An Efficiency Rationale for Committee Power*

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Abstract

A puzzling feature of legislative organization is the continuous support by a majority of seemingly non-majoritarian procedures, such as non-median committees and limits on amendments. This paper studies a legislature's choice of procedures. We focus on how legislatures institute restrictions on proposal and amendment rights. In our model the legislature is initially procedurally neutral - all legislators share proposal and amendment power equally. Once a policy issue arises, the legislature can consider it directly on the floor, under neutral procedures, or can first allocate proposal rights over that policy issue to a subset of legislators. If a committee is approved, the legislature can also vote to allow the committee to restrict amendments to its proposals. We find that when a risk-averse legislative majority votes to delegate exclusive agenda power to a committee it does so with the specific goal of improving *procedural efficiency* i.e. reduce the policy uncertainty that can result from prolonged floor bargaining. In equilibrium both median and non-median committees form and closed rules further enhance committee power. However, these procedural restrictions do not bias the distribution of policy outcomes. Instead, they reduce the variance and the variation in legislative output. Our results imply that committee power and restrictive amendment rules are both efficiency-enhancing and representative of floor preferences.

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1 Introduction

Legislatures based on majority rule voting endow their members with equal voting power, as required by constitutional provisions. Yet in most legislatures members do not exercise equal *procedural* power. Self-organizing legislatures typically evolve to restrict the procedural rights of its members. In practice this is achieved by creating legislative offices endowed with special prerogatives such as gatekeeping rights, proposal rights, and scheduling rights. These are further strengthened by limits on the rights to amend the output of those special offices. The existence of skewed procedural rights creates inequality in the distribution of legislative power that in turn critically affects policy outcomes (Shepsle and Weingast 1984, Baron and Ferejohn 1989). Given their likely impact on legislative output, the existence of restrictions on the procedural rights of some legislators seems at odds with a legislature's majoritarian foundation (Krehbiel 2004).

The question of whether restrictive procedures are fundamentally non-majoritarian has normative ramifications. As the quote below may suggest, Wilson (1885) was troubled by the power acquired by the standing committees of the U.S. House of Representatives by the late 1880s:

> "[The House] legislates in its committee-rooms; not by the determinations of majorities, but by the resolutions of specially-commissioned minorities." (page 69).

He argued that the committee system detracted from the constitutionally-intended deliberative nature of Congress and should be reformed. Still, the U.S. Constitution gives House members the right of self-organization. The power to change the standing rules can be exercised by a majority at any time;[1] the only leadership position imposed by the Constitution is that of Speaker.[2]

In fact, current leading theories of committee power confirm Wilson's fear that a committee's legislative output may fail to reflect the broad policy preferences of the legislature, the body that invested that committee with power in the first place. There are three leading theoretical approaches to committee power: distributive, partisan and informational. Current non-informational models of legislative procedures are based on the assumption of procedural commitment i.e. the majority commits to protect the pre-existing proposal or gatekeeping power of committees. Committees then form, for instance, because policy extremists can take advantage of gatekeeping power to exploit and protect the potential gains from trading their votes with each other (Weingast and Marshall 1988). Cox and McCubbins (1993) argue that the chamber median allows control of the agenda by the majority party median because this improves the party's "record" and with it its members' reelection prospects. In other words, party moderates are willing to sacrifice some policy goals

[1] Major reforms to the House committee system have been infrequent. The most significant was the Legislative Reorganization Act of 1946. It mandated a significant reduction in the number of standing committees from forty-eight to nineteen. Most of the abolished committees, however, resurfaced as sub-committees of the remaining standing committees.

[2] The question of on whether the institutions of the U.S. House of Representatives are majoritarian is a matter of current academic debate. Patty (2007), for instance, argues that the House discharge procedure is non-majoritarian.

in order to help their party move policy outcomes closer to the party median.[3] Or, a majority's preference affinities induce them to vote together to take over the legislative agenda in order to achieve their ideological goals, even if there are no extra-legislative incentives to impose party discipline (Diermeier and Vlaicu 2008). While procedural commitment models help us understand the incentives that lead to the formation of committees, they all predict that committees are able to extract policy benefits at the expense of the floor and so raise the question of why the floor *systematically* chooses to defer to committees.

The basic theoretical conundrum can be illustrated with a simple application of the median voter (Black 1958) and proposer-pivot (Romer and Rosenthal 1978) models, two models that form the backbone of the literature in this area. Consider the interaction between a committee and the floor. For simplicity suppose that policy is unidimensional and all legislators have single-peaked preferences over the available alternatives.[4] On the one hand, a committee with exclusive proposal and amendment power can keep outcomes away from the floor median by either protecting the status quo (gatekeeping) or by proposing a policy that leaves the median just indifferent between the proposal and the status quo. On the other hand, if legislating were made directly on the floor, the median voter model would predict that the resulting sequence of proposals and amendments would eventually push the final policy to the median's most preferred alternative.

Thus, according to these models, on any issue on which the committee has non-median preferences a majority would always exist that would want to circumvent the committee and bring the issue directly to the floor for consideration. In fact, in the U.S. House of Representatives the floor always has this option. All it needs to do is to file and pass a discharge petition. And herein lies the puzzle of committee power: Why have discharge petitions been so unsuccessful? From 1931-1998 out of 540 discharge petitions filed, only 46 received the required number of signatures, of which 31 were called up for a vote, and only 26 made a majority of votes (Stewart 2001). This is an average of less than one successful committee discharge for each two-year Congress. Could it be that committees are set up so that they already have median preferences? If that is the case, why would the floor bother to set up committees in the first place? It seems that a purely preference-based non-informational theory of committee power, one based on the logic of the median voter and proposer-pivot models above, cannot accommodate legislative institutions where committee power over policy coexists with floor sovereignty over procedure.

The informational approach to committees solves this conundrum by observing that there is a

[3] Both types of motivations may actually reflect the single-minded pursuit of reelection (Mayhew 1974). A legislator may care in a particular way about policy because it helps him get reelected. Similarly, he might care about his party reputation because voters use party clues when they vote and so to some extent a legislator's reelection depends on a legislator's party affiliation.

[4] In a multi-dimensional spatial model the conflict between legislative preferences and institutional outcomes can be even more severe. For instance, in the model of Shepsle and Weingast (1981) it is possible to have structure-induced equilibria that not only hurt a majority but are outright inefficient i.e. there is a *unanimous* preference to revert to the status quo or adopt an issue-by-issue median policy.

potential asymmetry of information between a committee and the floor, if the committee has had incentives to acquire expertise in its specific jurisdiction (Gilligan and Krehbiel 1987). In this theory the floor is willing to allow the committee use of a closed rule because this induces the committee to share its information. Agenda power in turn gives the committee an incentive to specialize. The floor ends up compromising on its policy preferences in exchange for a more informed policy choice. Subsequent papers have looked at how the committment involved in this exchange of agenda power for information can be sustained in equilibrium: ex-post selection of rule (Gilligan and Krehbiel 1989), overlapping generations model (Diermeier 1995), one-shot endogenous committee authority (Kim and Rothenberg 2008).

In this paper we present a model of majoritarian choice of procedural institutions where endogenously-determined committees and rules improve, rather than impair, the committee system's representation of floor preferences. Our approach is not based on asymmetries of information, like infomational theories, and does not assume procedural commitment, like distributional and partisan theories. Rather, we explicitly model the choice of procedures in a "busy legislature," one characterized by opportunity costs of legislative bargaining.[5] The goal is to address two questions: starting from a procedurally neutral legislature (i) what drives majoritarian incentives to restrict proposal power? and (ii) what drives majoritarian incentives to restrict amendment power?

Legislators begin a legislative session with equal proposal and amendment power. They first have the opportunity to reallocate proposal power to a subset of legislators - a committee. Subsequently, legislators bargain on the amendment rights that govern how a given policy proposal is considered on the floor. For instance, the right to make amendments can be reserved only to commmittee members. Finally, legislators bargain over policy under the proposal and amendment rights just passed. The model's key insight is that committee power stems from the floor's concern with procedural efficiency i.e. reducing the uncertainty produced by unorganized bargaining over policy. This incentive is stronger the more risk averse legislators are. The intuition is that when bargaining takes time floor deliberation does not guarantee median outcomes since non-median legislators can exploit their proposal power and the median's impatience to bias outcomes away from the median. Still, equal recognition rights ensure that, on average, outcomes will be unbiased relative to the median. However variance remains positive.

The uncertainty over the final legislative output creates an incentive for all legislators, median included, to restrict proposal power to designated committees, since a committee can reduce the variance in policy outcomes by limiting proposals. Both median and non-median committees can achieve that, however. Thus in setting up a *non-median* committee, the median legislator essentially trades off policy goals for a reduction in policy variance. The median (i) can keep policy bias low by using its pivotal position to retain membership in non-median committees and (ii) can further reduce policy bias by helping pass amendment rules that give it disproportionate amendment power.

[5] The idea of legislatures as busy organizations is discussed in Cox (2006).

Agenda power institutions are naturally more unbalanced when impatience improves the non-median legislators' bargaining power over procedure. As bargaining frictions become negligible proposal and amendment power converge to the median. Our interpretation for this feature of the model is that the efficiency role of procedural restrictions is to make policy outcomes more majoritarian.

The rest of the paper is organized as follows. The next section introduces a simple model of bargaining over policy under generic legislative procedures. We then present the full model where we there is a prior stage where legislators bargain over the distributions of proposal power and amendment power. The effects of each type of restriction on policy outcomes is separately discussed. We then examine the effect of bargaining frictions on equilibrium procedural chioce. We close the model by analyzing the effect of equilibrium procedures on legislative output. The last section concludes.

2 Legislative Output under Neutral Procedures

Suppose three legislators $i = l, m, r$ assemble to choose a new policy from the interval $[-1, 1]$. The three legislators can be also interpreted as three legislator types, as long as the three types have equal numbers. The status quo $q \neq 0$ may not be favorable to some legislators. The decison process for changing the status quo is a sequence of proposals and votes that are governed by proposal rights $\boldsymbol{\pi} = (\pi_l, \pi_m, \pi_r)$ and amendment rights $\boldsymbol{\alpha} = (\alpha_l, \alpha_m, \alpha_r)$, where $\pi_l + \pi_m + \pi_r = 1$ and $\alpha_l + \alpha_m + \alpha_r = 1$, are all recognition probabilities. At each step the decision rule is simple majority. Legislators have equal voting rights; thus, a plenary vote is successful if two or three legislators vote in favor of the proposal. In the next section, we use this same bargaining model to study legislators' choice of procedures. While the *procedures for choosing policies* are given by $\boldsymbol{\pi}$ and $\boldsymbol{\alpha}$, the *procedures for choosing procedures* will be assumed neutral: $\boldsymbol{\pi} = \boldsymbol{\alpha} = (1/3, 1/3, 1/3)$. This is because we are interested in self-organizing legislatures i.e. those that are allowed by a constitution to choose all of their procedral rules.

2.1 Preferences

Legislators have single-peaked preferences over this policy space. Let z_i denote the ideal point of legislator i. His policy preferences will be represented by the following utility function:

$$u_i(x|z_i) := v(|x - z_i|) \qquad i = l, m, r$$

where v is decreasing and concave in the absolute distance between policy and i's ideal point. Note that this implies legislators' preferences are symmetric are display risk-aversion. For simplicity, we assume that ideal points are arranged equidistantly in the policy space: $z_l = -1, z_m = 0, z_r = 1$.

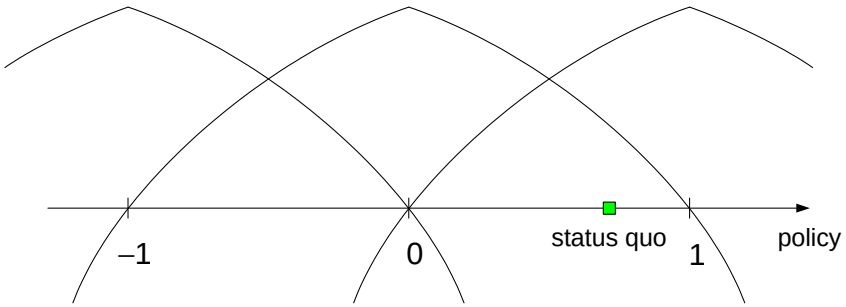

Figure 1: Policy Space and the Distribution of Policy Preferences.

Figure 1 illustrates these assumptions.

2.2 Timing

We adopt a legislative bargaining model based on Banks and Duggan (2006), who generalize the Baron and Ferejohn (1989) model to arbitrary vectors of recognition probabilities and broader policy spaces. The main difference from our model and the Banks and Duggan (2006) model is that we allow recognition probabilities for proposals $\boldsymbol{\pi}$ to differ from recognition probabilities for amendments $\boldsymbol{\alpha}$. A bargaining game governed by procedures $(\boldsymbol{\pi}, \boldsymbol{\alpha})$, with status quo q and common discount factor δ, with $0 \leq \delta < 1$, has the following structure:

(1) **Recognition** Legislator i is recognized with probability π_i.

(2) **Proposal** The recognized legislator makes a proposal x (the proposal can be the status quo itself - meaning that the proposer "keeps the gates closed" to preserve the status quo). If a legislator is indifferent among several proposals we assume that he will propose the one that has a better chance to be accepted.

(3) **Vote** All legislators simultaneously vote on the proposal x. The vote can be either to accept or to reject the proposal. The voting rule is simple majority rule. If the proposal passes, the game ends and the new policy is x. If less than two legislators vote for the proposal bargaining continues with exogenous probability δ, go to stage (4); if bargaining has to end (this happens with probability $1-\delta$) the status quo remains unchanged. If the status quo was proposed at stage (1), a vote against means that legislators want to change the status quo; bargaining continues probability δ, go to stage (4).

(4) **Recognition** Legislator i is recognized with probability α_i.

(5) **Amendment** The recognized legislator makes an amendment y.

(6) **Vote** All legislators simultaneously vote on the amendment y. If the proposal passes, the game ends and the new policy is y. If less than two legislators vote for the proposal bargaining continues with probability δ, return to stage (4); if bargaining has to end (this happens with exogenous probability $1-\delta$) the status quo remains unchanged.

2.3 Equilibrium Definition

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

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

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

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

$$(A_l, A_m, A_r)$$

define the *majority acceptance set* as:

$$A := \bigcup_{M \subset N} \bigcap_{i \in \{l,m,r\}} A_i$$

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

Our equilibrium concept is symmetric stationary equilibrium. A stationary equilibrium is an undominated subgame perfect equilibrium in stationary strategies, i.e. strategies that are independent of the history of play up to the current period.[6]

We will be looking for a symmetric equilibrium with proposal strategies of the form $(x_l, x_m, x_r) = (-x, 0, x)$. Banks and Duggan (2006) have shown that for single-peaked preferences the median legislator is pivotal and the majority acceptance set is the same as the acceptance set of the median legislator. Moreover, for single-peaked concave functions the equilibrium is unique. In our setup the equilibrium acceptance set of the median legislator can be written as:

$$\begin{aligned} A_m^* &= \{x \in [-1,1] \mid v(x) \geq (1-\delta)v(q) + \delta\left[(1-\alpha_m)v(x) + \alpha_m v(0)\right]\} \\ &= \left[-x^*\left(1-\alpha_m, \delta, q\right), x^*\left(1-\alpha_m, \delta, q\right)\right]. \end{aligned} \tag{1}$$

and so the equilibrium *policy deviation* $x^*\left(1-\alpha_m, \delta, q\right)$ depends on non-median amendment power $1-\alpha_m$ and is implicity defined as the certainty equivalent in the following equation:

[6] This is the standard equilibrium concept in legislative bargaining games. For details see Austen-Smith and Banks (2006).

$$v(x) = \frac{1-\delta}{1-\delta(1-\alpha_m)} v(q) + \frac{\delta\alpha_2}{1-\delta(1-\alpha_m)} v(0). \tag{2}$$

The equilibrium distribution of policy outcomes is threfore:

$$X^*(\boldsymbol{\pi}, \boldsymbol{\alpha}, \delta, q) = \begin{cases} -x^*(1-\alpha_m, \delta, q), & \text{with probability } \pi_l \\ 0, & \text{with probability } \pi_m \\ +x^*(1-\alpha_m, \delta, q), & \text{with probability } \pi_r \end{cases}$$

We refer to the mean of this distribution as the *policy bias*: $\mathbb{E}[X^*(\boldsymbol{\pi}, \boldsymbol{\alpha}, \delta, q)]$. We note several features of this equilibrium: first, the equilibrium deviation $x^*(1-\alpha_m, \delta, q)$ is positive as long as $q \neq 0$ and $\delta > 0$; it is larger when (i) the status quo is more extreme, since the cost of waiting is larger for the median, (ii) when the median is more impatient, which also increases the cost from delaying, and (iii) when the degree of risk aversion is higher, since future outcomes are uncertain so the benefits of waiting are reduced; second, bargaining frictions keep outcomes away from the median with probability $1-\pi_m$; and third, even if the median has all amendment power, outcomes still vary away from the median due to the median's impatience and risk aversion. We summarize these features of equilibrium in the next proposition, for the case of neutral procedures $\boldsymbol{\pi} = \boldsymbol{\alpha} = (1/3, 1/3, 1/3)$.

Proposition 1 *(Policy under Neutral Procedures) Floor consideration under neutral procedures generates a distribution of policy outcomes that is is symmetric and uniform and therefore unbiased relative to the median. Policy deviation is increasing with the median legislator's risk aversion, the median legislator's lack of amendment power, impatience/urgency of the policy issue, and extreme status quos.*

Another interesting feature of this equilibrium is that amendment power is less effective than proposal power in bringing outcomes to the median. If the median gets exclusive proposal power $\pi_m = 1$ the outcome is guaranteed to be median, amendment rules are irrelevant. If the median gets full amendment power $\alpha_m = 1$, however, but not full proposal power $\pi_m < 1$, there remains a positive probability that outcomes will diverge from the median. The policy deviation x is lower, though. It is given implicitly by the equation $v(x) = (1-\delta)v(q) + \delta v(0)$.

The legislative output described in Proposition 1 will serve as the benchmark against which we compare the legislative outcomes that arise when the legislature is free to choose its own procedures. Our goal is to answer the question: What is the effect of the endogenously chosen procedures on legislative output? The next section describes the bargaining process through which procedures are chosen in a majority rule legislature.

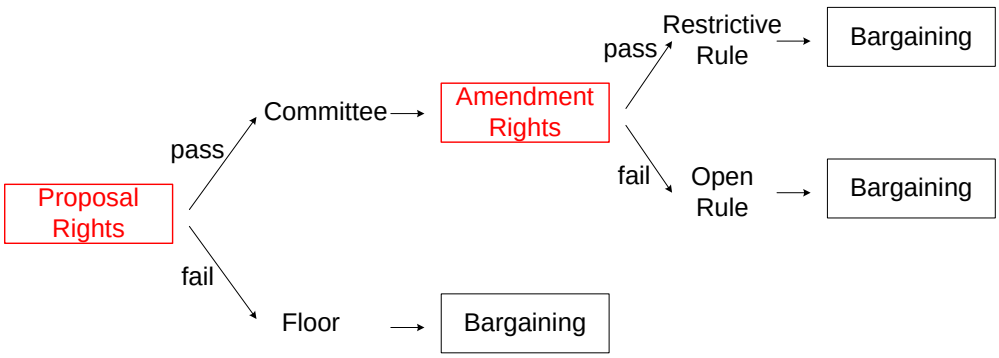

Figure 2: A Model of Endogenous Committees and Restrictive Rules.

3 Restrictions on Procedural Rights

There are two major types of procedural institutions that scholars of Congress associate with committee power: agenda power (either negative gatekeeping power or positive proposal/scheduling power) and closed rules. Committees tend to be especially powerful in the House, where the legislative process is more structured and legislative life busier, and less so in the Senate. According to the U.S. Constitution the House is a self-organizing body: all procedural institutions in the House, except the office of the Speaker, are proposed by members of the House and need to be approved by a majority. Moreover, these offices and rules can be altered at any time during a legislative term by any majority. Procedural rules must therefore, in effect, maintain the continuous support of a majority.

In this section we model the choice of procedures in a majority rule legislature. We assume that procedural choice takes place before each and every policy issue that is considered by the legislature.[7] This is important because it means that our procedural institutions do not originate in a previous session of the House or are imposed by a political party, or survive due to a norm of deference, or due to a previous committment of a majority. Our procedures need to have the endorsement of a majority of the membership of the legislature, with its *current* policy preferences. By construction, therefore, our committees and special rules are majoritarian. This is a setup where we can now pose the question: Can this procedural majoritarianism be compatible with committees that are non-median, with restrictions on amendment rights and, ultimately, with policy that deviates from the median?

The sequence of events is as follows (see Figure 2). A draw by nature determines the order of legislators' ideal points on the line. It also determines the status quo and the urgency of the issue

[7] In practice, most committees and subcommittees and their compositions and jurisdictions are very infrequently changed. The House sometimes does designate select or special committees that are created on an ad hoc basis to deal with specific issues. Amendment rules are different. They must accompany most measures reported from committee to the floor. The most well known are open and closed rules, but in between there is an entire spectrum of restrictive amendment rules that can govern the consideration of legislation on the floor.

(measured by the discount factor δ). Next, legislators bargain over the distribution of proposal power $\boldsymbol{\pi} = (\pi_l, \pi_m, \pi_r)$ under neutral procedures - equal proposal power, equal amendment power - since a self-organizing legislature starts institutions-free. The structure of the bargaining game is the one laid out in the previous section, with two differences: the discount factor is β' and the status quo is equal proposal power $\bar{\boldsymbol{\pi}} = (1/3, 1/3, 1/3)$. If bargaining stops before a decision is made (with probability $1 - \beta'$ after each round of bargaining), then policy making will take place under neutral procedures (the branch denoted Floor in the figure). If a new vector of proposal power is adopted (the branch denoted Committee) then the next step is bargaining over amendment rights $\boldsymbol{\alpha} = (\alpha_l, \alpha_m, \alpha_r)$. This subgame has the same structure as the one described in the previous section, with two exceptions: the discount factor is β'' and the status quo is equal amendment power $\bar{\boldsymbol{\alpha}} = (1/3, 1/3, 1/3)$. If bargaining stops before a decision is made (with probability $1 - \beta''$ after each round of bargaining), then policy making will take place under equal amendment rights. If a new vector of amendment power is adopted, then the next step is bargaining over policy under the adopted proposal and amendment rules (see previous section for the timing of this bargaining game).

4 Equilibrium Committees and Amendment Rules

We solve the game by backwards induction. There are three stages: proposal rights, amendment rights, and policy. We first solve the policymaking game, then the amendment rules game, and finally the proposal rules game. The last stage of the game is bargaining over policy.

We start by observing that due to the symmetry of the game there is only a limited number of committee types and rules types that can be sustained in equilibrium. In terms of commitees, because the median is pivotal, a non-median proposer of committee structure will trade off non-median proposal power with own proposal power. The committees that will be approved are therefore either left-median, median, or right-median. The same logic works for amendment powers. Let ϕ denote the non-median proposal probability in a non-median committee $\boldsymbol{\pi} = (\boldsymbol{\phi}, 1 - \phi, 0)$ or $(0, 1 - \phi, \boldsymbol{\phi})$. Let γ denote the the non-median amendment power in an amendment rule $\boldsymbol{\alpha} = (\gamma, 1 - \gamma, 0)$ or $(0, 1 - \gamma, \gamma)$. The solution of the game will thus be composed of the equilibrium values of three endogenous variables: $\boldsymbol{\phi}^*$,γ^*, and x^*.

The policy making game was solved in section two for fixed vectors of proposal and amendment rights. The solution was denoted $x^*(1 - \alpha_m, \delta, q)$.

4.1 Equilibrium Amendment Rights

The next stage to solve for is bargaining over amendment rights. At this stage the vector of proposal power $\boldsymbol{\pi}$ is given to the legislators, as it was set in the first stage. We are looking for a symmetric equilibrium of the form: left proposes a closed rule of the form $(\gamma, 1 - \gamma, 0)$ when the committee

is left-median and $(0,1,0)$ otherwise, the median proposes $(0,1,0)$; right proposes a closed rule $(0,1-\gamma,\gamma)$ when the committee is right-median and $(0,1,0)$ otherwise; the majority acceptance set is $\alpha_2 \geq 1-\gamma$. Thus the left attempts to pass a rule that protects the legislative product of the left-median commitee (therefore we call it closed rule), and counteracts a right-median commitee by giving all amendment power to the median.

Since the median is pivotal, we can solve for the equilibrium closed rule $\gamma^*(\beta'',\delta)$ by imposing the median's indifference condition: the expected payoff from accepting the limited amendment rules $(\gamma,1-\gamma,0)$ is at least as large as the expected payoff of an open rule (in case bargaining stops before a decision was made), and the expected payoff from waiting for another round of bargaining (in case there is still time for bargaining to go on). The expected payoffs take into account the fact that legislators can anticipate the equilibrium policy deviation that will occur in the next stage of the game $x^*(\gamma,\delta,q)$, based on the amendment rules γ to be chosen and the proposal powers approved in the previous stage. It is sufficient to check when the median wants to approve a closed rule $(\gamma,1-\gamma,0)$ for a non-median commitee $(\boldsymbol{\phi},1-\phi,0)$:

$$\begin{aligned}\phi v\left[x^*(\gamma,\delta,q)\right]+(1-\phi)\,v\left[0\right] \quad \geq \quad & \left(1-\beta''\right)\left(\phi v\left[x^*\left(\frac{2}{3},\delta,q\right)\right]+(1-\phi)\,v\left[0\right]\right)+ \\ & +\beta''\left(\frac{1}{3}\left\{\phi v\left[x^*(\gamma,\delta,q)\right]+(1-\phi)\,v\left[0\right]\right\}+\right. \\ & \left.+\frac{2}{3}\left\{\phi v\left[x^*(0,\delta,q)\right]+(1-\phi)\,v\left[0\right]\right\}\right)\end{aligned}$$

Substituting for equilibrium policy $x^*(\gamma,\delta,q)$ we get the closed-form expression for a non-median equilibrium amendment rule:

$$\gamma^*(\beta'',\delta)=\frac{\frac{2}{3}\left(1-\beta''\right)}{\left(1-\beta''\right)+\frac{2}{3}\beta''\left(1-\frac{2}{3}\delta\right)}. \tag{3}$$

Notice several features of this equilibrium. First, $0\leq\gamma^*(\beta'',\delta)\leq\frac{2}{3}$, the maximal value of the non-median equilibrium amendment rule is $\frac{2}{3}$, which means that the median either preserves its status quo (procedurally neutral) amendment power $1-\gamma=\frac{1}{3}$, or increases it. Effectively, a non-median proposer exploits the median's impatience to redistribute agenda power from the legislator from the other side to himself and the median. The median needs to be left with at least the same amendment power, and then given some more than under neutral procedures because, first, $\frac{1}{3}$ is the median's amendment power in the status quo, to which the median can always revert, and second, because the value of waiting is also at least as good, if not better, for the median than any non-median amendment rules. Second, the more restrictive the equilibrium amendment rule, the larger the deviations from the median. Third, since $x^*(\gamma,\delta,q)$ is increasing in γ, policy deviations are *reduced* by the equilibrium amendment rule relative to the benchmark of neutral procedures where $\gamma=\frac{2}{3}$.

Proposition 2 *Bargaining over amendment rules skews the distribution of amendment power in favor of the proposer and the median. A non-median proposes a* ***closed rule*** *to protect the legislative product of his committee, or proposes a* ***median amendment rule*** *that counteracts the proposal power of a commitee that is biased away from him.*

4.2 Equilibrium Proposal Rights

We close backwards induction by solving for the equilibrium proposal rights. As discussed previously a symmetric equilibrium has the following form: left proposes a left-median commitee $(\boldsymbol{\phi}, 1-\phi, 0)$; median proposes a median commitee $(0,1,0)$; right proposes a right-median commitee $(\boldsymbol{\phi}, 1-\phi, 0)$; and the majority acceptance set is $\pi_m \geq 1-\phi$. This equilibrium can therefore be succintly characterized by the endogenous parameter $\boldsymbol{\phi}$ that measures the strength of the non-median bias of a non-median commitee. When will the legislature approve a non-median commitee?

As before, since the median is pivotal, we need to ask what commitee bias $\boldsymbol{\phi}$ will make the median just indifferent between a non-median commitee and waiting for another round of bargaining. There is an upside and a downside of waiting. On the upside, the median will have a $\frac{1}{3}$ chance of proposing a median commitee, which will pass. On the downside, procedural bargaining might have to stop, and the policy issue will have to be considered under neutral procedures. And under neutral procedures, based on section two, we know there is potential for policy deviations.

When the median is making this calculation, it already has expectations about the equilibrium consequences of a given distribution of proposal power. In other words, the median takes into account that there are incentives in the future to adopt restrictive amendment rules, some of which neutralize a non-median commitee. Also that policy outcomes aredetermined by $x^*(\gamma, \delta, q)$ The median's approval constraint can be written as:

$$\begin{aligned} & \frac{1}{3}\left(\phi v\left[x^*\left(\gamma^*, \delta, q\right)\right] + (1-\phi)\, v\left[0\right]\right) + \frac{2}{3}\left(\phi v\left[x^*\left(0, \delta, q\right)\right] + (1-\phi)\, v\left[0\right]\right) \\ \geq\ & \left(1-\beta'\right)\left(\frac{2}{3} v\left[x^*\left(\frac{2}{3}, \delta, q\right)\right] + \frac{1}{3} v\left[0\right]\right) + \\ & +\beta'\left(\frac{2}{3}\left\{\frac{1}{3}\left(\phi v\left[x^*\left(\gamma^*, \delta, q\right)\right] + (1-\phi)\, v\left[0\right]\right) + \frac{2}{3}\left(\phi v\left[x^*\left(0, \delta, q\right)\right] + (1-\phi)\, v\left[0\right]\right)\right\} + \frac{1}{3} v\left[0\right]\right) \end{aligned} \tag{4}$$

Substituting for equilibrium policy $x^*(\gamma, \delta, q)$ from (2) and equilibrium amendment rule from (3) we get the closed-form expression for a non-median equilibrium amendment rule:

$$\begin{aligned}\phi^*(\beta', \beta'', \delta) &= \frac{1-\beta'}{\left(1-\frac{2}{3}\beta'\right)\left(1-\frac{2}{3}\delta\right)\left[1+\frac{1}{2(1-\delta\gamma^*)}\right]} \\ &= \frac{\left(1-\beta'\right)\left(1-\frac{\beta''}{3}\right)}{\frac{1}{2}\left(1-\frac{2}{3}\beta'\right)\left(1-\beta''\right)+\left(1+\frac{\beta''}{3}\right)\left(1-\frac{2}{3}\delta\right)}. \end{aligned} \tag{5}$$

Notice several features of this equilibrium. First, $0 \leq \phi^*(\beta', \beta'', \delta) \leq \frac{2}{3}$. This means that the median cannot be deprived of agenda power altogether, it at the least keeps its status quo (procedurally neutral) proposal power. This is intuitively clear. The median's fallback position is always to go back to neutral procedures. Second, from the first line of the above equation, notice that when there is an expectation that future amendment rights are going to be more restrictive the median is less willing to give up proposal power today, $\phi^*(\beta', \beta'', \delta)$ is lower. Third, the pattern of restrictions on proposals is the following: committees can be either left-median, median, or right-median, but can never include both the left and the right.

Proposition 3 *Bargaining over proposal rights skews the distribution of proposal power in favor of the proposer and the median. Both a* ***median commitee*** *and an* ***unbalanced committee*** *can be approved in equilibrium.*

The important consequence of this result is that procedural majoritarianism can produce non-median committees, and therefore is consistent with policy deviations from the median. We explore the full implications of this feature of the model in the last section.

4.3 Comparative Statics: The Effect of Bargaining Frictions on Equilibrium Procedures

To better understand how the equilibrium works, we can look at how its features change when the exogenous factors in the model vary. First, we fix the parameters of the policy game (δ, q), and we look at the effect of frictions in procedural bargaining on the structure of procedural institutions. Second, we look at the effect of δ on equilibrium procedural institutions.

The balance of power in bargaining over procedures is affected by the discount factors β' and β''. If a policy issue is politically sensitive, inaction on considering that issue can be costly to the incumbent legislators. Thus we can think of issues that are urgent as those that have small β' and β''. Clearly, a more urgent issue will allow a non-median proposer to extract more concessions from the median.

The discount factor δ can be interpreted as a measure of the importance of a policy issue. If the issue is important, legislators will have a low opportunity cost from spending most of their time

bargaining on this issue. There are two effects at work. A direct effect of policy importance is that, all else equal, policy deviation is smaller (see Proposition 1). This increases the median's utility, although it does so less than proportionally, due to the concavity of the utility function. Therefore, the median becomes more compromising on unbalanced procedures.

Proposition 4 *When committees are approved, they are more unbalanced when policy issues are more urgent (β' small) and more important (δ large). Amendment rules are more restrictive when policy issues are more urgent (β'' small) and more important (δ large).*

Finally, note how when β' and β'' indicate high urgency, non-median proposal and amendment power ϕ^* and γ^* converge to $\frac{2}{3}$, leaving the median at its status quo procedural powers. Also, when β' and β'' indicate low urgency, ϕ^* and γ^* converge to 0, and so policy converges to the median, despite the potential for policy deviation if the issue is not of top importance.

5 Legislative Output under Equilibrium Procedures

What is the effect of procedural institutions on legislative output? We are going to assess this effect from three points of view. One is the mean of policy deviations from the median, the other is the variance of policy deviations and the third is the size of policy deviations.

Proposition 5 *(i) Equilibrium committees and rules do not induce systematic bias in policy outcomes.*

(ii) Restrictions on proposal rights reduce the variance of legislative output. Restrictions on amendment rights reduce the variation in legislative output.

The policy outcomes under neutral procedures are distributed symmetric and uniform:

$$X^*(\boldsymbol{\pi}, \boldsymbol{\alpha}, \delta, q) = \begin{cases} -x^*\left(\frac{2}{3}, \delta, q\right), & \text{with probability } \frac{1}{3} \\ 0, & \text{with probability } \frac{1}{3} \\ +x^*\left(\frac{2}{3}, \delta, q\right), & \text{with probability } \frac{1}{3} \end{cases}$$

Consider the effect of restrictions on proposal rights first. To assess this separately from the effect of amendment rules, we keep amendment rights equal. The distribution of legislative outcomes under equilibrium committees is then:

$$X^*(\boldsymbol{\pi}, \boldsymbol{\alpha}, \delta, q) = \begin{cases} -x^*\left(\frac{2}{3}, \delta, q\right), & \text{with probability } \frac{1}{3}\phi^*(\beta', \beta'', \delta) \\ 0, & \text{with probability } 1 - \frac{2}{3}\phi^*(\beta', \beta'', \delta) \\ +x^*\left(\frac{2}{3}, \delta, q\right), & \text{with probability } \frac{1}{3}\phi^*(\beta', \beta'', \delta) \end{cases}$$

Equilibrium proposal rights do not affect the size of policy deviations. They only affect the probability distribution of policy deviations, which becomes more concentrated around the mean, thus

reducing the variance of legislative output. More balanced committees reduce the variance more, and thus in a sense become more majoritarian.

Equilibrium amendment rights affect both the size and the distribution of policy deviations. To assess this separately from the effect of proposal rules, we keep proposal rights equal. The distribution of legislative outcomes under equilibrium amandment rules is then:

$$X^*(\boldsymbol{\pi}, \boldsymbol{\alpha}, \delta, q) = \begin{cases} -x^*(\gamma^*, \delta, q), & \text{with probability } \frac{1}{9} \\ -x^*(0, \delta, q), & \text{with probability } \frac{2}{9} \\ 0, & \text{with probability } \frac{1}{3} \\ +x^*(0, \delta, q), & \text{with probability } \frac{2}{9} \\ +x^*(\gamma^*, \delta, q), & \text{with probability } \frac{1}{9} \end{cases}$$

where by Proposition 1 and the results in section three, $\gamma^* \leq \frac{2}{3}$ and therefore $x^*(\gamma^*, \delta, q) < x^*\left(\frac{2}{3}, \delta, q\right)$. By contrast to proposal rights, amendment rules cannot acheve full convergence to the median even if opportunity costs in procedural bargaining are zero. This is because proposal rights are still held widely and there is then positive potential for policy deviation.

Finally we can look at the joint effect of committees and restrictive amendment rules:

$$X^*(\boldsymbol{\pi}, \boldsymbol{\alpha}, \delta, q) = \begin{cases} -x^*(\gamma^*, \delta, q), & \text{with probability } \frac{1}{9}\phi^*(\beta', \beta'', \delta) \\ -x^*(0, \delta, q), & \text{with probability } \frac{2}{9}\phi^*(\beta', \beta'', \delta) \\ 0, & \text{with probability } 1 - \frac{2}{3}\phi^*(\beta', \beta'', \delta). \\ +x^*(0, \delta, q), & \text{with probability } \frac{2}{9}\phi^*(\beta', \beta'', \delta) \\ +x^*(\gamma^*, \delta, q), & \text{with probability } \frac{1}{9}\phi^*(\beta', \beta'', \delta) \end{cases}$$

which shows how proposal and amendment power are redistributed to the median in order to reduce policy uncertainty.

6 Conclusion

Legislatures are busy organizations where deliberation in the plenary has non-negligible opportunity costs. This paper proposes a model of endogenous choice of procedures in a majority rule legislature. The model provides a new way of thinking about the role of legislative procedures as it sheds light on the incentives to set up committees and restrictive amendment rules, some of the most evident features of modern legislative organization. We have argued that legislators who are risk averse have an incentive to organize the legislative process with the goal of reducing the variance of policy outcomes. Restrictive procedures thus play an efficiency role: they reduce the policy costs of considering legislation. Unlike in the informational approach to committee power in our theory restrictive procedural rights do not bias the legislature's output. From this point of view, then,

non-median committees and closed rules can be interpreted as majoritarian institutions.

[to be completed]

Appendix

Proof of Proposition 1 We derive the comparative statics of the deviation function $x^*(1-\alpha_m, \delta, q)$ with respect to risk aversion, non-median amendment power, the discount factor and the status quo. The following equation implicitly defines the equilibrium deviation - see equation (2) in section two:

$$v\left[x^*(1-\alpha_m, \delta, q)\right] = \frac{1-\delta}{1-\delta(1-\alpha_m)}v(q) + \frac{\delta\alpha_2}{1-\delta(1-\alpha_m)}v(0)$$

First note that x^* is the certainty equivalent of the lottery:

$$x = \begin{cases} 0, & \text{with probability } \frac{\delta\alpha_2}{1-\delta(1-\alpha_m)} \\ q, & \text{with probability } \frac{1-\delta}{1-\delta(1-\alpha_m)} \end{cases}$$

and so the more risk averse the median legislator, the higher the certainty equivalent he requires to approve a non-median policy.

Using the implicit function theorem we can also derive the effects of $1-\alpha_m, \delta, q$ on x^* :

$$\frac{\partial}{\partial(1-\alpha_m)}x^*(1-\alpha_m, \delta, q) = -\frac{\delta(1-\delta)\left[v(0)-v(q)\right]}{\left[1-(1-\alpha_m)\delta\right]^2 \frac{d}{dx}v\left(x^*\right)} > 0$$

$$\frac{\partial}{\partial\delta}x^*(1-\alpha_m, \delta, q) = \frac{\alpha_m\left[v(0)-v(q)\right]}{\left[1-(1-\alpha_m)\delta\right]^2 \frac{d}{dx}v\left(x^*\right)} < 0$$

$$\frac{\partial}{\partial q}x^*(1-\alpha_m, \delta, q) = \frac{\alpha_m}{1-(1-\alpha_m)\delta}\frac{\frac{d}{dx}v\left(q\right)}{\frac{d}{dx}v\left(x^*\right)} > 0.$$

Proof of Proposition 4 We study the partial slope of $\phi^*(\beta', \beta'', \delta)$ with respect to β' and δ :

$$\frac{\partial}{\partial\beta'}\phi^*(\beta', \beta'', \delta) = -\frac{\left(1-\frac{\beta''}{3}\right)\left[-\frac{1}{6}\left(1-\beta''\right)-\left(1+\frac{1}{3}\beta''\right)\left(1-\frac{2}{3}\delta\right)\right]}{\left[\frac{1}{2}\left(1-\frac{2}{3}\beta'\right)\left(1-\beta''\right)+\left(1+\frac{\beta''}{3}\right)\left(1-\frac{2}{3}\delta\right)\right]^2} < 0$$

The effect of δ can be seen by directly inspecting equation (5).

We study the partial slope of $\gamma^*(\beta'', \delta)$ with respect to β'' and δ :

$$\frac{\partial}{\partial\beta''}\gamma^*(\beta'', \delta) = -\frac{\left(\frac{2}{3}\right)^2\left(1-\frac{2}{3}\delta\right)}{\left[\left(1-\beta''\right)+\frac{2}{3}\beta''\left(1-\frac{2}{3}\delta\right)\right]^2} < 0$$

The effect of δ can be seen by directly inspecting equation (3).

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