The Legislative Calendar[*]

John W. Patty

Elizabeth Maggie Penn

Harvard University

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Abstract

In this paper, we examine the details of the process by which legislation is scheduled for floor consideration in the US House of Representatives. We then present two equilibrium models of legislative scheduling, one presuming that legislative schedules are themselves and the other based on calendars chosen by a Speaker that are immune from discharge. Both models incorporate details of the scheduling process in the modern-day House of Representatives. In examining the models, we provide both positive and negative results about the nonemptiness of the two solution concepts, as well as the results of numerical simulations. We discuss the implications of our theory for the design of legislative institutions and the debate concerning the power of political parties in the House.

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1 Introduction

Former House Speaker Tip O'Neill famously described the power of the speaker as the power to schedule. The Speaker has always been a member of the majority party and, almost by definition, a member of the majority party's leadership in the House. Yet political scientists are engaged in an active debate about whether the majority party leadership, *per se*, actually has any influence over legislative outcomes. On the one hand, a member's party membership is a voluntary (and strategic) decision. Additionally, the rules of the House are, in principle, quite majoritarian, with all members having equal voting rights, equal powers to propose legislation, equal rights to be heard on the floor, and (at least *ex ante*) equal opportunities to sit on committees. Thus, the argument against party influence goes, how could a relatively small number of members achieve outcomes against the will of the majority?

In this paper, we do two things: first, we discuss the details of scheduling in the modern-day US House of Representatives. Then we develop two abstract and formal models of equilibrium legislative scheduling (*i.e.*, two notions of an "equilibrium legislative calendar"). We focus on the legislative calendar for a number of reasons. Perhaps foremost is the concern that there exists no systematic theory of the process by which legislation comes to the floor in the House of Representatives. Secondly, the ultimate goal of understanding the scheduling process is to understand to what extent the House leadership possesses agenda-setting power and what implications such power have for the study of parties-in-congress. In line with the sentiments expressed by previous scholars,[1] this paper is motivated by the belief that control of the scheduling process is one of the main sources of whatever power is possessed by the majority party leadership in the House. The realities of the scheduling process clearly indicate (at least to us) that, at least in a *de jure* sense, the road to affecting public policy runs through the majority party leadership in the US House of Representatives. Accordingly, this paper is intended to extend our theoretical understanding of how legislation is scheduled for consideration in the U.S. House.

As mentioned above, we are not the first to claim that the power to schedule is a source of the majority party leadership's power to affect public policy. In contrast with many previous scholars, however, we examine some of the more minute details of the scheduling process and provide two equilibrium models of the legislative scheduling process. While we do not claim to have provided the definitive model of legislative scheduling, we feel that the theory presented in this paper is a productive first step in the creation of such a model.

1.1 The Agenda and Constraints

In the the 106^{th} Congress, $6,942$ bills were introduced in the House of Representatives: a rate of 22.25 bills per day the House was in session, or just under 16 bills per member. Of those, 410 were enacted into law[2]: less than one per member. Only 951 measures were reported out of committee. Thus, approximately $6,000$ (over 86%) of the bills that were introduced did not make it to the floor for consideration. At first blush, access to the floor appears very limited. There are a number of possible causes for bills to not be considered on the floor.

Hopeless Bills. Bills that are obviously not going to pass are a waste of the House's time and should not be observed coming up for roll call votes (unless taking the roll call vote has value in and of itself, as might be the case when legislators seek to signal their preferences or intentions to their constituents). The submission of so many more bills than will be considered is therefore surprising unless the drafting of bills offers its own reward and/or is costless to the member or members who draft it. However, the drafting of a bill is not free: the House Office of Legislative Counsel plays a large role in drafting most bills that are introduced, and often these bills are the subject of extensive drafting and redrafting (Sachs [1999]).[3]

Time Constraints. Legislative activity takes time, and the length of a House session is necessarily finite. With a biennial election cycle, members who desire reelection are forced to limit their time working on the Hill in favor of campaigning and fund-raising in their Congressional districts. Thus, even if a bill is preferred by a majority of the House membership, it may not be feasible to deal with it. The time constraint plays a major role in the theory developed later in the paper.[4]

Free-rider Problems. In reality, bills are often imperfect when first introduced: the language and content can be altered in some way that is preferred by a majority of the House. However, such imperfections can be costly (specifically, in terms of the time required) to discover and overcome. Accordingly, uncertainty about the future of the bill (*i.e.*, whether the bill will pass or even be considered) can lead rational legislators to pass on the opportunity to exert time and effort on a bill that is, for example, referred to their committee. Thus, some bills that would have passed (or least received serious consideration) may never be reported out because of the beliefs of a subset of the House membership. Overcoming such coordination failures is one of the reasons that the House membership may endow a member or members with strong scheduling authority.

Negative Agenda Control. Given the assumption that a member or members possess dictatorial control of the floor agenda, theory indicates that some bills will not reach the floor due to the outcomes that these members believe will follow from the consideration of these bills. The most obvious example of this is when a bill represents a policy preferred by a majority of the House to the status quo (*i.e.*, the prevailing public policy), but not preferred by the member(s) with the power to schedule. Other scholars have examined the implications of such power for models of legislative politics.[5] A developing theme of this literature (*e.g.*, Krehbiel [1999] and Crombez, Groseclose, and Krehbiel [2005]) is to examine why and when such power might exist in a majoritarian institution such as the U.S. House of Representatives. While this paper does not offer a definitive answer to this question, the theory does offer a comprehensive story about how the endowment of an individual with such scheduling power might benefit the majority of the House. Specifically, the notion of a stable calendar, as defined below in Section 5, often yields a unique prediction about the final policy outcome as well as the legislative process by which it will be reached.

2 The Realities of the Scheduling Power

When dealt with at all in formal models of the U.S. House, the Speaker's power to schedule is assumed to be absolute. Is this an accurate portrayal? This paper examines this question and offers a qualified answer. Empirically, it seems that, in the short-run (definitely over no more than one session of Congress), the power to schedule endows the Speaker with nearly absolute negative agenda control. The vast majority of floor business in the House is conducted with the consent of the Speaker. As discussed below, all routes to the floor – with the notable exception of the Discharge Calendar – are open only with the Speaker's assent. Furthermore, the one route that does not require the Speaker's approval – the Discharge Calendar – is the most logistically difficult to navigate successfully. In short, the best option for a bill's supporter to follow if practicable is to make his or her bill attractive to the Speaker.

However, while the myopic consideration of how a bill reaches the floor suggests that the Speaker is a powerful ally, the majoritarian nature of the House's rules implies that this short-run power is bestowed at the pleasure of a majority of the House membership. Both the Rules of the House and the Speaker are subject to majority approval at the beginning of each Congress. Accordingly, the majoritarian view of the House (*e.g.*, Krehbiel [1999]) is in some sense unassailable: the House's institutions and leadership can not consistently make a majority of the membership worse off than some alternative set of institutions and/or leaders.

However, rather than arguing that this logic implies that negative agenda control does not exist (as in Crombez et al. [2005]), we instead work backwards and conclude that, if (at least short-run) negative agenda control exists, it must make a majority of the membership better off than any alternative scheduling mechanism. The theory developed in this paper takes this as its starting point: given that the Speaker possesses scheduling power subject only to the discharge process, what are the predicted policy outcomes?

Before delving into the theory, however, we describe how the legislative calendar is controlled. While the majority party leadership often announces a schedule of upcoming business (with varying degrees of commitment and/or specificity), legislative business is actually scheduled through a "real-time" process, relying upon various parliamentary procedures.

2.1 Access to the Floor: An Overview

The vast majority of legislation considered by the House as a whole reaches the floor of the house through one of five ways: *unanimous consent*, *suspension of the rules*, *adoption of a special rule*, *corrections calendar*, or by being reported out of a privileged committee. The privileged committees are Appropriations (for appropriations bills and continuing resolutions), Budget (on the matters set forth in the Budget Act of 1974), House Administration (on matters relating to the preservation of the records of the House), Standards of Official Conduct, and Rules.[6]

While there is a calendar procedure set forth in Rules XIV and XV, the vast majority of the House's business is initiated either by a privileged motion or a suspension of the rules. Both of these means are to a great extent under the control of the majority party leadership. While the privilege of the Committee on Rules endows it with nearly dictatorial negative agenda control, the majority party is overrepresented on the Rules committee. Similarly, the motion to suspend the rules is in order only upon recognition by the Speaker, giving him effectively dictatorial control of this means bring legislation to the floor. So, given that the chairmen of the other privileged committees are members of the majority party leadership (by definition), the principal limitation on the leadership's control of the agenda is the Discharge Calendar, which we discuss below.

Discharge Calendar. The discharge calendar is a potent, though rarely used, instrument for agenda control.[7] Through the discharge calendar, a majority of the House membership can effectively bypass the negative agenda powers held by committee chairmen and the Speaker.[8] The process for discharging a bill is complicated. We provide a short description here, and refer the interested reader to Beth [2001b] and Burden [2004] for more detailed discussions of the procedure.

First, a member must file a discharge petition with the Clerk. A discharge petition may deal with at most one bill or rule and may not allow for the consideration of nongermane amendments.[9] The Clerk makes this petition available for signature at all times while the House is in session. Any member can sign the petition and remove their signature so long as the required number of signatures has not yet been reached. If and when the petition is signed by a majority of the membership of the House, the petition is placed on the Discharge calendar. On the second and fourth Mondays of the month, it is in order for any member who has signed the petition to move that the House consider the petition.[10] At that point, the petition is subject to 20 minutes of debate (equally divided) and then voted upon by House. (No motions are in order except for one motion to adjourn during the debate of a motion to discharge.) If the petition is approved by a majority and discharges a bill, then the bill is immediately considered by the floor under the standing rules of the House. Alternatively, if the discharge petition discharged a special rule from the Rules committee, the rule is considered on the floor, which then results in the consideration of the bill in question.

2.2 The Realities and Implications of the Discharge Process

Krehbiel [1999] has argued that a strong parties model of House would predict that the number of members required for a bill to be discharged would equal the number of members of the minority party plus one-half of the members of the majority party. The fact that the required number is a bare majority (218) is then presented by Krehbiel as evidence against strong majority party control of the House.

Krehbiel's argument is compelling. However, it is based on the joint assumption that the policy space is unidimensional and that policymaking is performed with complete information. These assumptions are important for two reasons. First, the assumption of unidimensionality (along with the standard assumption of single-peaked preferences) implies that the members can be ordered unambiguously with regard to their preferences on all bills. While this assumption may be useful as a first-order approximation, it is quite clearly controverted by the facts of roll-call voting in the House. Without an ordering condition, the speaker may be unsure of where he or she may stand in relation to the committee chairman on a future bill.

2.2.1 Conclusions about Scheduling Power

As argued earlier, it appears that, at least in practice, the power of the majority party leadership to schedule House business appears nearly absolute. Essentially, the only constraint on this power is the discharge process. The formal theory developed in this paper accounts for this reality by examining what types of calendars are "discharge-proof". As far as we are aware, this aspect of scheduling has not been formally studied previously.

It should be noted that, at least in theory, there are two other constraints on the Speaker's negative agenda control : the floor membership could change the House Rules and/or replace the leadership. Extending this paper's theory to include these constraints would draw Congressional scholars closer to successfully accounting for the Rikerian critique (Riker [1980]):

institutions do not "solve" collective choice problems once one recognizes that institutions are themselves the subject of collective choice. As suggested by our qualification of the extent of the majority party's leadership's negative agenda control (*i.e.*, that it is "effectively" absolute "in the short-run"), such an extension clearly is desirable. However, with regard to the question of whether a majority should alter the House Rules, before one can carry out the general equilibrium analysis suggested in Riker [1980], one must be able to derive the outcomes produced by an institution. The theory developed here allows us to begin such an analysis of the current House Rules, in which the Speaker's power to schedule is effectively only limited by the discharge process.

3 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 (dimension) at a time. We also assume that the legislature enforces a *germaneness* restriction on amendments, as is currently used in the U.S. House. An amendment is germane if it does not add additional issues to the bill in question. Within this model, "adding an issue to a bill" is interpreted as altering the status quo on any dimension (or dimensions) that the original bill did not alter. Thus, an amendment is germane so long as the amended bill would not change the status quo on any dimension that the original bill did not also propose to alter. Finally, we assume that the ability to amend bills is universal and unlimited – any member of the legislature may propose unlimited (germane) amendments to any bill or bills. This assumption is roughly equivalent to assuming that the legislature operates under an "open rule." We discuss this process in more detail below.

We make these assumptions for reasons of analytical tractability, of course, but we also feel that they are reasonably faithful to the real-world procedures of the House of Representatives. In addition, these assumptions have become standard in models of legislative choice in multidimensional policy spaces (e.g., see Shepsle and Weingast [1984], Cox and McCubbins [1993], and Cox and McCubbins [2002]).

Primitives. This set of potential public policies is denoted by X. We assume that X is a nonempty subset of $\mathbf{R}^m$. As mentioned above, each dimension of X is referred to as an "issue." Thus, we assume that there are m potential issues for the legislature to address. We do not restrict m except to presume that it is finite.

The set of n legislators is denoted by N. Each legislator $i \in N$ is assumed to possess preferences over X that are represented by a utility function, $u_i : X \to \mathbf{R}$. 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 $p_i^d(x^{-d}) = \arg\max_{\alpha \in X^d} u_i(\alpha, x^{-d})$. We assume that each legislator's preferences over a dimension are single-peaked in the following sense. Given any dimension d and any vector of policies on all dimensions other than d, denoted by x^{-d}, there exists a point, $p_i^d(x^{-d})$, such that, for all $y, z \in X$ with $y^{-d} = z^{-d} = x^{-d}$,

$$z^d < y^d \leq p_i^d(x^{-d}) \Rightarrow u_i(y) > u_i(z) \text{ and}$$
$$z^d > y^d \geq p_i^d(x^{-d}) \Rightarrow u_i(y) > u_i(z)$$

We will refer to a legislator's preferences as being *issue separable* if his or her ideal policy on each dimension $j \in M$ does not depend on the location of policy on the other dimensions, $M \setminus \{j\}$. If legislator i's preferences are issue separable, then the x^{-d} argument for his or her ideal policy, p_i^d, is unnecessary.[11]

Majority Rule. Define the set of decisive coalitions of N to be $\mathcal{D} \subset 2^N$, with $N \in \mathcal{D}$ and $\emptyset \notin \mathcal{D}$. Using $\mathcal{D}$ to define "majority preference" in the usual way, we denote the majority preference relation over X by $\succeq_\mu$. For simplicity, we will assume throughout that $\mathcal{D}$ represents simple majority rule: *i.e.*, $D \in \mathcal{D} \Leftrightarrow |D| \geq \frac{n+1}{2}$. As far as we can tell, our results do not depend in any sensitive way on the choice of decisive structure, so long as it is *proper*.[12]

Changing The Status Quo. The status quo policy is denoted by $q \in X$.[13] We operationalize the division-of-the-question requirement by assuming that the status quo may be changed on at 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. However, given the use of an open rule in the legislature, the germaneness restriction on amendments, and the assumption that individual preferences are single-peaked on any given dimension, the location proposed by any bill will be irrelevant. Thus, in this setting it is sufficient to characterize any bill simply by the dimension k that it proposes to alter.

Calendars. We denote the set of dimensions by $M = \{1, 2, \ldots, m\}$. A legislative calendar is an ordered subset of M, denoted by C. The set of all calendars (*i.e.*, all ordered subsets of M) is denoted by $\mathcal{C}$. Given a calendar C, the length of the calendar is denoted by $\lambda(C) = |C|$ and the j^{th} element of the calendar is denoted by C^j. The set of all calendars of length no greater than L is denoted by $\mathcal{C}^L$. One of the main parameters in our analysis is the maximum feasible calendar length, denoted by $\mathbf{L}$. This parameter is intended to capture the time constraints of legislative scheduling.

Sophisticated Outcomes. In order to choose rationally between calendars, a legislator must have expectations about the outcome resulting from each calendar. We assume that legislators have correct beliefs about the outcome that results from any given calendar C. Given the status quo q, the outcome following from calendar C is denoted by $x(C, q)$. Given x, the status quo q, and a maximum calendar length $\mathbf{L}$, only certain policies are implementable: a large number of policy outcomes can not be reached as the equilibrium amendment and voting behavior following from any calendar in $\mathcal{C}^{\mathbf{L}}$. Accordingly, the set of *implementable policies* encompasses all policies $y \in X$ for which there exists some calendar $C \in \mathcal{C}^{\mathbf{L}}$ such that the sophisticated outcome following from the consideration of C yields y. Formally, this set is defined as

$$I(q, \mathbf{L}) = \{y \in X : \exists C \in \mathcal{C}^{\mathbf{L}} \text{ s.t. } x(C, q) = y\}.$$

Discussion of Sophisticated Outcomes. Many of the results in this paper require only that each calendar C possesses a well-defined continuation value for each player. In other words, many results require no restrictions on the function x except that it be well-defined. 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].

Without restrictions on legislators' preferences above and beyond the single-peakedness condition, deriving the outcome resulting from a calendar C, $x(C, q)$, can be quite complicated.[14] However, if we assume that legislators' preferences are issue separable then the proper definition of $x(C, q)$ is clear: the final policy is the status quo on all dimensions not included in the calendar, and the median ideal policy on each dimension that is considered.[15]

Theorem 1 *Suppose that preferences are issue separable. Then the outcome that results from calendar C, given status quo q, is*

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

where

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

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 fix a status quo q. Consider a calendar C and any permutation of C, denoted by C'. The outcome that results from calendar C is identical to the outcome resulting from C'. Formally, $x(C,q) = x(C',q)$.*

Unless otherwise stated, we assume throughout the remainder of the paper that legislators' preferences are separable across issues. Perhaps more to the point, we assume throughout that the order of the calendar does not affect the sophisticated outcome resulting from its consideration.

4 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."

Of course, this model is not at all descriptively realistic – the U.S. House of Representatives does not explicitly vote on the order of business for the ensuing two years at the beginning of a Congress. However, this model of legislative scheduling serves at least two purposes: first, as will hopefully become clear, this approach would underly any strategic theory of how the members of the House should go about electing a Speaker and, second, such a model is a useful baseline case for comparison with more descriptively realistic institutional of the scheduling process, such as the second model presented later in the paper.

Majority Preference over Calendars. We continue to presume that legislators are sophisticated – not only in how they vote along a given calendar, but also in estimating the policy outcome that will result from the use of any given calendar. Using this assumption, it is possible to define majority preference between two calendars simply as the majority preference between the policy outcomes resulting from their consideration.

For any two calendars C and C', the majority rule preference relation $\succeq_\mu$ is defined as follows: $C \succeq_\mu C'$ if $x(C, q) \succeq_\mu x(C', q)$. In other words, a calendar C is majority preferred to another calendar C' if there exists a decisive coalition $d \in \mathcal{D}$ 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 1 *Given q and $\mathbf{L}$, a* voting equilibrium *is any calendar C^* such that $C^* \succeq_\mu C$ for all $C \in \mathcal{C}^{\mathbf{L}}$.*

In other words, an equilibrium in the voting game defined over calendars is defined to be any element of the majority rule core over the set of outcomes that are implementable by a calendar. Before proceeding to establishing results about this notion of equilibrium, we discuss the link between our model and work on structure induced equilibrium and government coalition formation in parliamentary systems. Let $\mathbf{C}^*(q, \mathbf{L})$ denote the set of voting equilibrium calendars for status quo q and maximum calendar length $\mathbf{L}$

Voting Over Calendars, Structure Induced Equilibrium, and Government Formation. Since the game we are examining is a multidimensional voting game with additional rules imposed, the equilibrium under consideration is very similar (at least in spirit) to the notion of *structure induced equilibrium* Shepsle [1979]. In the sense that a choice of a calendar is equivalent to a choice of which voters to offer authority to (in the sense that inclusion of a given dimension implies that some member's[16] is chosen as the public policy, voting over calendars is also similar to voting over cabinets in parliamentary systems. For example, our model of voting over calendars is very similar to voting over *equilibrium cabinets* as studied by Laver and Shepsle [1996].

Positive 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. To facilitate exposition, we will refer to any dimension of the policy space on which the status quo policy is not equal to the median ideal policy as *incongruent* and denote the number of these issues, for a status quo q, by $D(q)$.

Theorem 2 *Suppose that* $D(q) \leq \mathbf{L}$*. Then*

1. $\mathbf{C}^*(q, \mathbf{L})$ *is nonempty and*

2. $C \in \mathbf{C}^*(q, \mathbf{L})$ *implies* $x(C, q) = x_m$*.*

So long as preference are issue separable, any calendar C^* that is a voting equilibrium must be at least as long as the lesser the number of incongruent issues or the maximum length of the agenda, $\mathbf{L}$. To state this formally, for any status quo q and length $\mathbf{L}$, denote the set of voting equilibria by $\mathcal{V}(q, \mathbf{L})$

Theorem 3 *Suppose that preferences are issue separable and that* $C^* \in \mathcal{V}(q, \mathbf{L})$. *Then* $\lambda(C^*) = \min[\mathbf{L}, D(q)]$.

Theorem 3 is simple to prove – consider any shorter calendar and compare it to the calendar where one additional incongruent issue is added to the end. This calendar is majority preferred to the original calendar, meaning the original one can not be a Condorcet winner among feasible calendars. Hence, the original calendar must not be a voting equilibrium given q and $\mathbf{L}$. The requirement that preferences are issue separable rules out cases where 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 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* $\mathbf{L} = 1$ *and* $x(C, q)$ *is well-defined for all calendars* $C \in \mathcal{C}^{\mathbf{L}}$. *The following condition is sufficient for nonemptiness of the set of voting equilibria over* $\mathcal{C}^{\mathbf{L}}$: *there exists* $j \in M$ *such that, for some decisive coalition* $d \in \mathcal{D}$, $i \in d$ *implies that* $j \in \arg\max_{k \in M} u_i(x(\{k\}, q))$.

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. The proposition generalizes to longer calendars.

Theorem 4 *Suppose that* $x(C, q)$ *is well-defined for all calendars* $C \in \mathcal{C}^{\mathbf{L}}$. *The following condition is sufficient for nonemptiness of the set of voting equilibria over* $\mathcal{C}^{\mathbf{L}}$: *there exists an ordering of* M, $\mathcal{O}$, *such that, for each* $s \in \{1, \ldots, m\}$, *there exists some decisive coalition* $d \in \mathcal{D}$ *such that* $i \in d$ *implies that* $u_i(x(\{\mathcal{O}^s\}, q)) \geq \arg\max_{k \in M \setminus (\cup_{r=1}^{\mathbf{L}} \mathcal{O}^r)} u_i(x(\{k\}, q))$.

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 $m = 2$, $\mathbf{L} = 1$, and $x(C, q)$ is well-defined for all calendars $C \in \mathcal{C}^{\mathbf{L}}$. Then the set of voting equilibria over $\mathcal{C}^{\mathbf{L}}$ is nonempty.*

In the special case considered, the result is actually stronger than stated in the corollary: the equilibrium in voting over calendars is "almost always" unique. So long as all legislators have strict preferences between the two feasible nonempty 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.

Negative Results. 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. Unfortunately, the sufficient conditions offered in Theorem 4 do not always hold. 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 shown in Figure 1.

[— Figure 1 Here. —]

A natural question at this point is whether we can provide necessary conditions for the existence of a voting equilibrium over calendars. The question is interesting because the existence of a voting equilibrium may depend sensitively (and subtly) on the maximum length of the calendar, $\mathbf{L}$. (Existence of a voting equilibrium also depends on q, of course.) We have already provided an example where a voting equilibrium over calendars exists with $\mathbf{L} = 1$ and fails to exist when $\mathbf{L} = 2$. We now provide a three-dimensional example where a voting equilibrium exists when $\mathbf{L} = 2$ and fails to exist when $\mathbf{L} = 3$ or $\mathbf{L} = 1$.

Example 1 Consider five legislators deciding on policy in $\mathbf{R}^3$. Each legislator's preferences are "Euclidean" (*i.e.*, $u_i(x, p_i) = -\sum_{k=1}^{m}(x^k - p_i^k)^2$: each legislator is assumed to have circular indifference curve) and their ideal points are as follows:

$$\begin{aligned} p_1 &= (0.901760, 0.0860715, 0.705325), \\ p_2 &= (0.942594, 0.9331840, 0.806061), \\ p_3 &= (0.578579, 0.3990110, 0.169725), \\ p_4 &= (0.531870, 0.4067160, 0.983734), \text{ and} \\ p_5 &= (0.392945, 0.6905870, 0.505594). \end{aligned}$$

Supposing that the status quo is located at $q = (0.5, 0.5, 0.5)$, there is a majority preference cycle over the set

$$I(1, q) = \{(0.5, 0.5, 0.5), (0.578579, 0.5, 0.5), (0.5, 0.406716, 0.5), (0.5, 0.5, 0.705325)\}.$$

In particular,

$$(0.578579, 0.5, 0.5) \succ_\mu (0.5, 0.5, 0.705325) \succ_\mu (0.5, 0.406716, 0.5) \succ_\mu (0.578579, 0.5, 0.5).$$

However, the Condorcet winner among

$$I(2, q) = I(1, q) \cup \{(0.578579, 0.5, 0.705325), (0.5, 0.406716, 0.5), (0.578579, 0.5, 0.705325)\}$$

is $(0.578579, 0.5, 0.705325)$. Finally, there is a cycle over

$$I(3, q) = I(2, q) \cup \{(0.578579, 0.406716, 0.705325)\}$$

since

$$(0.578579, 0.406716, 0.705325) \succ_\mu (0.578579, 0.5, 0.705325)$$
$$(0.578579, 0.5, 0.705325) \succ_\mu (0.578579, 0.5, 0.5) \text{ and}$$
$$(0.578579, 0.5, 0.5) \succ_\mu (0.578579, 0.406716, 0.705325).$$

$\triangle$

Discussion of Example 1. The example is illustrative: according to the majority preference relation, the dimension-by-dimension median defeats the unique element of $\mathcal{V}(q, 2)$, but is defeated by an element of $I(q, 1)$. This type of majority rule cycle illuminates a general feature of majority preference over the set of implementable outcomes. Specifically, with separable preferences, one does not need to consider calendars of length $\mathbf{L} - 1$ when exploring whether voting equilibria exist. There are essentially two central questions underlying the existence of voting equilibria: first, is there a majority preference relation cycle among the "full length calendar" outcomes (*i.e.*, $I(\mathbf{L}, q) \setminus I(\mathbf{L} - 1, q)$) and, if not, is there an outcome that is generated by a shorter calendar that defeats the Condorcet winner among the full-length calendar outcomes? If the answer to either question is "yes," then (by Theorem 3) the set of voting equilibria is empty.

4.1 Implications of Voting Over Calendars

Once committed to by the legislature, a legislative calendar C is equivalent to a equilibrium policy outcome in the resulting proposal and voting game.[17] Thus, in some ways, the joint application of our assumed legislative procedures (as described in Section 3) and a given legislative calendar is a particular instance of the notion of a structure induced equilibrium (Shepsle [1979]). However, the above discussion illuminates the fact that the set of calendars may not possess a Condorcet winner. Without a Condorcet winner, the choice of legislative calendar will depend upon the method by which it is chosen. In line with Riker's discussion of structure-induced equilibrium (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.

Note that we imposed a great deal of structure on the legislative process in the preceding discussion. First and foremost, we imposed a germaneness requirement, which, with the assumption of single-peaked preferences, guarantees the existence of equilibrium in the unmodeled amendment subgame following the consideration of a bill. Second, by assuming that legislators' preferences are single-peaked with respect to each possible issue, we have imposed an assumption that is effectively equivalent to a form of a "division of the question" requirement. The failure of these assumptions to yield a Condorcet winner among the set of possible legislative calendars indicates the importance of establishing some form of gate-keeper for legislative business.

In the next section, we argue that the exact nature of the discharge process plays an important role in yielding stability within the House without undermining the majoritarian essence of the House's operations.

5 Discharge-Proof Calendars

As discussed before, the floor membership does not actually vote on the calendar. Rather, the calendar is essentially proposed by the Speaker through his power to recognize members on the floor, and the chairpersons of the privileged committees, through their ability to be recognized on the floor. Most pertinent to this paper is the fact that the majority party leadership is imbued with the power to exclude bills from easy access to the floor. Without the support of at least one member of the majority party leadership, the only remaining route to the floor is the discharge process. The focus of this section, therefore, is on what types of schedules can be proposed by majority party and not be altered through the discharge of a previously excluded bill/issue for floor consideration. We shall see that, while there can be more than one such calendar, it is also possible that the set of such calendars is empty, depending on the configuration of preferences among the floor membership, the maximum length of calendars, and the status quo policy. Prior to defining the model, we briefly discuss the model of scheduling provided by Cox and McCubbins [2002], which is, to our knowledge, the most closely related paper in the literature.

Cox and McCubbins [2002] offer a model of scheduling in which the majority party acts in concert so as to exert dictatorial control over the calendar. They impose a strong germaneness requirement and do not allow for the discharge of unscheduled bills. They find that the majority party will schedule bills only on dimensions on which the floor median is closer than the status quo to the majority party's median ideal policy. They also examine a model of scheduling in which the calendar is controlled by the floor. They assume that there is no time constraint (so that all issues can considered if so desired), and that legislators' preferences are issue separable.

Cox and McCubbins [2002] assume that the support for the party is unconditional in the sense that members of the majority party will not defect against the party's median with regard to any scheduling decision. While we feel that this assumption can be justified if members' preferences are purely for reelection and voters are assumed to be naive about the scheduling process, it is unfair in the face of the majoritarian critique offered by Krehbiel [1999]. The power to schedule is not dictatorial. Thus, we do not presume majority party deference to the scheduling decisions of its leadership. In accordance with both Cox and McCubbins [2002] and Krehbiel [1999], we assume throughout that legislators vote solely according to their preferences and without regard to party membership.

5.1 The Primitives of the Model

We use the framework defined above in Section 4 and impose the following scheduling process for determining the legislative calendar. First, the (exogenously chosen) Speaker picks a calendar, C. This calendar may be no longer than $\mathbf{L} \leq m$. The House may then either approve the floor median on the first issue on the calendar (denoted by C^1) or discharge any issue it chooses, after which the floor median on the discharged issue is presumed to be enacted. Consideration of the calendar then proceeds until the calendar is completed and no subsequent discharge motions are offered (this is equivalent to voluntary adjournment) or the House considers $\mathbf{L}$ issues, at which point the session ends due to the time constraint.

In this section, we are interested in calendars that are *immune to discharge* once proposed by the Speaker (that is, the floor considers the proposed calendar in its entirety, even though discharge is an option). A calendar C is immune to discharge if there is no majority of legislators that strictly prefers adding some dimension to C that is not considered in C. If there is no restriction on the length of C, 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, $\mathbf{L}$, 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 $\lambda(C) \geq \min[\mathbf{L}, D(q)]$ 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.

If the calendar is of full length (*i.e.*,$\lambda(C) = \mathbf{L}$), then the addition of an issue (*i.e.*, the discharge of a bill on an dimension not in C) requires the dropping of a previously scheduled issue. Thus, for a maximum length calendar to be susceptible to discharge, there must exist a majority of legislators that prefer setting policy at the median on one unscheduled dimension to setting policy at the median on some scheduled dimension. (This requires that at least one legislator prefer both movements to staying at the status quo on each respective dimension.) The question that must be answered before proceeding concerns what issue will be replaced by the discharged issue. For simplicity (and because we are interested in calendars that are immune to discharge), we assume in this paper that a successfully discharged issue j in period t simply replaces C^t on the calendar, leaving the other components of C unaltered.

5.2 Discharge Deviations: Amendment Sequences

A theoretical virtue of explicitly modeling the scheduling process is that the set of possible deviations is limited by the rules of the House. In particular, the calendar can be amended in only a limited number of ways.[18] As discussed above, discharge petitions can only consider a single bill (represented here as a single dimension of the policy space) and bring that bill to the floor immediately. Finally, following the consideration of a discharged bill, the original calendar is once again the basis for floor business until adjournment or discharge of another bill in the future.

In order to capture this process in the model, define an *amendment sequence* (or *amendment path*) from a calendar C to another calendar C' in the following way: remove one issue from C, replacing it with another issue, and repeat until the resulting calendar equals C'. This is defined formally below.

Definition 2 *For any two calendars C and C', an amendment sequence from C to C' is any finite sequence of calendars $a = (C_0, C_1, \ldots, C_{\lambda(a)})$ such that*

1. *$C_0 = C$ and $C_k = C'$ and*

2. *C_k and C_{k+1} differ by exactly one component, for all $0 \leq k \leq \lambda(a) - 1$.*

The length of an amendment sequence a is denoted by $\lambda(a) = |a| - 1$.[19] For any two calendars C and C', let $A(C, C')$ denote the set of all finite amendment sequences from C to C'.[20] We can now define a majority preference relation between amendment chains and calendars.

Definition 3 *Given a calendar C and an amendment path a, we say that a is* majority preferred *to C (denoted by $a \succ_\alpha C$) if the equivalent policy outcome of each calendar in a is majority preferred to that of the previous calendar in the amendment sequence. Formally, $a \succ_\alpha C$ if*

1. $\exists D \in \mathcal{C}^{\mathbf{L}}$ *such that* $a \in A(C, D)$ *and*

2. $x(a^k, q) \succ_\mu x(a^{k-1}, q)$ *for all* $k \geq 1$.

This definition of $\succ_\alpha$ does not require that any component of the amendment sequence be majority preferred to the original calendar other than the first component. In this respect, it is similar to the relation required of the amendment (proposal) sequences studied in McKelvey [1976], McKelvey [1979], and McKelvey and Schofield [1987]. The distinction for the purposes of this paper is the restriction of possible amendment sequences to a specific (and discrete) subset of the policy space through the imposition of the germaneness restriction and rational expectations.[21] The previous work considered, among other questions, what policy outcomes an agenda setter could obtain if voters voted sincerely at each step of an amendment sequence. This is precisely the definition of sincerely majority preference over amendment chains offered in Definition 3. We now use the definition of $\succ_\alpha$ to define a new binary majority preference relation on the set of calendars, $\mathcal{C}^{\mathbf{L}}$.

Definition 4 *For any $C, D \in \mathcal{C}^{\mathbf{L}}$,*

$$C \mathbf{Mc}\, D \Leftrightarrow \exists a \in A(C, D) \text{ s.t. } a \succ_\alpha C$$

For the purposes of this paper, the $\mathbf{Mc}$ relation is useful in defining a notion of calendar stability.

While a more general definition and discussion of the $\mathbf{Mc}$ relation is provided in Patty [2004], it is useful to note a few characteristics of the $\mathbf{Mc}$ relation. First, $\mathbf{Mc}$ is transitive: if one calendar C can be amended to form another, D, in a way that respects majority preference, and D can be amended to form a third calendar, E, in accordance with majority preference, then C can clearly be amended to form E in a majority-preference-consistent fashion as well. However, $\mathbf{Mc}$ is not complete: that is, there may exist two calendars, C and D, such that C can not be amended so as to equal D in a majority-preference-consistent fashion, or vice-versa. Finally, $\mathbf{Mc}$ is often not irreflexive. In other words, it may the case that $C\mathbf{Mc}\ C$ for some (or possibly all) calendars. As well will see, this fact leads to the possibility that our notion of a stable calendar (defined below) may be satisfied by no calendar at all.

5.3 Stable Calendars

Our notion of discharge-proof calendars relies upon the $\mathbf{Mc}$ relation defined above. In words, a *stable calendar* is a calendar for which there exists no amendment sequence that is majority preferred to it. In general, the set of stable calendars is not required to be nonempty and may contain more than one calendar. Formally, a stable calendar is defined as follows.

Definition 5 *A* stable calendar *is any calendar C^S for which there exists no $C \neq C^S$ such that $C\mathbf{Mc}\ C^S$.*

For a status quo q and length $\mathbf{L}$, let $\mathcal{S}(q, \mathbf{L}) \subseteq \mathcal{C}^{\mathbf{L}}$ denote the set of stable calendars. It is worth noting that $\mathcal{S}(q, \mathbf{L})$ may be empty.

Interestingly, there can exist stable calendars *other* than a voting equilibrium calendar even when a voting equilibrium calendar exists. Furthermore, the following simple result establishes that the notion of a stable calendar is a generalization of the notion of a voting equilibrium calendar:

Theorem 5 *For any* $q \in X$, $\mathbf{C}^*(q, \mathbf{L}) \subseteq \mathcal{S}(q, \mathbf{L})$.

At first glance, emptiness of $\mathcal{S}(q, \mathbf{L})$ generally results from the fact that "a lot" of amendment paths are possible, increasing the probability of finding, for any given calendar, an amendment path that defeats it according to $\succ_\alpha$. Accordingly, one objection to the definition of stability is that the set of amendment sequences used is "too large." Voters are not entirely sophisticated: $\succ_\alpha$ only considers the majority preference relation between neighboring components within an amendment sequence. Thus, it could be the case that $a \in A(C, C')$, with $a \succ_\alpha C$, and yet $C \succ_\mu C'$. (Equivalently, there exists situations in which $C' \mathbf{Mc}\, C$ and yet $C \succ_\mu C'$.)

The first criticism is an important one: without considering "farsighted" behavior by the legislators, stability may be ruling out calendars that are, in reality, immune to discharge because the equilibrium result of modifying the calendar is a policy outcome that is less preferred by a majority of legislators to the original calendar's sophisticated outcome.[22] This is particularly the case inasmuch as one is concerned with a majority coalition of legislators attempting to hijack the legislative agenda for more than one issue. While this issue is important, it is also outside the scope of the paper to some degree. We offer some comments on the possibility of extending the model in this direction at the conclusion of the paper.

5.3.1 Is Stability Too Demanding?

Since the set of stable calendars is not guaranteed to be nonempty, are the requirements imposed by our notion of stability too demanding? We can list at least two reasons why this might appear to be the case and offer justifications for why the notion of stability, while not the unambiguous best choice for modeling floor control, is nonetheless a valid theoretical construct.

Respecting Time: The Order of the Calendar. At first blush, one concern is that stable calendars are required to be robust to amendment paths that may not be feasible in the sense that they require amending/discharging components of the schedule that are farther in the future prior to amending/discharging earlier ones. For example, consider the calendar $C = (1, 2, 3)$ and suppose that

$$(4, 2, 5) \succ_\mu (1, 2, 5) \succ_\mu (1, 2, 3) \succ_\mu (4, 2, 3)$$

Letting $C' = (4, 2, 5)$, there exists an amendment chain $a \in A(C, C')$ that majority defeats C according to $\succ_\alpha$ but also violates the practical realities of the discharge process in the sense that it requires that the first component of C be altered after the third component. In other words, the amendment process

$$a = ((1, 2, 3), (1, 2, 5), (4, 2, 5))$$

is obviously in $A(C, C')$ and is majority preferred to C by $\succ_\alpha$. However, this amendment process requires legislators to "reverse time". On the other hand, $(4, 2, 3)$ does not defeat $(1, 2, 3)$ according to $\succ_\mu$, so the amendment process

$$a' = ((1, 2, 3), (4, 2, 3), (4, 2, 5))$$

is in $A(C, C')$ and respects the progression of the consideration through time, but is not majority preferred to C according to $\succ_\alpha$. Of course, an individual might claim that we should not require the process to respect majority rule at each step of the discharge process, instead requiring it only to satisfy majority preference "in the end". Another way of saying this is that the discharge process should be farsighted, as discussed above. However, even this requirement is not guaranteed to solve the problem, since $\succ_\mu$ may be (and often is) cyclic. Thus, it is quite possible that $(4, 2, 3) \succ_\mu (4, 2, 5)$. If this were the case, then once the first component is changed from 1 to 4 and the second component is left unchanged, the majority preference relation between $(4, 2, 3)$ and $(4, 2, 5)$ would inhibit the final step of the discharge process. Issues along these lines are very interesting but left for future research.[23] It suffices for now to simply state that concerns about the ordering of amendment sequences are unfounded. If there exists an amendment sequence that is "improperly" ordered (relative to the time-based realities of the discharge procedure) and is majority preferred to a calendar C, then there necessarily exists another amendment sequence that is properly ordered and also majority preferred to C. This follows because any amendment sequence that violates time requires at least two steps, but the existence of a two-step amendment sequence a that is majority preferred to some calendar C implies the existence of at least one one-step calendar (consisting of the first component of a) that is majority preferred to C according to $\succ_\alpha$. Thus, our notion of stability is maximal with respect to this concern, meaning restricting $\mathbf{Mc}$ to only amendment sequences that respect the progression of consideration of the calendar will *not* enlarge the set of stable calendars.[24]

Farsightedness Again. A second (and related point) is that an amendment sequence can eliminate a calendar from the stable set even if that sequence leads to a calendar that is ultimately less preferred than the original one by a majority of the membership. This concern is less of an issue, however, since the definition of $\mathbf{Mc}$ implies that the existence of an amendment sequence a with a length greater than one and that satisfies $a \succ_\alpha C$ is sufficient to ensure the existence of a 1-step amendment sequence a' that is majority preferred to C (as in the discussion above, simply consider the amendment sequence consisting only of the first component of a).

Existence and characterization of stable calendars in standard settings is the topic of current work. For the moment, we report some numerical results in a stylized setting to demonstrate that the concept of stable calendars is not vacuous.

5.3.2 Some Numerical Results

In order to investigate the concept of stability, we calculated the frequency with which stable calendars exist in some simple spatial models of majority rule decision making. We ran 100 simulations in 2 different settings. The setting is a 10-dimensional spatial model, with the policy space being $X = [0,1]^{10}$. Each legislator's ideal point was drawn from the uniform distribution over X, and the status quo was $(0.5,\ldots,0.5)$. The parameters of interest were the number of voters (either $n = 3$ or $n = 100$) and the length of the agenda ($\mathbf{L} \in \{1,\ldots,10\}$). For each of the $(n,\mathbf{L})$ combinations, we recorded whether the set of stable calendars, $\mathcal{S}(\mathbf{L},q)$, was nonempty and the size of the set, $|\mathcal{S}(\mathbf{L},q)|$.[25]

The logic underlying the code is that any calendar is stable if and only if it is full length (*i.e.*, $\lambda(C) = \mathbf{L}$) *and* it is robust to all possible "single-component" deviations. Thus, to search for stable calendars, one must do the following: fix q, $\mathbf{L}$, and then create the set of sophisticated outcomes resulting from all possible full-length calendars. Following this mapping of calendars into their sophisticated outcomes, one must check each calendar and see if it is defeated by any calendar that differs by exactly one component. Any calendar which is not defeated by any such deviation is stable for q and $\mathbf{L}$.

$\mathbf{L}$	1	2	3	4	5	6	7	8	9	10
# of Times $\mathcal{S}(q,\mathbf{L}) \neq \emptyset$	87	72	61	54	52	51	56	63	79	100
# of Stable Calendars	87	72	61	54	52	51	56	63	79	100

Table 1: Simulation Results for 3 Voters (100 Total Runs)

$\mathbf{L}$	1	2	3	4	5	6	7	8	9	10
# of Times $\mathcal{S}(q,\mathbf{L}) \neq \emptyset$	98	94	94	94	90	83	85	89	95	100
# of Stable Calendars	98	94	94	94	90	83	85	89	95	100

Table 2: Simulation Results for 100 Voters (100 Total Runs)

The first item of interest is that, for all $\mathbf{L} < 10$, the set of stable calendars was nonempty in a higher proportion of the runs when $n = 100$ than when $n = 3$. Thus, stability (at least in this setting) is more likely to be satisfied by some calendar when the number of voters is large. The second item of interest is that, in the case where $n = 100$, there were *no* cases where the set of stable calendars was empty for all $\mathbf{L} < 10$. There were 2 runs in which, for $n = 3$, the only calendar length that produced a stable calendar was $\mathbf{L} = 10$. Finally, as alluded to above, the fact that the set of stable calendars is frequently nonempty (and always a singleton when it is nonempty) in both settings demonstrates that the concept of a stable calendar is potentially useful as theoretical tool.

6 Discussion, Extensions, and Conclusions

In this paper, we have developed a model of the scheduling process in the US House of Representatives and two notions of equilibrium within this model. While the study of legislative scheduling was motivated by a desire to further our theoretical understanding of the business of the US House of Representatives, the theory has been developed in a way that is applicable to legislative bodies more generally.

In addition, we have examined the properties of scheduling by majority rule in legislatures with a preexisting germaneness amendment restriction and a division-of-the-question scheduling procedure. We have shown that, even with the additional structures imposed on collective decision-making, majority preference over what to consider may still be fraught with instability/intransitivities.

The results are both positive and negative in the sense that we have provided a notion of equilibrium in games with a less-than-dictatorial agenda-setter and shown that, while the set of such equilibria is not guaranteed to be nonempty, it is nonempty in a nontrivial set of cases.

Far-Sighted Discharge Behavior. As mentioned in Section 5, one potential generalization of the current theory involves the incorporation of a "far-sighted" requirement into the definition of stability. Scholars who have examined theories of democratic decision making along these lines (though in slightly different settings and ways) include Ward [1961], Miller [1977], Miller [1980], Rubenstein [1980], McKelvey [1986], Breton and Salles [1990], Li [1993], Chwe [1994], and Penn [2003].

Optimal Discharge Procedure. One question that this theory raises is, "what is the optimal discharge procedure?" One's notion of optimality is obviously relevant to providing an answer to this question.[26] Unfortunately, regardless one's definition of optimality, this question is difficult to answer for a number of reasons. First, the space of possible discharge procedures is quite large. Krehbiel [1999] discusses the majority requirement: how many members must approve of a change in the calendar for it to be implemented? While obviously important, this is not the only important parameter in the definition of the discharge process. At least two other factors are also of importance: the number of bills that may be discharged at once and the timing of the discharge process. We have seen that the ability to discharge more than one bill (or, equivalently for our purposes, issue) at a time enlarges the set of feasible calendar deviations for the floor to consider. Allowing multiple issues to be bundled into a single discharge vote increases the possibility of creating a coalition to overturn the proposed calendar and hijack control of the agenda. At the extreme, imposing no limit (other than $\mathbf{L}$ on the bills that can be discharged implies that a stable calendar must be a Condorcet winner among the entire set of policy outcomes that can be implemented by a full-length calendar.

The timing of the discharge process is important insofar as the inability to discharge an issue for later consideration (in effect, the inability of the floor to commit to the future consideration of an issue) implies that the order of the calendar can determine its stability *even if the order of a calendar does not affect the policy outcome resulting from its consideration*. Of course, if the order of the calendar does affect the strategic voting outcome (as would be expected unless most or all legislators' preferences were separable across issues), the impact of the order of a calendar on its stability is increased. Given these considerations, deriving an optimal discharge procedure is both important and complicated enough to be explored in its own right. We therefore leave this as a topic for future work.

Concluding Remarks. In this paper, we have argued that 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 issues come to floor, it is impossible to predict which issues are observed in equilibrium and which ones are not. We argue that it is impossible to uncover legislators' preferences (either true or induced) regarding political issues from their vote choices without knowing what issues are being voted on. Accordingly, we argue that an understanding of the scheduling process – in particular, the discharge process and the ability of the majority party leadership to schedule around it – is essential for the provision of a coherent answer to questions regarding, for example, the power of political parties in Congress.

In addition to its importance in the eventual provision of a general model of policy making in the US House, the model presented in this paper has highlighted features of the discharge process that have been overlooked previously. The fact that a discharge petition may not discharge more than one bill *and* may not allow for nongermane amendments increases the number of calendars that are immune to discharge. Indeed, without such a requirement, the discharge process could effectively undermine the germaneness restriction of the standard House rules – the set of stable calendars would be reduced to the set of calendars that implement the Condorcet winner among the set of implementable policies (when one exists). In the likely absence of such a policy, no calendars would be stable. That is, in spite of extensive intra-chamber institutions (e.g., committees, caucuses, and party leadership), there is no guarantee that the policy making process would be well-defined in the sense of possessing an equilibrium.

Notes

[1]A few of these include Oppenheimer [1977], Sinclair [1983], Bach and Smith [1988], Cox and McCubbins [1993, 2002, 2004]. For an recent alternative argument from an empirical standpoint, however, see Hasecke [2002].

[2]401 of these were public bills and 9 were private bills

[3]Of course, as Anderson, Box-Steffensmeier, and Sinclair-Chapman [2001] note, there are a nontrivial proportion of introduced bills that are clearly hopeless. The motivations behind such introductions are nebulous, to say the least. Obviously, position-taking plays a role in such costly behavior. Consider, for example, the successful discharge of measures proposing a balanced budget amendment to the U.S Constitution in the 97^{th}, 101^{st}, 102^{nd}, and 103^{rd} Congresses (Beth [2001a]). The prospect of the measure passing with the required two-thirds majority was hopeless in each case. Nonetheless, the bills were brought to floor so that legislators could signal their commitment to fiscal responsibility by voting in favor of them. For reasons of space and clarity, we do not incorporate this type of legislator motivation into the theory developed in this paper.

[4]Legislative time is an understudied aspect of legislative processes. While Patty and Penn [2003] have recently developed a model of legislative policymaking in which the allocation of time by legislators determines the value of different bills to the members of the legislature, as Richman [2005] points out, some legislatures regularly adjourn before they have exhausted the time available for legislative business (*e.g.,* some state legislatures in the U.S.). While we discuss the case where the available time exceeds the amount of business pending before the legislature, this case is actually very simple within our framework, as there exists a unique policy prediction under both of our notions of equilibrium (Theorems 2 and 5).

[5]The entirety of this literature is too large to list here, but any comprehensive list would include Shepsle [1979], Denzau and Mackay [1983], Krehbiel, Shepsle, and Weingast [1987], Shepsle and Weingast [1987], Weingast and Marshall [1988], Gilligan and Krehbiel [1987, 1990], Aldrich [1994], Rohde [1994], Epstein [1997], Cox and McCubbins [2002], Crombez et al. [2005], and Krehbiel, Meirowitz, and Woon [2005].

[6]These are set forth in Clause 5 of Rule XIII of Representatives [2003].

[7]The process by which a bill is entered onto the discharge calendar is referred to as the discharge *procedure*. As Cox and McCubbins [2004] note (p.78, n. 37), this process is qualitatively different than the discharge *motion*, which – though it too is used to remove a bill from a committee or committees – is entertained only with the Speaker's approval (see also Oleszek [2001]).

[8]We are not aware of its use, but there does appear to be a means for the Speaker to eliminate the power of the discharge process. Bills can only be discharged from a committee, and the Speaker controls referrals. The referral of a bill to a particular committee can (arguably) be overridden by the floor. However, it is at least unclear that the floor can force the Speaker to refer a bill in the first place. The Speaker is directed to refer all bills by the House Rules (Rule I), but the means and form of punishment for violating this Rule are left unspecified.

[9]This restriction was imposed in 1997 (Beth [2001a]).

[10]There are some time constraints. In particular, it is not in order to consider a discharge motion until 30 days have elapsed since a bill was referred to the committee in question and 7 days have passed since the bill was referred to the Rules committee (if it has been so referred). In reality, these do not appear to be binding constraints. They are relaxed when the end of a session is approaching. However, the date of adjournment is usually unknown and, apparently,

this leads to the relaxation not being made in practice. This point is interesting when one considers the model presented in Section 5. The model predicts that the Speaker's power is weakest at the end of the session, due to the commensurate reduction in his power to retaliate against members who support a discharge petition.

[11]Note that issue separability is a weaker condition than *additive separability* across dimensions. Legislator i's preferences are *additively separable* if there exists a vector of functions $(f_i^1, \ldots, f_i^m)$ such that

$$u_i(x) = \sum_{k=1}^{m} f_i^k(x^k, p_i^k).$$

Used by several scholars (*e.g.*, Cox and McCubbins [2004]), additive separability implies that the *net utility* gain (or loss) from moving policy in one dimension is invariant to the location of the policy in all other dimensions.

[12]A decisive structure (*i.e.*, a collection of decisive sets) is proper if one set of legislators being decisive implies that its complement is *not* decisive (Austen-Smith and Banks [1999], p. 73).

[13]The status quo policy is the policy that will prevail in the absence of legislative action. 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.

[14]See Patty [2004] for a more detailed discussion of this.

[15]This assumes that the median legislator has the power to propose his or her ideal policy and that making proposals/amendments is costless.

[16]Namely, the member with the median ideal position on the dimension in question.

[17]Furthermore, the outcome is a subgame perfect Nash equilibrium in weakly undominated

strategies.

[18]We are actually simplifying the process in this paper. We do not consider the possibility of replacing the Speaker or the possibility of divergent interests between the Speaker and the chairmen of privileged committees. Similarly, we do not allow for unanimous consent or suspension of the rules, either of which would allow the floor to bundle several issues together. Incorporating these features into the model represents an interesting avenue for future work.

[19]The length is the cardinality minus one because of the requirement that the first element of the amendment chain be the original calendar itself.

[20]It should be noted that it is possible for some calendar to appear more than once in an amendment path, either consecutively (replacing an issue with itself) or otherwise. For reasons that will become obvious, such amendment paths are inconsequential for our analysis. For simplicity, we allow them to remain in $A(C, C')$.

[21]In this context, the imposition of rational expectations implies that the members have correct beliefs about the policy outcome that will results from each calendar.

[22]For examples of models that take such farsighted behavior into consideration, see Chwe [1994] and Penn [2003].

[23]Some of these issues are explored in Patty [2004].

[24]We have not explored this in as much detail as we would like, but it seems that such a restriction would not shrink the set of stable calendars either. If this is the case, then calendar ordering matters only insofar as the ordering affects the final policy outcome.

[25]The simulations were performed in Mathematica. The code is available from the authors.

[26]For example, optimality could be defined either in terms of the Speaker's preferences or in

terms of average payoff of the floor membership.

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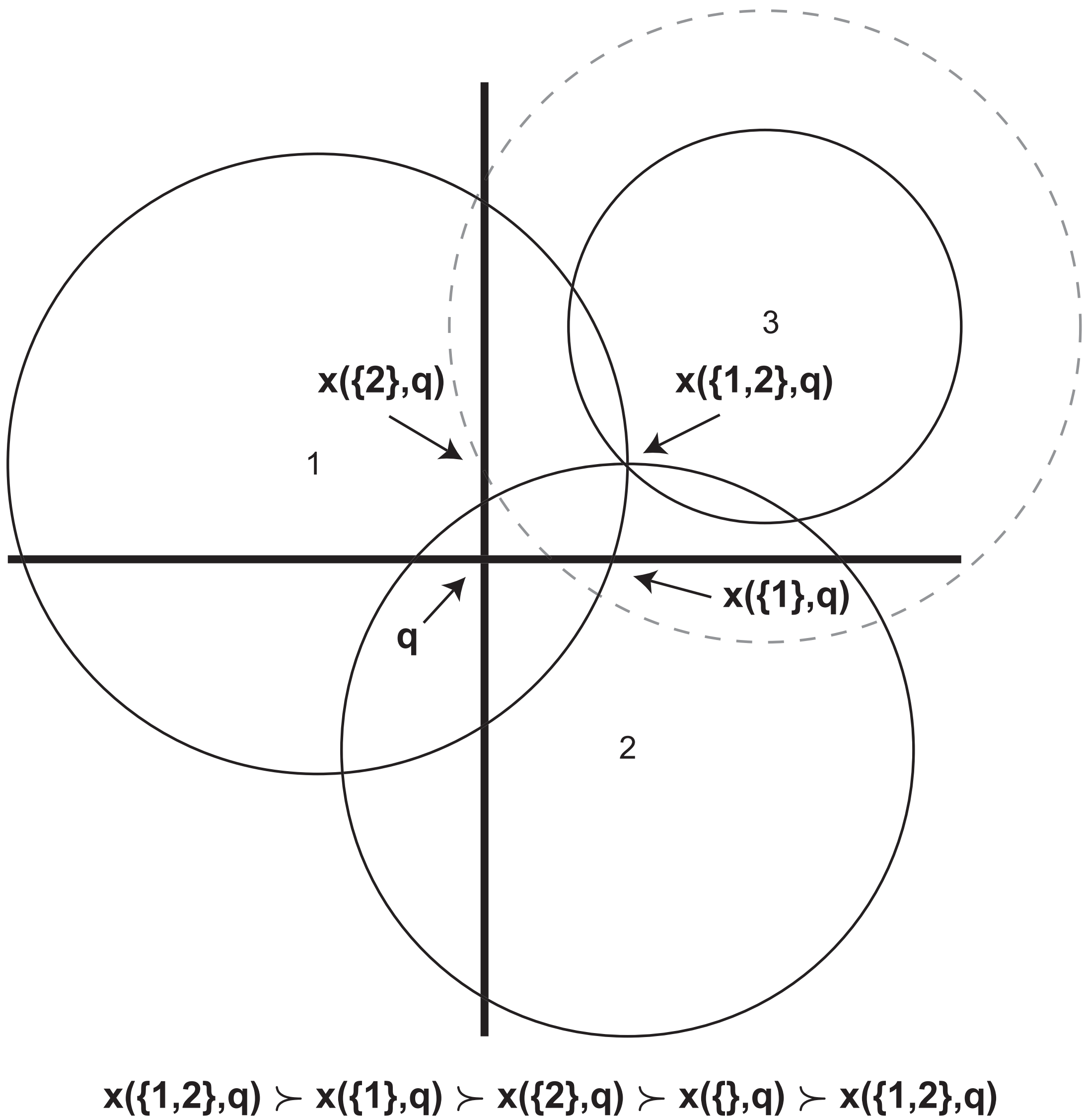

Figure 1: A Two-Dimensional Example without a Condorcet Winner in Calendars of Length Up to Two