislators $i \in N$ and any dimension $d \in M$, there exists a value, $\hat{p}^d_i \in \mathbb{R}$, such that, for any policy $x \in X$, and any pair of policies $y, z \in X$ with $y^{-d} = z^{-d} = x^{-d}$,

\[
\begin{align*}
    z^d < y^d \leq \hat{p}^d_i \Rightarrow u_i(y) > u_i(z) \quad \text{and} \\
    z^d > y^d \geq \hat{p}^d_i \Rightarrow u_i(y) > u_i(z)
\end{align*}
\]

Issue separability of preferences implies that each legislator’s ideal policy on any dimension $j \in M$ does not depend on the location of policy on the other dimensions, $M \setminus \{j\}$ and, furthermore, that each legislator has single-peaked preferences over policy in any given dimension.\(^{9}\)

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\(^{8}\)In principle, this policy could be the equilibrium outcome of some other policy game following a failure by the legislature to act. This policy’s origin is not of interest to us in this paper.

\(^{9}\)Note that the first implication of issue separability (independence of local maximizer on any dimension from the location of policy on all other dimensions) is weaker than (*i.e.*, implied by) the assumption of
We denote the median of legislators’ ideal policies on dimension \( j \) by \( x^j_M \) and the dimension-by-dimension median of ideal points by \( x_M = (x^1_M, x^2_M, \ldots, x^m_M) \). We refer to any dimension of the policy space on which the status quo policy is not equal to the median ideal policy (i.e., any dimension \( j \) such that \( q^j \neq x^j_M \)) as being incongruent. We will denote the set of incongruent issues for any status quo \( q \in X \) by \( \Phi(q) \subseteq M \), and denote the number of these issues by \( \phi(q) = |\Phi(q)| \).\(^{10}\)

**Collective Choice.** The legislature’s decisive structure is a nonempty set of nonempty subsets of \( N \). This set of decisive coalitions is denoted by \( D \subseteq 2^N \) and assumed to be nonempty, monotonic, and proper.\(^{11}\) While, technically speaking, the decisive structure is \( (N, D) \), no confusion will result (since we will always be taking \( N \) as given) by using only \( D \) to describe the decisive structure. For any two policy outcomes \( y, z \in X \) and a decisive structure \( D \), we will write \( y \succeq_D z \) if there exists a decisive coalition \( D \in D \) such that \( i \in D \Rightarrow u_i(y) \geq u_i(z) \) and we will denote the asymmetric portion of \( \succeq_D \) by \( \succ_D \).\(^{12}\) Since we frequently assume that \( D \) is the set of (strict) majority coalitions within \( N \) (i.e., \( D \in D \iff |D| \geq \frac{n+1}{2} \)), we will write \( \succeq_M \) to denote the majority preference relation.

**Legislative Procedure: How the Status Quo is Changed.** We operationalize the division-of-the-question requirement by assuming that the status quo may be changed on at

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\(^{10}\)Throughout, for any set \( Z \), the notation \( |Z| \) denotes the cardinality of (i.e., number of elements in) \( Z \).

\(^{11}\)A set of subsets of a set \( N \), \( D \) is monotonic if \( A \in D \) implies \( B \in D \) for any \( B \subseteq N \) with \( A \subseteq B \), while \( D \) is proper if \( A \in D \Rightarrow N \setminus A \notin D \). This assumption is without loss of generality so long as one assumes that \( D \) represents a preference aggregation rule (Austen-Smith and Banks [1999], Lemma 2.2, p. 42).

\(^{12}\)By “the asymmetric portion,” we mean the (asymmetric) binary relation induced on \( X \) by \( \succeq_D \) as follows: \( y \succ_D z \) if and only if \( y \succeq_D z \) and not \( z \succeq_D y \).
most one dimension by any bill. Thus, a bill can be represented simply as a dimension \( k \) and a location \( y \). This represents a proposal to move policy on dimension \( k \) from the status quo location, denoted by \( q^k \), to \( y \). In addition, we will assume that the legislature uses an open rule to consider all bills, along with a germaneness restriction on amendments. This assumption, along with the assumption that individual preferences are single-peaked on any given dimension, implies that the location proposed by any bill will be irrelevant. Thus, we will characterize any bill simply by the dimension \( k \) that it proposes to alter.

**Calendars.** A legislative calendar is an ordered subset of \( M \) and an arbitrary calendar is denoted by \( C \). The set of all calendars (i.e., all ordered subsets of \( M \)) is denoted by \( \mathcal{C} \). The length of calendar \( C \) is denoted by \( \lambda(C) = |C| \), the \( j \)th element of the calendar is denoted by \( C^j \), and, for all \( j \geq 1 \), the calendar created by replacing the \( j \)th component of \( C \) with \( k \) is denoted by \( C \oplus_j k \). If \( j \geq \lambda(C) + 1 \), then \( C \oplus_j k \) denotes the calendar \( C \) with \( k \) appended to the end of \( C \).\(^{13}\) Finally, the set of all calendars of length no greater than \( L \) is denoted by \( \mathcal{C}_L \). The maximum feasible calendar length is a positive integer denoted by \( L \geq 1 \).

**Sophisticated Outcomes.** Legislators are assumed to have correct beliefs about the outcome that results from any given calendar \( C \). Given the status quo \( q \), the (commonly known) final policy outcome following from consideration of calendar \( C \) is denoted by \( x(C, q) \).\(^{14}\) Two useful properties of the outcome function, \( x \), are defined below. In Theorem 1, below, we show that these two properties are satisfied in a wide array of settings when preferences are issue separable.

\(^{13}\)That is, \( C \oplus_j \{k\} \) contains \( \lambda(C) + 1 \) elements.

\(^{14}\)Many of the results in this paper require only that each calendar \( C \) possesses a well-defined and commonly known continuation value for each player. In other words, many results require only that the function \( x \) be well-defined and common knowledge. In particular, while we will require that it be degenerate (i.e., it picks out exactly one outcome in \( X \) for each calendar \( C \)), the evaluation of \( x \) could instead be a lottery over outcomes. This would be the case if we assumed that the amendment game following consideration of a dimension consisted of the random selection of a legislator to propose a bill, followed by an amendment process in which the consideration of amendments (i.e., “delay”) is costly, a model that is studied in detail by Banks and Duggan [2000].
Property 1 The outcome function \( x \) is iteration-invariant if, for any status quo \( q \), any calendar \( C \), any issue \( i \in C \), and any \( j \geq 0 \), \( x(C, q) = x(C \oplus j, i, q) \).

Property 2 The outcome function \( x \) is order-invariant if, for any status quo \( q \), any calendar \( C \), and any permutation \( \pi : \{1, 2, \ldots, \lambda(C)\} \rightarrow \{1, 2, \ldots, \lambda(C)\} \), \( x(C, q) = x(\pi(C), q) \).

Iteration invariance of \( x \) implies that the set of calendars can be reduced to only those that are nonredundant. Order invariance of \( x \) implies that, for any length \( L \), \( C^L \) can be reduced to the set of subsets of \( M^L \) containing no more than \( L \) elements. If \( x \) is both iteration and order invariant then, for any length \( L \), \( C^L \) can be reduced to the set of subsets of \( M \) containing no more than \( L \) elements.

A policy \( y \in X \) is implementable if there exists some calendar \( C_y \in C^L \) such that the sophisticated outcome following from the consideration of \( C_y \) yields \( y \) (i.e., \( y = x(C_y, q) \)). The set of all implementable policies is denoted by \( I(q, L) \) and the set of all policies that can be implemented through a nonredundant full length calendar (i.e. a calendar \( C \) with \( \min[L, m] \) distinct elements) is denoted by \( \bar{I}(q, L) \).

In order to define a notion of outcomes resulting from the consideration of any calendar \( C \in C \) that is itself consistent with the operation of majority rule after the selection of \( C \), it would be nice to rely upon the notion of the majority rule core over the set of outcomes considered at each stage of the calendar (i.e., the set of unbeatable proposals within each dimension or issue considered in the calendar). However, this set may very well be empty. Thus, a generalization of the core is utilized as a minimal requirement for a choice to be consistent with majority will. For any set \( Y \) and binary relation \( R \) on \( Y \), a subset \( Z \subseteq Y \) is \( R \)-undominated if there exists no element \( w \in Y \setminus Z \) such that \( wRz \) for some \( z \in Z \). An \( R \)-undominated subset \( Z \subseteq Y \) is minimally \( R \)-undominated in \( Y \) if no proper subset of \( Z \) is \( R \)-undominated in \( Y \). With this in hand, the GOCHA set for \( (Y, R) \) (Schwartz [1986])) is the union of minimum \( R \)-undominated subsets of \( Y \). For any set \( Y \) and binary relation \( R \)
on \( Y \), let \( G(Y, R) \) denote the GOCHA set for \((Y, R)\). The following facts illustrate why this approach is an appealing one to take for a general theory of legislative scheduling.

**Fact 1** For any set \( Y \) and binary relation \( R \subseteq Y^2 \),

1. \( G(Y, R) \) is nonempty,
2. \( G(Y, R) \) is equal to the top-cycle set when \( R \) is complete,
3. Nonemptiness of the the \( R \)-core in \((Y, R)\) implies that \( G(Y, R) \) is equal to the \( R \)-core,
4. \( G(Y, R) \) is equal to the set of outcomes that are the sophisticated winners of some binary agenda, regardless of the status quo policy.

Demonstrations of Parts 1-3 can be found in Schwartz [1986] and Laslier [1997] (among other places). Part 4 was first shown by Ordeshook and Schwartz [1987].

**Definition 2** A function \( x : C \times X \to X \) is an equilibrium outcome function for decisive structure \( D \) if, for each \( q \in X \),

\[
x(\emptyset, q) = q,
\]

and for each \( C \in C \),

\[
x^j(C, q) = \begin{cases} 
q^j & \text{if } j \notin C \\
z \in G(S(j, q), \succeq_D) & \text{if } j \in C
\end{cases}
\]

for each \( j \in M \).

Without restrictions on legislators’ preferences above and beyond the single-peakedness condition, deriving an equilibrium outcome function can be quite complicated – indeed, it is frequently the case that multiple equilibrium outcome functions will exist. However, assuming that legislators’ preferences are issue separable and that the legislature uses strict majority rule, there is a unique and straightforward proper definition of \( x \). In particular, for
any calendar $C$ and status quo $q$, the final policy outcome $x(C, q)$ is simply the status quo on all dimensions not included in the calendar and the median ideal policy on each dimension that is considered.

**Theorem 1** Suppose that preferences are issue separable, $D = M$, and $x$ is an equilibrium outcome function. Then the unique equilibrium outcome that results from any calendar $C \in C$, given any status quo $q \in X$, is

$$x(C, q) = (x^1(C, q), \ldots, x^m(C, q)),$$

where

$$x^j(C, q) = \begin{cases} 
q^j & \text{if } j \notin C \\
x^j_M & \text{if } j \in C 
\end{cases} \quad \text{for } j \in M \tag{1}$$

**Proof:** When preferences are issue separable and the number of individuals, $n$, is odd, it is well known (Black [1948]) that a majority rule core exists in $S(j, q)$ for any $j \in M$ and $q \in X$. Furthermore, it is well-known that $G(Y, R)$ equals the core when one exists (Laslier [1997]). Accordingly, it follows that any function $x$ satisfying 2 must also satisfy Equation (1).

In addition to resulting in a equilibrium outcome that is simple to derive, assuming that preferences are separable also implies that the equilibrium outcome resulting from a calendar $C$ is invariant to the order of $C$, as stated in the following corollary.

**Corollary 1** Suppose that preferences are issue separable and that $D = M$. Then the equilibrium outcome function is iteration- and order-invariant.

A couple of points are in order before continuing to the consideration of collective choice over calendars. First, the assumption that preferences are issue separable is consistent with (actually implied by) the canonical assumption that legislators have traditional Euclidean
preferences over $X$, where the utility function for each legislator $i$ over $X$ is determined by two vectors, $p_i \in \mathbb{R}^m$ and $\sigma_i \in \mathbb{R}^m_+$, as follows:

$$u_i(y; p_i, \sigma_i) = -\sum_{j=1}^{m} \sigma_i^j (y^j - p_i^j)^2.$$ (2)

Second, the presumption that a bill is associated with a single basis dimension of the policy space $X$ (as described by the representation of $p_i$) is consistent with the presentation of multiple issues in the works of Kramer [1972], Shepsle [1979], and Austen-Smith and Banks [2004].

Third, the definition of a calendar utilized in this paper is consistent with sequential consideration of bills (as is done in both the U.S. House and Senate). Third, given the traditional assumption of majority rule and the use of an open rule for the consideration of bills on the floor, Theorem 1 describes the equilibrium outcome function in the extension of models such as those of Gilligan and Krehbiel [1987], Krehbiel [1991], Cox and McCubbins [1993, 2005], and others. Accordingly, the results above imply that the following conclusions hold in the direct extension of such models to the sequential consideration of bills.

1. The order of the calendar does not affect the equilibrium policy outcome resulting from its consideration.

2. The repetition of issues is instrumentally irrelevant.

3. The policy outcome following consideration of any issue is determined by the preference of the legislator with the median most-preferred location on that issue.

Note that the presentation in Shepsle [1979] does not depend upon the functional form represented in Equation (2). In the relevant portion of the article (Section 3, p. 38), Shepsle assumes that $u_i : X \rightarrow \mathbb{R}$ is continuous and strictly quasi-concave, both of which are satisfied by $u_i$ as defined in Equation (2). However, the use of utility functions as defined by Equation (2) in no way changes the conclusions of Shepsle [1979], as the “structure” of the bill proposal process and what Shepsle refers to as “simple jurisdictions” (the focus of Section 3 of Shepsle [1979]) makes the cardinal properties of individual payoffs irrelevant. This point stands in stark contrast to the findings presented above (Proposition 1 and Example 1), since the cardinal properties of individual legislators’ utility functions determine their preferences over different calendars. Simply put, some issues are more important than others to any given legislator.
To make the point as concrete as possible and following the discussion above (Fn. 15), each of the assumptions underlying Theorem 1 and Corollary 1 are consistent with the structure induced equilibrium framework introduced by Shepsle [1979]. Furthermore, it should be emphasized that each of these assumptions about the relationship between the content of admissible bills and individual legislators’ preferences are all very restrictive in behavioral, institutional, and mathematical terms. Accordingly, the failure of either of our two notions of equilibria to exist stands in direct contrast to the general satisfaction with the suitability and robustness of structure induced equilibrium expressed by many scholars since Shepsle’s original work. Structure-induced equilibrium is a powerful and useful concept. One of the main contributions of the theory presented below is to note that the stability of structure induced equilibria depends is affected by constraints (such as time) on the number of issues that may be considered.

3 Voting Over Legislative Agendas

In this section, we present a social choice theory of legislative agendas. In short, we examine the majority preference relation over the set of policy outcomes that can be reached by some legislative calendar. If one such outcome is a Condorcet winner, then many (if not all) democratic theories would predict that a legislative calendar implementing that outcome should be used by the legislature. Specifically, following the logic of Black [1948] and others, if the legislators were free to propose unlimited alternative calendars and decided between the proposals by majority rule, no calendar implementing any other policy should be chosen by the legislature. Accordingly, we refer to this model as a model of “voting over calendars.”

16 For example, see the discussion in Chapter 5 of Austen-Smith and Banks [2004], as well as the references cited therein.
Collective Preference over Calendars. We define collective preference between two calendars simply as the collective preference (as determined by \( u \) and \( D \)) between the policy outcomes resulting from their consideration. For any two calendars \( C \) and \( C' \), the majority rule preference relation \( \succeq_D \) is defined as follows: \( C \succeq_D C' \) if \( x(C, q) \succeq_D x(C', q) \). In other words, a calendar \( C \) is majority preferred to another calendar \( C' \) if there exists a decisive coalition \( d \in D \) such that the sophisticated outcome generated by \( C \) is weakly preferred to the outcome generated by \( C' \) by all members of \( d \). We are now in a position to define equilibrium in voting over calendars.

**Definition 3** Given \( D \), \( q \), and \( L \), a voting equilibrium is any calendar \( C^* \) such that \( C^* \succeq_D C \) for all \( C \in \mathcal{C}^L \).

In other words, an equilibrium in the voting game defined over calendars is defined to be any element of the majority rule core over \( I(q, L) \), i.e., the set of implementable outcomes. Let \( V^*(q, L) \) denote the set of voting equilibrium calendars for status quo \( q \) and maximum calendar length \( L \).

Nonemptiness Results. We now establish a few positive results that highlight why the notion of voting over calendars is interesting. The first result deals with the impact of the status quo policy, legislators’ preferences, and the maximum calendar length on the set of voting equilibria when the legislature uses majority rule.

**Theorem 2** Suppose that \( D = \mathcal{M} \), preferences are issue separable, and \( \phi(q) \leq L \). Then \( C \in V^*(q, L) \) implies \( x(C, q) = x_M \).

**Proof:** Consider the calendar \( C = \Phi(q) \). Clearly, \( C \) is a feasible calendar, as \( |C| = \phi(q) \leq L \). Then, by Theorem 1, \( x(C, q) = x_M \). Consider any calendar \( C' \in \mathcal{C}^L \) with \( x(C', q) \neq x_M \).

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\[17\] Note that a voting equilibrium is similar in spirit to both *structure induced equilibrium* (Shepsle [1979]) and *equilibrium cabinets* in parliamentary systems (Laver and Shepsle [1996]). It represents a structural relaxation of the notion of a core in general majority rule settings by disregarding policies that can not be reached via sophisticated behavior consistent with some legislative calendar.
Define

$$f(C', C^*) = |(C' \setminus C^*) \cap \Phi(q)|$$

to be the number of incongruent issues included in $C^*$ and not included in $C'$.

Note first that $\hat{C}'$ defined as the calendar containing only the incongruent issues contained in calendar $C'$ with the ordering induced by $C'$ is clearly a feasible calendar (in fact, $\lambda(\hat{C}') < L$) and, by the assumption that preferences satisfy issue separability, $\hat{C}'$ is equivalent to $C'$ with respect to the induced majority relation on $C^L$, i.e., $C \succeq_M \hat{C}' \iff C \succeq_M C'$ and $\hat{C}' \preceq_M C \iff C' \preceq_M C$ because $x(\hat{C}', q) = x(C', q)$. Accordingly, we will work with $\hat{C}'$ for the remainder of the proof.

Note next that, by the supposition that $x(\hat{C}', q) \neq x_M$, this implies that $f(\hat{C}', C^*) \neq \emptyset$. If $|f(\hat{C}', C^*)| = 1$, then the issue separability of legislators’ preferences implies that $x(C^*, q) \succ_M x(\hat{C}', q)$. Accordingly, suppose that $|f(\hat{C}', C^*)| > 1$ and let $j$ and $k$ denote two distinct elements of $f(\hat{C}', C^*)$. Now consider the calendar $\hat{C}'' = \hat{C}' \oplus \{j\}$, which has length no greater than $L$ and is accordingly feasible. The issue separability of legislators’ preferences and construction of $x(\hat{C}''', q)$ implies that $x(\hat{C}''', q) \succ_M x(\hat{C}', q)$, so that $\hat{C}' \not\in V^*(q, L)$, which implies that $C' \not\in V^*(q, L)$, from which the desired result follows.

The next result states that, so long as legislators’ preferences are issue separable, any calendar $C^*$ that is a voting equilibrium must be at least as long as the lesser of the number of incongruent issues or the maximum length of the agenda, $L$.

**Theorem 3** Suppose that preferences are issue separable. For any $C^* \in V^*(q, L)$,

$$\lambda(C^*) \geq \min[L, \phi(q)].$$

**Proof:** The result holds trivially whenever $V^*(q, L) = \emptyset$, so consider any $C^* \in V^*(q, L)$ and suppose, for the purpose of reaching a contradiction, that $\lambda(C^*) < \min[L, \phi(q)]$. Then choose
\( j^* \in \Phi(q) \setminus C^* \) (such an issue must exist by the supposition that \( \lambda(C^*) < \phi(q) \)) and consider the alternative calendar \( C' = C^* \oplus \{ j^* \} \). This calendar \( C' \) is feasible by the supposition that \( \lambda(C^*) < L \). By the hypothesis that preferences are issue separable, it follows that \( x(C', q) \succeq_D x(C^*, q) \). Accordingly, \( C' \succ C^* \), implying that \( C^* \not\in V^*(q, L) \), resulting in a contradiction.

It is useful to describe the role of the issue separability assumption in Theorem 3. This assumption rules out situations in which a calendar shorter than \( \lambda(C^*) \) can be constructed in such a way as to reduce the number of incongruent issues to zero. Theorem 3 implies that \( V^*(q, L) \) may contain several elements – this is due to the fact that \( V^*(q, L) \) is defined with respect to weak majority preference over \( C^L \) and, accordingly, may include some calendars that “waste time” in the sense of that some issue \( i \) is considered two or more times within the same calendar.

Theorem 3 simplifies the search for voting equilibria in a nontrivial class of cases (including most standard multidimensional spatial models of legislative politics). It does not offer any guarantee that the set of voting equilibria is nonempty, however. That is the focus of the next three results.

**Proposition 1** Suppose that \( L = 1 \). The following condition is sufficient for nonemptiness of the set of voting equilibria over \( C^L \): there exists \( j \in M \) such that, for some decisive coalition \( d \in D \), \( i \in d \) implies that \( j \in \arg\max_{k \in M} u_i(x(\{k\}, q)) \).

**Proof:** Suppose, in line with the statement of the result, that there exists an issue \( j \) such that there exists a coalition \( d \) for which \( i \in d \) implies that \( j \in \arg\max_{k \in M} u_i(x(\{k\}, q)) \). The result requires two steps of proof. For the first step, letting \( C^* = \{ j \} \), consider any nonempty calendar \( C' = \{ j' \} \) for some \( j' \in M \setminus \{ j \} \). (The case of the empty calendar, \( C = \{ \} \), is considered in the second step.)
For each individual $i \in N$, the difference in payoffs from choosing $C^*$ instead of $C'$ is

$$\bar{u}_i(C^*, C') = u_i(x(\{j\}, q)) - u_i(x(\{j'\}, q)).$$

The supposition that $u_i(x(\{j\}, q)) = \max_{k \in M} u_i(x(\{k\}, q))$ implies that $\bar{u}_i(C^*, C') \geq 0$ for all nonempty calendars $C'$, implying that no nonempty calendar $C'$ is strictly preferred to $C^* = \{j\}$.

Turning to the second step and considering $C^0 = \{\}$, the definition of an equilibrium outcome function implies the result. To see this, note that $\bar{u}_i(C^*, C^0) = u_i(x(\{j\}, q)) - u_i(x(\{}), q) = u_i(x(\{j\}, q)) - u_i(q)$, and the fact that $x$ is an equilibrium outcome function implies that there must exist a decisive coalition, $d^j \in D$ (not necessarily equal to the coalition $d$ described in the result) for which $i \in d^j$ implies that $u_i(x(\{j\}, q)) - u_i(q) \geq 0$. Accordingly, $C^0$ is not strictly preferred to $C^*$. Since $C^*$ is weakly socially preferred to all other $m$ feasible calendars, it follows that $C^* \in V^*(q, 1)$, as was to be shown.

Proposition 1 is simple to state in words. The condition is simply that a decisive coalition (i.e., a majority of legislators) agree that a particular dimension is the “most important” in the sense that they each benefit at least as much from the consideration of that dimension as from the consideration of any other. A corollary of Proposition 1 is illustrative. Given that $m = 2$, the sufficient condition stated in Proposition 1 is guaranteed to be satisfied.

**Corollary 2** Suppose that $m = 2$ and $L = 1$. Then the set of voting equilibria over $C^L$ is nonempty: $V^*(q, 1) \neq \emptyset$.

Note that neither Proposition 1 nor Corollary 2 require that legislator preferences be issue separable – this is because at most one issue is being considered when $L = 1$. The corollary states that, so long as all legislators have strict preferences between the two feasible non-empty calendars and $n$ is odd, then the equilibrium calendar is the one that the majority of
legislators considers “most important”, conditional upon equilibrium voting behavior. This is in direct opposition to the generic emptiness of the core (and hence generic lack of a prediction) in traditional 2-dimensional spatial voting games. Since one can obtain a prediction in this setting (albeit with additional restrictions), the notion of voting equilibrium over calendars does offer something above and beyond the notion of a core in multidimensional voting games.

The Possibility of Emptiness. The results above offer some hope that the notion of equilibrium in voting over calendars will generate useful predictions about the outcomes of legislative decision making in multidimensional policy spaces. We now show that an equilibrium in voting over calendars does not necessarily exist even when preferences are issue separable. This is because, so long as \( m \geq 2 \), the space of possible outcomes is effectively the same as a multidimensional spatial model. Even when \( m = 2 \), a Condorcet winner may fail to exist, as demonstrated in Example 1.

Example 1 Consider a legislature with 3 legislators, \( N = \{1, 2, 3\} \), two issues: \( X = \mathbb{R}^2 \), and a status quo located at \( q = (0, 0) \). The legislature uses majority rule (so \( \mathcal{D} = \mathcal{M} = \{\{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\} \)) and the legislators’ utility functions being given by

\[
\begin{align*}
  u_1(y) &= -\sqrt{(y_1^1 + 2)^2 + (y_2^2 - 1)^2}, \\
  u_2(y) &= -\sqrt{(y_1^1 - 2)^2 + (y_2^2 + 2)^2}, \text{ and} \\
  u_3(y) &= -\sqrt{(y_1^1 - 4)^2 + (y_2^2 - 3)^2}.
\end{align*}
\]

The set of (nonredundant) calendars is \( \mathcal{C} = \{\emptyset, \{1\}, \{2\}, \{1, 2\}, \{2, 1\}\} \). These preferences satisfy issue separability and there are an odd number of voters so, by Theorem 1, the set
of implementable equilibrium policy outcomes are

\[
x(\emptyset, q) = (0, 0),
\]

\[
x(\{1\}, q) = (2, 0),
\]

\[
x(\{2\}, q) = (0, 1), \text{ and}
\]

\[
x(\{1, 2\}, q) = x(\{2, 1\}, q) = (2, 1).
\]

It can be verified that legislators 1 and 2 both strictly prefer \(x(\emptyset, q)\) to \(x(\{1, 2\}, q)\), implying that \(C^0 = \emptyset\) is majority preferred \(C' = \{1, 2\}\). This is displayed in Figure 1.

\[
\]

3.1 Implications of Voting Over Calendars

For a given equilibrium outcome function, \(x\), the selection of a calendar uniquely identifies a final policy outcome. Even with this assumed level of “stability” in hand, however, the results thus far indicate that, when the choice of calendar is determined by majority rule, the existence of an unambiguous prediction is far from guaranteed. Thus, echoing the sentiments of Riker [1980], we find that the institution of a legislative calendar affords us definite predictions about outcomes but does not alleviate the generic instability of majority rule with respect to the exact design of this institution. This formalization of Riker’s argument is particularly telling once one recognizes that we have already imposed a great deal of structure on the legislative process. In particular, the difficulty remains even in the face of an unquestioned germaneness restriction and a strong version of division of the question (or “simple jurisdictions), in the words of Shepsle [1979]. The failure of these assumptions to yield a Condorcet winner among the set of possible legislative calendars indicates the importance of distinguishing scheduling matters from votes on legislation, per se. In the
remainder of the paper, we develop a framework for considering calendars that respects the fundamental decisive structure of the legislature, $D$.

4 Discharge-Proof Calendars

As discussed before, the floor membership does not actually vote on the calendar. The focus of this section is on what types of calendars are immune to challenge against any single component. We refer to any such calendar as stable. Stability, clearly, is a (generally much) weaker property than that of being a voting equilibrium, as defined in the previous section. Nevertheless, this property is more closely aligned with the realities of sequential operations of real-world legislatures. In particular, it is a reasonable approximation of the workings of the discharge process in the U.S. House of Representatives and other legislative bodies.

4.1 The Primitives of the Model

In this section, we are interested in calendars that are immune to discharge in the sense that there is no decisive coalition of legislators that strictly prefers adding some dimension to (or altering some component of) the calendar. If there is no restriction on the length of the calendar, such immunity from discharge implies that every dimension on which the status quo does not equal to the median ideal policy must be considered. In the presence of a length restriction, $L$, immunity from discharge implies that the calendar must be at least as long as the minimum of the length restriction and the number of incongruent issues. Formally, the calendar must satisfy $\lambda(C) \geq \min[L, \phi(q)]$ in order to be immune to discharge. Any calendar that is a voting equilibrium (as defined in the previous section) is clearly immune to discharge.
4.2 Discharge-Proofness: Stable Calendars

Fixing the set of legislators $N$, the decisive structure $\mathcal{D}$, the maximum calendar length $L$, and the equilibrium outcome function $x$, calendar stability is defined in three steps. First, define the “single discharge” binary relation $\triangle$ on $\mathcal{C}^L$ as follows: $C \triangle C'$ for any two calendars $C$ and $C'$ in $\mathcal{C}^L$ if and only if

1. $|C \setminus C'| = 1$ (i.e., $C$ contains exactly one component that $C'$ does not), and
2. $|C' \setminus C| \in \{0, 1\}$ (i.e., $C'$ contains at most one element that $C$ does not).

Next, define the binary relation $\delta_D$ on $\mathcal{C}^L$ as follows $C \delta_D C'$ if and only if $C \triangle C'$ and $x(C, q) \succ_D x(C', q)$ (note the use of the asymmetric portion of collective preference under $\mathcal{D}$). Finally, define $\text{Mc}_D$ as the transitive closure of $\delta_D$. In words, if $CMcC'$ for any two calendars $C, C' \in \mathcal{C}^L$, then there exists a sequence of discharges from the calendar $C'$ to the calendar $C$ such that each discharged issue is supported by some decisive coalition in $\mathcal{D}$. This represents a “sincere” (or “naive”) operation of majority preference over discharges and accords with the notion of majority preference utilized by McKelvey [1976, 1979], Schofield [1978], and McKelvey and Schofield [1987].

**Definition 4** For any decisive structure $\mathcal{D}$, status quo $q$, equilibrium outcome function $x$, and length $L$, a calendar $C^* \in \mathcal{C}^L$ is stable if there exists no $C \neq C^*$ such that $CMcD C^*$.

For any $(\mathcal{D}, q, x, L)$, let $S(\mathcal{D}, q, x, L) \subseteq \mathcal{C}^L$ denote the set of stable calendars. Interestingly, there can exist stable calendars other than a voting equilibrium calendar even when a voting equilibrium calendar exists. Perhaps clearly, the notion of a stable calendar is a generalization of the notion of a voting equilibrium calendar, as stated in the next result.

**Theorem 4** For any $q \in X$ and $L \geq 1$, $V^*(q, L) \subseteq S(\mathcal{D}, q, x, L)$.
Proof: Suppose that \( V^*(q, L) \neq \emptyset \). Otherwise, the result holds trivially. Let \( C^* \in V^*(q, L) \) denote a voting equilibrium calendar. For any calendar \( C' \in C^L \), there must exist some decisive coalition \( d_{C'} \in D \) such that \( i \in d_{C'} \) implies that

\[
u_i(x(C^*, q)) \geq u_i(x(C', q)),
\]

and accordingly, this must hold for all \( C' \) that differ with \( C^* \) by one element. Accordingly, the result follows.

When preferences are issue separable, any stable calendar must be of full length.

**Proposition 2** Suppose that preferences are issue separable. Then, for any calendar \( C^* \in S(D, q, x, L) \), \( \lambda(C^*) \geq \min[\phi(q), L] \).

Proof: Choose \( C^* \) to be the first \( L \) elements of \( \Phi(q) \) (with \( C^* \) being equal to \( \Phi(q) \) if \( \phi(q) \leq L \)). Then, for any nonredundant calendar \( C \) with length \( \lambda(C) = \min[\phi(q), L] - 1 \), it follows immediately from issue separability of legislators’ preferences that there exists some issue \( j \in C^* \) such that \([C \oplus \{j\}] \delta_D C \) and hence \([C \oplus \{j\}] \Mo_D C \). Similarly, for any \( C' \) with \( \lambda(C') = \lambda(C^*) - k \) for \( k \in \{2, \ldots, L\} \), there exists a calendar \( C'' \) with \( C'' = C' \oplus \{j\} \) for some \( j \in M \setminus C' \) such that \( C'' \Mo_D C' \).

The next result states that acyclicity of \( \succeq_D \) with respect to the set of outcomes implementable through a nonredundant, full length calendar is a sufficient condition for nonemptiness of \( V^*(q, L) \).

**Theorem 5** Suppose that preferences are issue separable and \( \succeq_D \) is acyclic on \( \bar{I}(q, L) \). Then \( S(D, q, x, L) \neq \emptyset \).

Proof: By Proposition 2, any stable calendar must implement a policy in \( \bar{I}(q, L) \). The result then follows from well-known arguments and the easily verifiable fact that \( \bar{I}(q, L) \) is finite.
The next corollary notes the link between Theorem 5 and Example 1 by pointing out that, when \( m = 2 \), the sufficient condition in Theorem 5 is trivially satisfied for any calendar length.

**Corollary 3** Suppose that \( m = 2 \). Then \( S(D, q, x, L) \neq \emptyset \).

*Proof:* If \( L \neq 1 \), then the conclusion is immediate, as \( \bar{I}(q, L) \) is a singleton. If \( L = 1 \), then \( \bar{I}(q, L) \) contains 2 elements, and acyclicity of \( \succ_D \) is trivially satisfied. \( \square \)

## 5 Obtaining Acyclicity: Procedural Structures

Acyclicity of the asymmetric portion of a binary relation on a finite set is a well-known sufficient condition for the existence of a maximal element of the relation. It is not generally satisfied by majority preference when the set has more than two elements. Accordingly, one might ask whether the theory presented here has any purchase at all on the question of stability in legislative policymaking. The answer, fortunately, is “yes,” because the decisive coalitions for determining the agenda in many legislative bodies (including both the U.S. House and Senate) are a strict subset of the set of majority coalitions. To capture this reality, and understand better how the theory presented in this paper advances our understanding of the agenda-setting and policymaking processes in legislative bodies, we define the notion of a *procedural structure*, which generalizes the decisive structure framework used thus far.

For any nonempty finite set of legislators \( N \), a *procedural structure* consists of two sets of subsets of \( N \), \( P \) and \( D \), both of which are nonempty, monotone, and proper, and for which \( P \subseteq D \). As before, the set \( D \) describes the coalitions that determine policy outcomes upon consideration of any dimension \( j \in M \). The set \( P \) describes the coalitions of legislators that may alter the calendar – thus, if \( P = D \), the results presented above remain substantively unaltered. For any decisive structure \( D \), let \( A(D) \) denote the set of nonempty, monotone,
and proper families of subsets of $N$ weakly contained within $D$. The set $A(D)$ is referred to as the set of \textit{admissible procedural structures}.

Before continuing, note that this depiction of legislative scheduling is consistent with the depiction of the U.S. House of Representatives presented in Patty [2007], where Patty argues that the majorities that can alter the agenda of the House must contain either the Speaker of the House or a majority of the Rules Committee. In other words, in Patty’s analysis, while $D$ in the House of Representatives is equal to the set of majority coalitions, the set of procedural coalitions in the House, $P$, excludes all coalitions not containing the Speaker or a majority of the Rules Committee. Thus, the analysis presented below is relevant to understanding how the elimination of some decisive coalitions from the determination of the legislative schedule can give rise to a nonempty set of stable calendars. In this extended framework, the notion of a stable calendar depends upon the procedural structure, $P$, but the determination of policy outcomes resulting from any calendar, $C$, is determined by $D$, as above. This notion is defined formally below.

\textbf{Definition 5} For any decisive structure $D$, status quo $q$, equilibrium outcome function $x$, length $L$, $P \in A(D)$, a calendar $C^* \in C$ is $P$-stable if there exists a such that there is no $C \neq C^*$ such that $C \mathcal{M} P C^*$. 

Let $S_P(D, q, x, L)$ denote the set of $P$-stable calendars and define

$$\sigma S(D, q, x, L) = \bigcup_{P \in A(D)} S_P(D, q, x, L)$$

as the set of all calendars $C$ for which there exists some procedural structure $P^C \in D$ such that $C$ is $P^C$-stable, given $q$, $x$, and $L$. We refer to this set as the set of \textit{potentially stable} calendars (given $D$, $q$, $x$, and $L$).\textsuperscript{18} If $q$ is in the Pareto set within $X$ with respect to the

\textsuperscript{18} A clear next step is to require that the choice of $P$ be consistent in some way with the preferences of the legislators, $u$, and the exogenously given decisive structure $D$. This topic – alternately described as
legislators’ preferences, $u$, then the set of potentially stable calendars is always nonempty.

**Proposition 3** Suppose that $q \in X$ is Pareto-efficient. Then for any $D, x, \text{ and } L$,

$$\sigma S(D, q, x, L) \neq \emptyset.$$  

**Proof**: Consider $P^0 = \{N\}$ and the calendar $C^0 = \{\}$. The addition of any issue $j$ to $C^0$ for which $x(\{j\}, q) \neq q$, be blocked by some individual in $N$ by the supposition that $q$ is Pareto efficient. For some dimension $k \in M$ which does not change the status quo (i.e., $x(\{k\}, q) = q$), let $C' = \{k\}$. While it is the case that $C' \triangleright C^0$, it is not the case that $C' \delta_{P^0} C^0$. Accordingly, there exists no calendar $C' \supseteq P^0 C^0$, implying that $C^0 \in \sigma S(D, q, x, L)$.  

A more interesting question than nonemptiness of $\sigma S(D, q, x, L)$ is what a procedural structure $P$ that yields a nonempty set of $P$-stable calendars “looks like.” We will presume for the remainder of the analysis that legislators’ preferences are issue separable.

For any status quo $q \in X$ and dimension $j \in M$, let $D^j(q)$ denote the set of legislators who (weakly) prefer policies with $j$th component $x^j_D$ to those with $j$th component equal to $q^j$ ($D^j(q)$ is an unambiguously defined set under the supposition that legislators have issue separable preferences). Clearly, $D^j(q) \subseteq M$ and, so long as $q$ is in the Pareto set with respect to $u$, $D^j(q) \neq N$. For any calendar $C$, consider the following set of coalitions $E^C(q) \subseteq M$:

$$E^C(q, D) = \{d \in D : \exists j \in M \setminus C \text{ s.t. } d \subseteq D^j\}, \quad (3)$$

and then define

$$\bar{P}^C(q, D) = D \setminus E^C(q, D). \quad (4)$$

The proof of Proposition 3 is equivalent to a proof that the Pareto efficiency of $q$ implies that

"consistent choice rules," or "equilibrium institutions" is an active area of work (e.g., Aghion, Alesina, and Trebbi [2004], Barbera and Jackson [2004], Messner and Polborn [2004], Coelho [2005], Harstad [2005], and Eguia [2007]).
$\bar{P}^C(q, D)$ is nonempty. The next result demonstrates that the nonemptiness of $\bar{P}^C(q, D)$ is a sufficient condition for potential stability.

**Proposition 4** Suppose that preferences are issue separable. Then, for any decisive structure $D$, status quo $q$, equilibrium outcome function $x$, and length $L$, a calendar $C^* \in C^L$ is potentially-stable if $\bar{P}^C(q, D) \neq \emptyset$.

**Proof:** Fix a calendar $C^* \in C^L$ and let $\bar{P}^{C^*} \equiv \bar{P}^C(q, D)$. Consider without loss of generality any $C' \in C^L$ such that $x(C', q) \neq x(C^*, q)$ and $C' \triangleright C^*$. Let $j = C' \setminus C^*$. By the supposition of issue separable preferences, the set of legislators who prefer $x(C', q)$ to $x(C^*, q)$ is equal to $D^j(q)$. However, by construction (Equations (3) and (5)), $D^j(q) \notin \bar{P}^{C^*}$, so that it is not the case that $C' \delta_{PC^*} C^*$. Furthermore, since $C'$ is an arbitrary selection from all calendars (subject to $C' \triangleright C^*$), it can not be the case that $C' \text{Mc}_{PC^*} C^*$. Accordingly, there exists no calendar $C'' \in C^L$ such that $C'' \text{Mc}_{PC^*} C^*$, implying that $C^*$ is $\bar{P}^C(q, D)$-stable and accordingly potentially stable.

Proposition 4 provides a sufficient condition for potential stability – which in substantive terms is the provision of a sufficient condition for the construction of a procedural structure (such as determining the membership of the Rules Committee in the U.S. House) to implement the calendar in question. In particular, for any Pareto efficient status quo $q$, any calendar $C$ is $\bar{P}^C(q, D)$-stable.

In other words, stability of a calendar can be obtained whenever political conflict is ubiquitous in the legislature. Specifically, if for each issue there is at least one legislator who prefers the status quo to the outcome of that issue receiving floor consideration, then for any legislative calendar, there exists some procedural structure that will make that calendar stable. Space prohibits the consideration of deeper aspects of this result, but the following represent promising questions for future research:

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\[19\] Note that this step is necessary by virtue of the definition of $\text{Mc}_{PC}$ as the transitive closure of $\delta_{PC}$. 

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1. Characterization of calendars that can be made uniquely stable through the appropriate choice of procedural structure,

2. Characterization of calendars that can be made stable through the elimination of the fewest decisive coalitions in \( D \), and

3. What further restrictions can be made on \( P \) (relative to \( D \)) without eliminating all potentially stable calendars?

Before concluding, it is worth noting that some of the principal characteristics of the procedural structure approach have intriguing analogies in the history of the U.S. House. The Rules Committee was established in its modern form (in the sense of controlling the process of everyday floor business) between 1880 and 1883, which was a period of marked partisanship. Until 1910, the Rules Committee was run by the Speaker of the House (the so-called era of “Czar rule”) in both \( de facto \) and \( de jure \) senses. Roughly speaking, the House during this time period (with only a few exceptional years) essentially operated under a procedural structure with a single vetoer (Nakamura [1979], Austen-Smith and Banks [1999]). From the 1910 revolt until Speaker Rayburn’s death-bed fight to enlarge the Rules Committee in 1961, the Speaker of the Rules Committee effectively replaced the Speaker in this role as the vetoer of agenda challenges. In 1967, the Rules Committee adopted rules to allow a majority of the committee to overrule the chairman on agenda matters, enlarging the set of coalitions that could effectively and successfully challenge the legislative calendar. Finally, from the 1970s until present, the Speaker of the House has (re)gained many of her powers to circumvent the Rules Committee, once again further enlarging the set of potential coalitions that can challenge the House’s agenda.
6 Conclusions

In this paper, we have presented a theoretical framework for the study of legislative scheduling in bodies such as the US House of Representatives, as well as two notions of equilibrium within this model.

In so doing, we have examined the properties of “scheduling by the floor” in legislatures and argued that this is analogous to the democratic selection of a structure induced equilibrium. We have shown that, in line with Riker [1980] and in spite of imposing some heroic (and canonical) assumptions on the legislative process, collective preference over what to consider may still be fraught with instability/intransitivities.

An important avenue for extension of this framework is the incorporation of a “farsighted” requirement into the definition of stability. In particular, discharge of an issue may ultimately lead (through successive discharges) to an outcome that is not majority-preferred to the original outcome (this point is illustrated by the previously-discussed example in Figure 1). Accordingly, a modified notion of stability that required any challenge to the calendar to be based upon correct beliefs about the ultimate calendar that would result from a successful challenge.\(^{20}\)

A detailed model of the scheduling, or calendar-setting, process is a necessary component of any systematic and complete analysis of a deliberative body. The reasons such a model is necessary include the fact that, without an understanding of the details of how issues are brought up for consideration by the body as a whole, it is unclear if equilibria even exist, making the derivation of comparative statics and empirical predictions potentially fruitless. In addition, without an understanding of how the calendar is set, it is impossible to predict which issues will be considered by the legislature. This is clearly important in its own

\(^{20}\)Even beyond the somewhat narrow focus on legislative scheduling in this paper, the question of farsightedness in sequential collective choice is of interest in a wide array of settings. Examples of work in this broader vein include Ward [1961], Miller [1977], Miller [1980], Rubinstein [1980], McKelvey [1986], Breton and Salles [1990], Li [1993], and Chwe [1994].
right, but it also has auxiliary implications. As an obvious example, attempts to estimate legislators’ preferences (either true or induced) their vote choices would be more efficient with information about the relationship between what was voted on and the alignment of preferences among the floor membership. More broadly and accordingly, an understanding of the scheduling process is central to the provision of internally consistent answers to questions such as the power of political parties in Congress, the effect of executive popularity on legislative success, and the impact of campaign donations on public policy outcomes.

References


Figure 1: A Two-Dimensional Example without a Condorcet Winner in Calendars of Length Up to Two